



Ties That Bind

2014 Edition

The San Francisco Bay Area's
Economic Links to Greater China

A Bay Area Council
Economic Institute Report



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Ties That Bind

2014 Edition

The San Francisco Bay Area's Economic Links to Greater China

**A Bay Area Council
Economic Institute Report**

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PREFACE

Assessing China and the Bay Area

In November 2006, the Bay Area Council Economic Institute (then the Bay Area Economic Forum) released *Ties that Bind*, a report that examined the longstanding commercial and cultural ties between the San Francisco Bay Area and greater China.

The report was a first-of-its-kind effort to document a unique economic relationship that began with the arrival of the first Chinese immigrants at San Francisco's docks in 1849. These new arrivals sought—and found—both an escape from overpopulation and famine after the Taiping Rebellion, and an often difficult fresh start as miners and prospectors in the Gold Rush, as contract labor for railroads and canneries, as fishermen, or as workers in—and owners of—small businesses.

We began with this history, discussing successive waves of Chinese immigrants to the Bay Area; the formation of Chinatowns with clusters of Chinese-owned businesses; the rise of family benevolent associations and later, a dramatic expansion of business and home ownership.

The central focus of *Ties that Bind*, however, was on a converging set of trends in the 1980s and 1990s, and how they were reflected in the economy:

- an influx of science and engineering graduates from elite universities in Taiwan, Hong Kong and mainland China, often government-supported, who were drawn by world-class universities and by opportunities in Silicon Valley;
- a recognition by governments, state-owned enterprises and family-owned industrial conglomerates throughout greater China that emerging information technologies were the key to moving their industries up the value chain;
- a strategy among wealthy Chinese families to invest in educating the next generation, exposing them to a wider world and new ideas, but also establishing an overseas foothold amid political uncertainty;

- a nexus of cross-border Chinese professional networks and access to venture capital, which combined to produce new technology start-ups and cross-border innovation.

Ties that Bind studied the infrastructure that developed around and behind this cross-border collaboration—student trends; alumni connections; professional associations and the linkages among their members, sponsors, investors and foreign government sponsors; cross-border collaboration between research clusters; and the evolution of this ecosystem through redeployed capital, university endowments and business mentorship.

We went on to study two-way flows of trade and investment, and focused on opportunities and obstacles for companies active in China in key industry sectors: finance, law, the Internet, information technology and computing, architecture and urban planning, advertising, energy, environmental protection and life sciences. In each case, we tried to present a balanced picture of market and regulatory conditions in China for the sector in question, accompanied by interviews and case studies highlighting firms' experiences on the ground.

We considered venture, private equity and portfolio investment trends, examined high-profile cases of direct investment by Bay Area firms in China, and discussed early examples of Chinese firms attempting to establish footholds in the U.S. market, achieve global scale and take advantage of synergies by merging with, acquiring or buying stakes in Bay Area firms.

Finally, the report laid out a set of guiding principles, strategies and recommendations for policymakers at all levels of government to consider, in order to grow and deepen the Bay Area-China economic relationship. These involved education and workforce training, funding of basic research, visa policy, trade, tourism and investment promotion, and freight infrastructure improvements.

Tracking an Evolving Relationship

Much has happened since late 2006. The global economic downturn has slowed demand for China's exports and accelerated an internal shift toward indigenous innovation and increased domestic consumption. A new Five-Year Plan through 2015 emphasizes continued urbanization; cleaner energy, air and water; and a more robust healthcare and pension safety net. And China is increasingly venturing out into the world—encouraging even state-owned firms to raise private capital and invest overseas and enter new markets.

California, for its part, has demonstrated its capacity to innovate—in biofuels and energy conservation, cloud computing and big data, biomedicine and genomics, nanomaterials and mobile communications.

These trends suggest both a converging set of interests and new opportunities as the Bay Area and China build on their close 160-year relationship.

In this 2014 update of *Ties That Bind*, we revisit earlier educational and institutional relationships, professional networks, trade and investment flows, and business connections by sector, to understand what has changed in the past eight years. In doing so, we also consider

new sectors that have developed significant connections with China, including clean energy technology, digital media and cloud computing.

We examine new initiatives—some of them having grown out of the original *Ties That Bind* report—that have capitalized on synergies among cities, institutes, universities and companies in the Bay Area and greater China.

We assess the new opportunities presented by the rising tide of outbound Chinese investment.

Finally, we re-examine earlier policy issues and recommendations and report changing conditions, progress made, and new concerns to monitor or address.

The first edition of *Ties That Bind* found a level of connection between the Bay Area and China that is unique in its depth and breadth. Our conclusion was that this relationship—historical, cultural and economic—represents a major opportunity for the region. While no report can fully capture such a deep and complex relationship, in this new edition the Institute once again highlights for businesses and policymakers the key market dynamics, deals, firms and innovators that form the close and lasting economic bond between the San Francisco Bay Area and China.

Executive Summary

China and the San Francisco Bay region enjoy a 160-year relationship dating back to the first arrival of immigrants during the Gold Rush. New arrivals came in the tens of thousands, built railroads, panned for gold, fished the Bay, worked as servants, started businesses and built thriving communities in San Francisco, Oakland, San Jose, Sacramento and the Delta.

Since then, successive waves of immigrants from Hong Kong, Taiwan and mainland China have made important contributions to the regional economy—as business owners, and most recently as entrepreneurs with advanced degrees in science, technology, engineering and mathematics.

The Bay Area has also contributed to China's development as a global economy. The region's universities, research laboratories and companies have played a role in building China's Internet; reforming its legal and judicial systems; planning new, sustainable buildings and communities; and supporting entrepreneurial growth.

China's admission into the World Trade Organization (WTO) in 2001 marked the beginning of an explosion in investment and trade that changed the global landscape, stimulating massive investment in China—primarily in manufacturing—and generating large Chinese trade surpluses that have produced more than \$3 trillion in foreign exchange reserves. The 2008–09 recession marked a change, however. Nearly two decades of double-digit GDP growth ended, and with it the dramatic expansion in U.S.-China trade. Trade growth has resumed but is slower; the assumption of a continuous and steep upward economic trajectory has given way to new pragmatism.

Within China, the largest mass rural migration to cities in world history is continuing. Rising wage and land costs are pushing new industrial development away from highly developed cities such as Beijing and Shanghai, to Tier 2, Tier 3 and interior cities. And a growing and sometimes restive middle class is pressing the government for improved working conditions, a cleaner environment, a stronger social safety net and continued upward mobility.

These trends point to important synergies, as the San Francisco Bay Area is a global center for much of the talent, innovation and technology crucial to China's continued economic transformation.

Economy

China's economy is slowing and becoming more diversified.

- Urbanization is driving growth, which is moving inland. This massive shift will continue, with another 200 million Chinese moving to urban centers in coming decades.
- China's labor force has shifted from agriculture to manufacturing and services, serving both export markets and a rapidly emerging middle class.
- The economic, social and environmental implications of these shifts will be profound—with growth in incomes and markets, but also environmental challenges.

Students

Chinese students have made an important contribution to the region's economy. Many have chosen to remain in the area after graduation, supporting technology innovation, launching start-ups, and becoming angel and venture investors.

- China contends with India as the top source of students from overseas.
- The number of students in the Bay Area from greater China—the People's Republic of China (PRC), Taiwan and Hong Kong—has grown from approximately 5,500 in 2004–05 to an estimated 7,000 in 2011–12.
- Tuition, living expenses and other spending in 2011–12 by Chinese students enrolled in Bay Area colleges and universities contributed nearly \$219 million to the state and regional economies.
- The Bay Area's elite universities continue to attract top talent, primarily at the graduate level where students concentrate in science and technology.

- Stanford has opened a facility in Beijing, and Berkeley has a research presence in Shanghai.
- Undergraduate enrollment at Bay Area universities by Chinese students is up dramatically, helping budget-strapped schools.
- This has raised new issues, however, as many undergraduates show up unprepared, schoolastically and in English language proficiency.
- Reported endowments from Chinese donors to Berkeley and Stanford in the past two decades total more than \$150 million.

Professional Networks

Professional associations provide robust entrepreneurial and business networks, offering information, mentorship and access to business opportunities.

- Associations such as the Asia America MultiTechnology Association (AAMA), the Hong Kong Association of Northern California, the Monte Jade Science and Technology Association, the Hua Yuan Science and Technology Association (HYSTA), and the Chinese American Semiconductor Professional Association (CASPA) continue to thrive and have evolved their offerings as member interests and the channels for access to China have grown.
- New associations have been added to the region's already rich landscape of China-related organizations. The Chinese Enterprise Association, for example, helps more than 80 large mainland firms with a Bay Area presence stay current on technology advances and connect with business and government leaders. The Taiwanese American Industrial Technology Association (TAITA) promotes Taiwan-Silicon Valley exchanges.

Trade and Tourism

Trade with China is growing, but more slowly than in recent years.

- Between 2006 and 2012, U.S. exports to China doubled to \$110.5 billion; imports from China increased by nearly 48 percent, to \$425.6 billion.
- Nearly \$18 billion in imports from China and \$6.4 billion in exports to China passed through

Bay Area ports and airports in 2012. About \$4 billion of that \$6.4 billion originated in the region (the balance being goods in transit.)

- While Bay Area trade with the PRC and Taiwan has recovered to 2008 levels, imports from Hong Kong have declined by half, as more cargo moves directly to and from mainland ports.

As China's middle class broadens its horizons, the number of Chinese travelers to the U.S. is growing. The Bay Area is a prime destination.

- From 2008 to 2012 the number of Chinese tourists visiting the U.S. grew from 275,000 to nearly 1.5 million, enabled by the Chinese government's granting of "approved destination status" for the U.S. and the U.S. government's streamlining of visa processing in China.
- SF Travel estimates that the city hosted 198,000 visitors from mainland China in 2011, 60,000 from Taiwan and 50,000 from Hong Kong. The association has offices in Shanghai and Beijing.
- The profile of Chinese tourism is shifting from lower-end packaged tours to more and wealthier Chinese traveling as individuals.
- Hotel chains such as Hilton, Starwood and Marriott have introduced Chinese-friendly services at locations popular with Chinese tourists, including the Bay Area.
- Four airlines—United, Cathay Pacific, Singapore and Air China—offer a combined 49 non-stop weekly flights to Hong Kong, Beijing and Shanghai through SFO, with a capacity of more than 16,000 passengers. In 2013 China Eastern Airlines began daily non-stop flights to Shanghai, with continuing same-plane service to Wuhan and Qingdao, adding over 1,600 seats per week. In 2014, United Airlines will launch same-aircraft service to Chengdu, via Shanghai, and will reinstate non-stop service to Taipei.

Affiliates and Invention

Cross-border investment and collaborative innovation are growing. The presence of Chinese companies in the Bay Area is increasing, as is the presence of Bay Area businesses in China.

- The Bay Area is home to 96 affiliates of companies from Taiwan, 51 from China, and 38 from Hong Kong.

- The PRC ranks second among the top sites for Bay Area businesses abroad. Currently there are 795 Bay Area affiliates located in the PRC, plus 303 in Taiwan and 216 in Hong Kong.
- Collaborative patenting activity with China-based inventors represents a growing percentage of total foreign co-patenting in the region, expanding from less than 1 percent in 2002 to 9.9 percent in 2012.
- Investment from the Bay Area to China reached \$2.7 billion in 2011, representing 38 percent of all Bay Area investment abroad in that year.
- China is also a growing investor in the Bay Area, with \$495 million invested in 2011, or 7 percent of all foreign private equity and venture capital flowing to the region.

Key Sectors

While China remains an important manufacturing base and markets continue to grow, Chinese objectives have broadened to include indigenous innovation and the creation of globally competitive Chinese brands. As a result, today's business environment is increasingly complex.

Architecture and Urban Planning

Bay Area architecture and planning firms have brought cutting-edge design and sustainability principles to Chinese cities, as China has embraced daring forms and sustainable design, with planning and construction taking place on an extraordinarily scale. In the last decade, Chinese demand has helped keep a number of Bay Area firms afloat, particularly as new construction in California and the Bay Area contracted, and as China's stimulus spending ramped up. A revival of construction in California and the Bay Area now offers increased opportunity at home, but Bay Area architecture and planning firms remain in demand due to their prestige and reputation for leadership in sustainable design.

Key projects include Gensler's Shanghai Tower, China's tallest, and the China headquarters of Internet portal Tencent; Skidmore Owings and Merrill's Huawei Technologies Corporate Campus and the Knowledge and Innovation Community technology park in Shanghai; Heller Manus' China Automotive Technology & Research Center in

Tianjin and its sustainable plan for Guangzhou's city center; and Woods Bagot's 78-story CBD Tower Z11 in Beijing.

Energy/Environment

China's rapid growth has translated into rising energy demand and massive environmental costs, with the government under intense pressure to address growing health problems induced by poor air quality. The 12th Five-Year Plan aims to cap coal consumption, promote clean coal and renewable energy technology, strengthen energy conservation and building efficiency standards, and create pilot carbon trading programs. These measures spell opportunity for Bay Area firms.

Conservation-related exchanges mainly involve government bodies, research institutions and non-governmental organizations. The China Energy Group at Lawrence Berkeley National Laboratory manages extensive joint energy efficiency research and technical support projects with Chinese counterparts and has helped Chinese steel, cement, refining and textile firms develop cost-effective operating efficiency standards and best practices. Energy Foundation China supports LBNL's China Energy Group and has more than 100 partner institutions in China. It has also advised China's State Council in drafting particulate matter emissions standards and supports sustainable urban design projects in six cities; the furthest along is in Kunming, where Berkeley-based Calthorpe Associates is developing the master plan.

Cleantech

China's pressing need for renewable energy and environmental solutions and California's expertise in both cleantech and environmental management (primarily concentrated in the Bay Area) point to further synergies. Cleantech markets in both the Bay Area and China are growing, but that has also brought political complexity.

Major Chinese solar panel makers and systems providers Trina Solar, Suntech Power and Yingli Green Energy have established North American headquarters in the Bay Area. A glut of subsidized solar panels from China in 2009–10 squeezed U.S., Chinese and other manufacturers but benefited system installers. In 2013, the U.S. government

imposed significant antidumping duties and countervailing duties on Chinese solar imports.

China has also made significant investments in Bay Area cleantech firms, including Kaistar Lighting's \$25 million investment in Livermore LED lighting technology firm Bridgelux, and Hanergy Holding Group's \$120 million acquisition of Mi-Sole, a Santa Clara maker of thin-film solar cells.

Banking/Finance

Foreign-owned banks in China continue to face headwinds. The most sophisticated global banks make money but have small shares of an already thin slice of an otherwise huge market. Wells Fargo Bank has two branches, in Shanghai and Beijing. Bank of America's Asia-Pacific operations activities, with 27,000 employees, are headquartered in Hong Kong, with client-serving offices in Beijing, Guangzhou and Shanghai. Opportunities are growing to serve mid-market U.S. companies with operations in China, and Chinese companies that are expanding internationally. Bank of Tokyo-Mitsubishi UFJ has been active in China since 1980; its U.S. subsidiary Union Bank leverages this China presence through its Global Business Coordination Unit in San Francisco. Silicon Valley Bank has a strong focus on tech and innovation-centered companies and has subsidiary offices in Shanghai and Beijing and a banking license to handle onshore dollar-based transactions.

Hong Kong and Taiwan banks have a long history in the Bay Area, and now PRC banks are making an initial approach. Industrial and Commercial Bank of China (ICBC) has five Bay Area retail branches—in San Francisco, Oakland and South San Francisco—through its 80 percent interest in Bank of East Asia, a Hong Kong-owned bank chartered in the U.S. The Bank of Communications has been approved to open in downtown San Francisco its second wholesale branch outside New York.

Mobile/Internet

As the Internet matures, it has become the nexus where computing and communications intersect, for consumers and increasingly for enterprises. China has been quick to embrace this change, and the Internet in China begins

with the smartphone. In 2013, one in three smartphones sold in the world were sold in China.

Oracle serves its top 500 enterprise accounts in China—mainly large institutions, government agencies and state-owned enterprises, such as China Mobile, China Telecom and China Unicom—through a dedicated sales force and has an R&D center in Shanghai. Cisco was instrumental in developing China's Internet infrastructure and works with universities and provincial governments to expand delivery of public services. Intel has production facilities in Shanghai, Chengdu and Dalian.

Tech companies active in China since the 1980s face challenges from both technological change and from Chinese competitors. Global web portal Yahoo! and search firm Google once enjoyed lead positions in China but were caught between government surveillance, censorship policies and competition from indigenous portals. Yahoo eventually traded its China operations and \$1 billion to Alibaba.com for a 40 percent stake. Google took down its China site and moved its servers to Hong Kong in 2010 to offer unfiltered search via Google.hk. Its Android operating system, however, is found on most Chinese-made handsets and enjoys a 90 percent share of the China mobile phone market.

iPhones are considered a luxury in China and sell mainly to high-end customers in major cities. As a result, Apple (served by China Unicom) has only a 4.2 percent share of China's mobile phone market. The September 2013 launch of its less expensive iPhone5c in partnership with China Mobile, however, is expected to increase its market share.

Chinese IT companies are also expanding their Bay Area footprint in R&D and as service providers. China's leading Internet search engine, Baidu, plans to open the Institute of Deep Learning (IDL)—its first wholly-owned research center—in Cupertino. China Mobile and Huawei both have R&D centers.

Law

China's admission to the WTO created a market for investment-related legal services: cross-border regulatory and tax compliance; the formation of wholly foreign-owned enterprises (WFOEs);

technology licensing; and cross-border M&A and public listings. M&A and IPO business stalled during the global downturn. Business is returning now, but often in different areas: Chinese bank and SOE (state-owned enterprise) offshore financing and investments; structuring of overseas renminbi funds; and cross-border real estate transactions in both directions. Advisory work on inbound Chinese investment across a range of sectors is growing. As case law develops, intellectual property disputes are fewer but remain common.

Life Sciences/Health Care

China represents a \$300 billion-plus life sciences market that is growing 15–20 percent annually, amid challenges of aging, chronic diseases, environmental illnesses and pandemics. The 12th Five-Year Plan aims to ensure comprehensive insurance coverage for over 90 percent of the population; upgrade the pharmaceutical supply chain; expand drug coverage, and modernize and expand public health infrastructure. The Plan also seeks to reduce reliance on foreign vendors and suppliers.

Bay Area firms are taking advantage of China's growing pre-clinical and clinical trial research capacity, conducting trials at lower cost and in shorter time frames than in the United States. Chinese pharmaceutical, biotech and medical device firms are also looking to the U.S. for partnerships and M&A that combine cutting-edge U.S. science with low-cost production to more deeply penetrate Chinese and global markets. They are also investing in the Bay Area.

Investment

The environment for foreign direct investment (FDI) between the U.S. and China is changing at both ends. Some U.S. investors in China have taken a defensive posture, favoring greater China plays—financial services in Hong Kong, and tech manufacturing in Taiwan—that leverage the mainland market. Venture and private equity groups are favoring later stage investments in companies with proven management and business models. Fund managers are using the Five-Year Plan as a roadmap to invest in sectors that address identified national priorities and enjoy government support.

The biggest news, however, is the dramatic growth in outbound investment from China to the U.S. and other countries. Chinese FDI in the U.S. has been rising strongly, setting new records every year since 2009. Some proposed Chinese investments have failed, primarily due to strategic or security concerns. In response, a new strategy may be emerging in favor of deals under \$500 million; joint ventures, partnerships and equity stakes rather than outright acquisitions; a focus on privately held versus publicly traded firms; and avoidance of companies that are likely to raise strategic or security concerns.

Property development in particular is attracting investment from China. Chinese developer Zarsion, a private company, has committed \$1.5 billion to a partnership with Signature Development Group to develop the Brooklyn Basin project on Oakland's waterfront. Vanke, China's largest residential developer, is partnering with U.S. firm Tishman Speyer to build two high-rise residential towers in San Francisco's South of Market district.

Connectors

New organizations have joined the already-rich landscape of institutional connectors between Bay Area and China business.

- The Bay Area Council has opened offices in Shanghai and Hangzhou and will open a third in Nanjing.
- The Governor's Office of Business and Economic Development (GoBiz) has opened a California Office of Trade and Investment in Shanghai, in partnership with the Bay Area Council.
- China SF and China Silicon Valley are working to bring Chinese investment to San Francisco and San Jose.
- Regional centers are leveraging the federal EB-5 program to bring investment to projects such as Hunters Point in San Francisco and call centers, logistics facilities and nursing homes in Oakland.
- Chinese entrepreneurs and developers have launched technology and life sciences incubators to connect start-ups, established companies and investors for cross-border collaboration with Chinese counterparts. Early entrants include InnoSpring, Hanhai Z-Park and Hanhai-Zibo Life Science Park.

Paths Forward

Several specific areas of opportunities emerge from this analysis.

- *Education:* The Bay Area is a major destination for students from China, who bring tangible benefits to the region and its economy. To stay competitive, and support California students, continued investment in public higher education in California is essential. While Bay Area universities have opened teaching and research facilities in China, there is also a significant opportunity for Chinese universities to establish facilities in the Bay Area.
- *Tourism* will continue to grow as an area of opportunity.
- *Immigration:* Current policy makes it unnecessarily difficult for many graduates from China and other countries to stay and contribute to the economy. Immigration reform is needed that removes country quotas for green cards (which are quickly exhausted for high-volume countries such as China), makes it easier for entrepreneurs from China and other countries to stay in the U.S. to found companies, and enables foreign graduates of U.S. universities with advanced degrees in STEM fields to secure green cards.
- *Energy and Climate:* California and China share an interest in reducing the consumption of fossil fuels, increasing the production of renewable energy, improving energy efficiency, and mitigating climate change. This presents an opportunity for the Bay Area, where the state's cleantech industry is concentrated and where government, university and private initiatives offer a rich basis for dialogue and cooperation.
- *Investment:* As China sends ever-larger volumes of investment capital abroad, California and the Bay Area are positioned to capture an outsized share. Evidence to date suggests that Chinese investment is bringing positive benefits through infusions of capital, job creation and, in some cases by improving access to Chinese markets.
- *The EB-5 program* is a promising vehicle to expand Chinese and other foreign investment and can play an important role in financing infrastructure, housing and new businesses.

Overseas investors, however, need more security and transparency. The EB-5 program (which is currently only a pilot and subject to extensions) should be made permanent. U.S. Citizenship and Immigration Services should also be given the resources it needs to expedite applications processing (which can take as long as 18 months), advance priority projects, and exercise better oversight of regional centers.

Conclusion

The Bay Area is in a strong position to interpret China to the U.S., and the U.S. to China, as it continues to build a positive, multifaceted relationship.

While China will remain a sometimes controversial topic in Washington, states, regions and private companies tend to see China more pragmatically. The Bay Area has shown a particular affinity and openness to China, and ever since the historic creation of the Shanghai-San Francisco Sister City Committee, has reached out to develop new relationships and channels. New intermediary entities such as ChinaSF and the Bay Area Council's Shanghai and Hangzhou offices exemplify this trend and provide platforms for continued business growth.

The wealth of opportunities outlined in this report does not suggest that China will be an easy place to do business or that significant barriers don't exist. China's economy is slowing, labor costs are rising, and competition from Chinese firms is increasing both in China and overseas. Cyber security, intellectual property protection, transparency, and government policies that require technology transfer or favor national companies will remain significant issues for both businesses and policy makers.

Bay Area companies, however, have demonstrated their capacity to succeed in China's often challenging environment, and local government has chosen to lead as well. As the Economic Institute found in its 2006 report, as China grows as a major force in the world economy, the San Francisco Bay Area continues to occupy the pole position among its potential U.S. partners. Because of the scale of this opportunity, the relationship merits continued investment at both the public and private sector levels.

1. CHINA'S ECONOMY

Slower, but More Diversified

In any discussion of the Bay Area's economic ties with China, it is important to first understand the macroeconomic, political and market forces driving China's economy, including the evolving role of the Chinese government in key areas of the economy—from state-owned enterprises to ownership and local content restrictions applied to foreign firms and investors; to labor, intellectual property and environmental regulation; and to rule of law in commercial contracts.

In 2006

Since its opening to the world in 1978, China had seen steady, strong economic growth. But with China's admission into the World Trade Organization (WTO) in 2001 came a seven-year explosion of trade and investment that has arguably altered the structure of both the Chinese economy and Chinese society in irreversible ways.

With annual growth of 9–10 percent, China's economy doubled during 1999–2005 to \$2.2 trillion, almost overnight becoming the world's fourth largest economy. State-owned enterprises made up only a quarter of the economy by 2005; old economy industries such as oil, steel and autos were surpassed by the manufacturing for export of a wide range products—from consumer goods and apparel to advanced electronics—and by new companies based in telecommunications and Internet services.

Annual foreign direct investment (FDI) into China grew by nearly 50 percent over 2003–05; and total cumulative FDI reached \$941 billion, with the U.S. being the fifth largest investor. U.S. firms across a range of sectors—technology, energy, home furnishings, sporting goods, electrical machinery and appliances, autos, apparel—set up manufacturing joint ventures to produce low-cost goods for the U.S., using Chinese facilities to save

costs and achieve global manufacturing scale. Increasingly, those facilities were also positioned to serve an emerging Chinese middle class.

Technology and life sciences companies established R&D centers to develop new generations of products, drawing on a talented labor pool of science, math and engineering graduates who could be deployed in large numbers to solve problems.

China's trade surplus with the world ballooned. Export growth stimulated the mass migration of 140 million workers from inland rural areas to coastal cities. Nearly 100 cities grew in size to populations exceeding 1 million; the number of cars in China tripled to 20 million over 2000–05; the highway system grew to 23,000 miles; 37 new international airports were built; the rapidly expanding ports of Shanghai and Shenzhen displaced Hong Kong and Singapore as the world's leading harbors; Shanghai boasted 4,000 new skyscrapers, with 1,000 more on the drawing boards.

As it assumed the role of the world's manufacturer, China's demand for raw materials, energy, and capital equipment increased exponentially. At the high point of its economic growth, surging Chinese demand led to global steel, copper and aluminum shortages and raised oil prices on world markets. In 2005, the U.S. trade deficit with China was reached \$201 billion; in 2006 China's foreign exchange reserves—largely derived from trade—approached \$1 trillion, with 70 percent held in dollar-denominated securities, mainly U.S. Treasury certificates.

Growth brought challenges: Chinese export industries were heavily subsidized, displacing domestic industries in other countries and leading to trade disputes; with the "China price" came quality assurance problems in some sectors; the China price was rising, as wages and land prices soared;

Beijing did not have the means to enforce intellectual property (IP) protections nationwide, nor was it inclined to let IP concerns constrain exports; in most industries, foreign FDI came with strings attached, in the form of burdensome technology transfer and local content rules aimed at supporting competing domestic brands.

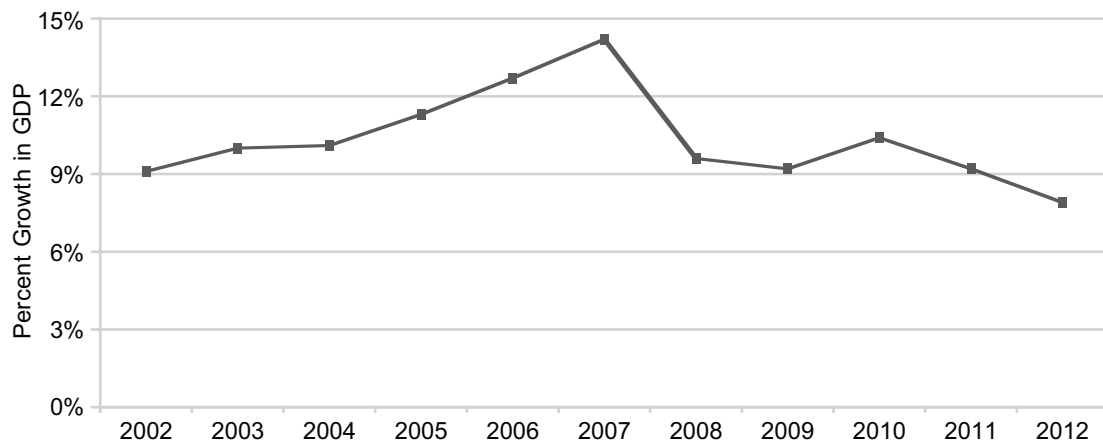
Today

The extent to which China's fortunes in the previous decade were tied to foreign manufacturing investment, exports and consumers in the U.S.

and Europe became readily apparent in the crisis of 2008–09.

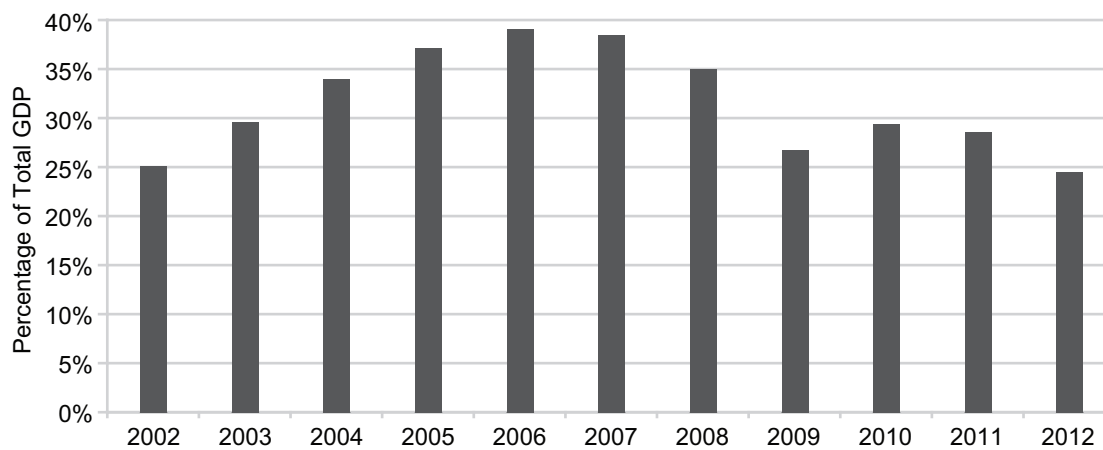
Successive years of double-digit GDP growth ground to a halt during the global recession of 2008–2009. In mid-2009, People's Republic of China (PRC) exports were down 23 percent from a year earlier, as U.S. and European demand dried up. China had by that time displaced other emerging economies as the global manufacturer of choice, so the impacts of global recession were immediate and dramatic. China's economy has recovered, but not to previous levels.

China GDP Growth, 2002–2012



Source: Asian Development Bank; analysis by Bay Area Council Economic Institute

China Exports of Goods and Services as a Percentage of Total GDP, 2002–2012



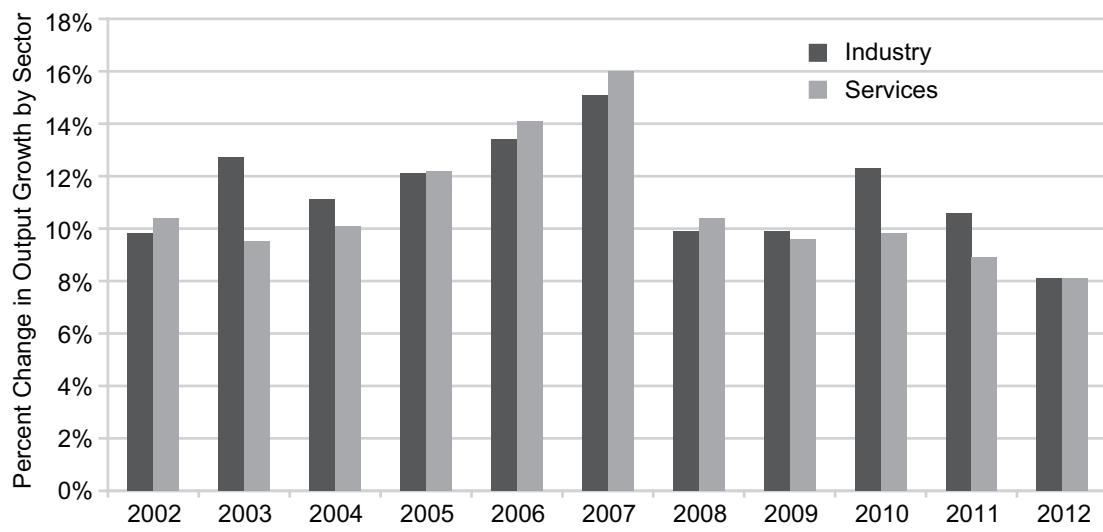
Source: Asian Development Bank; analysis by Bay Area Council Economic Institute

China's GDP in 2012 was \$8.36 trillion. The government set a 7.5 percent growth target for 2013, which was China's lowest since 1990. As China's economy continues to mature, growth should remain strong but is not likely to see the double digit levels of recent decades. The World

Bank forecasts moderate annual growth of 8 percent through 2015.

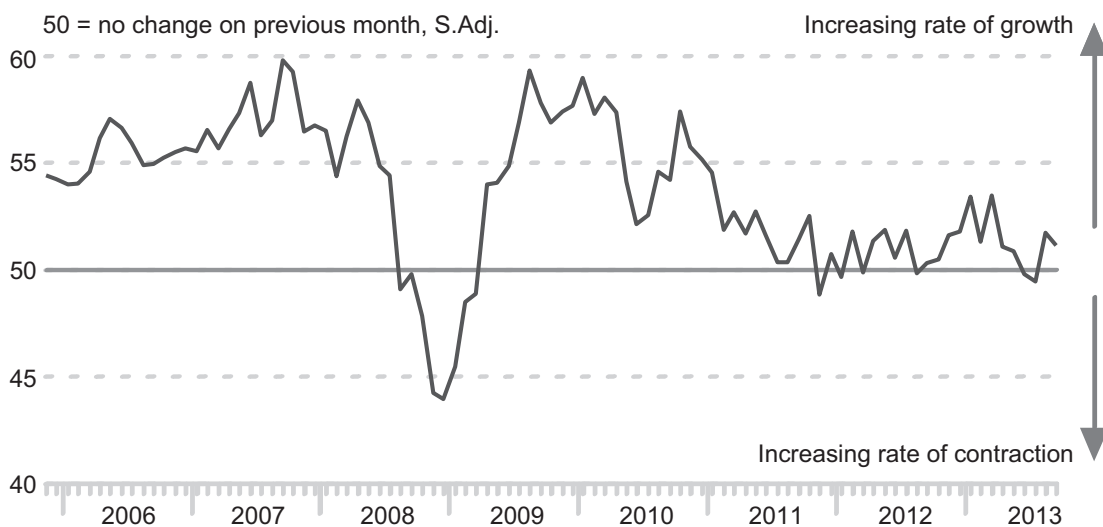
A weighted mix of manufacturing and services in the China Purchasing Managers' Index (PMI), prepared by HSBC and consultancy Markit Economics, validates the trend dating back to 2006.

Annual China Output Growth by Sector, 2002–11 (Percent Change)



Source: Asian Development Bank; analysis by Bay Area Council Economic Institute

HSBC China Composite Output PMI



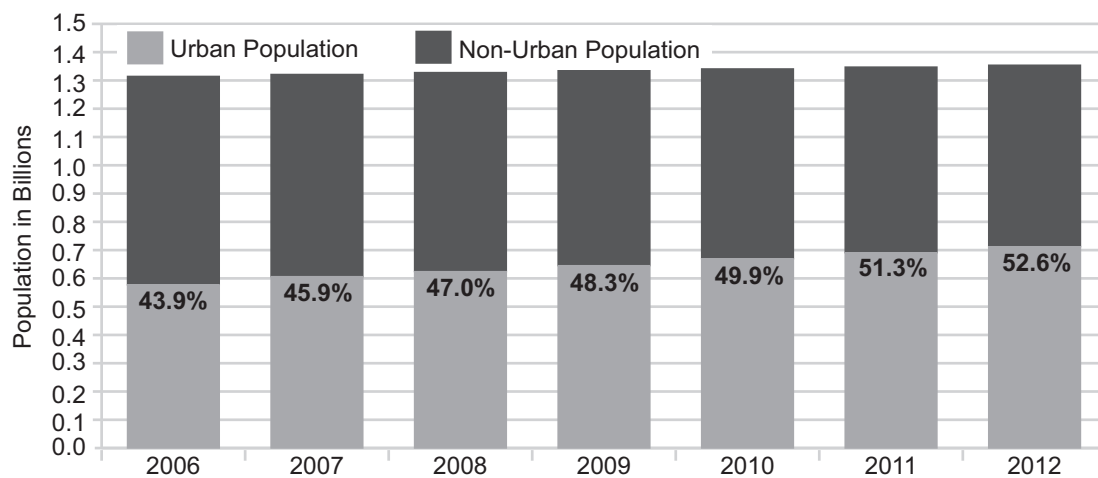
Sources: Markit, HSBC

Responding to the global recession, a USD 585 billion stimulus introduced by the Chinese government in November 2008 included tax rebates in labor-intensive sectors, increased bank lending to small businesses, lowered taxes on home sales, and large-scale financing for job-creating infrastructure projects. At the same time, the government announced multiple interest rate cuts, and state-owned banks pumped money into the economy with fresh loans and

easy credit, aided by a record expansion of the monetary supply. Taken together, these policies helped insulate China from the more severe effects felt in Europe and the United States, though as will be seen below, there have been other domestic consequences.

For the longer term, Beijing's drive to sustain economic growth is apparent in two other sets of numbers: population and labor force.

China Population Growth, 2006–2012 (Billions)



Source: Asian Development Bank; analysis by Bay Area Council Economic Institute

China Labor Force Growth, 2006–2012 (Millions)

	2006	2007	2008	2009	2010	2011	2012
Labor Force ^a	763.2	765.3	770.5	775.1	783.9	785.8	788.9
Employed ^b	749.8	753.2	755.6	758.3	761.1	764.2	767.0
Agriculture ^c	319.4	307.3	299.2	288.9	279.3	265.9	257.7
Industry ^d	188.9	201.9	205.5	210.8	218.4	225.4	232.4
Services ^e	241.4	244.0	250.9	258.6	263.3	272.8	276.9
Unemployed ^f	8.5	8.3	8.9	9.2	9.1	9.2	9.2

Source: Asian Development Bank/National Bureau of Statistics

a. Active population aged 16 and over who are capable of working, are participating in, or willing to participate in economic activities, including the employed and unemployed.

b. Persons engaged in social labor and receiving remuneration payment or earning business income.

c. Primary industry that includes farming, forestry, animal husbandry, and fishery.

d. Secondary industry that includes mining and quarrying, electricity, gas and water, and construction.

e. Tertiary industry that includes hotel and catering services, and other services.

f. Urban areas only.

First, urbanization is driving growth. Since 1979, China has seen the largest rural migration to cities in human history. At the end of 2012, China's National Bureau of Statistics reported that 263 million rural residents had migrated to cities within or outside their provinces—roughly the equivalent of the U.S. population. China's urban population reached nearly 712 million, up 21 million from the previous year, which pushed the percentage of urban dwellers in 2012 to 52.6 percent of the total population.

This massive shift will continue, with another 200 million Chinese expected to move into cities by 2025. The economic, social and environmental implications will be profound—with growth in incomes, markets, and emissions.

Growth is also shifting from China's well-developed Tier 1 and coastal cities (such as Beijing, Shanghai and Guangzhou) to Tier 2 and Tier 3 cities in the interior. *The Economist Intelligence Unit* reports that while growth in the most developed cities and coastal provinces has recently been in the 7.2–7.4 percent range, cities and provinces in central and western China are growing at double digit rates: 10.1–13.6 percent. This reflects both Chinese government policy to encourage more balanced growth between coastal and inland centers and a shift of manufacturing and other investment to cities where growth is accelerating and labor is cheaper and more abundant. This shift of economic activity inland has been enabled by the government's large-scale investment in infrastructure—highways, rail, ports, river freight transport systems, and airports—that has helped attract manufacturing to cities like Chengdu, Wuhan, Zhengzhou and Chongqing.

Second, as China's urban population has grown, its labor force has shifted from agriculture to industry and services, much of that employment tied to exports and manufacturing and serving an emerging urban middle class. The transition has not been seamless. While the government has encouraged migration to reduce rural-urban wealth inequality, it has left in place the old 1958 *hukou* household registration system aimed at regulating rural-urban workforce mobility. Some 23 million migrant workers with rural registrations, laid off in 2009 as exports

dried up, were left stranded in coastal cities with no access to new state-allocated jobs, housing, social services or education. Many, who had been trained for specific factory jobs, had no choice but to return home.

The government has promised gradual household registration reform beginning in late 2013, allowing rural migrants to establish residency in smaller cities. One obstacle is that local governments bear most of the \$400 average cost per year per new resident, yet they have little taxing authority to generate new revenue. As a result, cities have been reluctant to issue registrations.

Aggressive stimulus spending also created issues. Much of it went to state-owned enterprises (SOEs) where it could be monitored and distributed quickly. But SOEs only account for 20 percent of total employment, so the benefits were dampened. In addition,

- small businesses that accounted for most job growth could not access credit easily;
- stimulus funds were often spent on projects without receiving adequate review;
- bad projects piled long-term debt onto provincial and local government balance sheets; and
- stimulus channeled into securities and property, driving development and creating asset bubbles.

Real estate, which is China's leading source of wealth and contributor to demand, is an important economic bellwether. *The Wall Street Journal* reports that at the end of 2012 China had more than 4 billion square meters of residential property under construction, enough to meet estimated demand for four years without any new construction. As a result, construction slowed in 2013, impacting global markets for raw materials such as steel and cement, as many developers sold down inventory. The government has attempted to curb speculation—through taxes on profits from home resales and higher down payments and mortgage rates for second home buyers. Cities have also tried to tamp down speculation with curbs on the pre-sale of new units. With credit readily available, however, and homebuyers fearful of rising costs, housing prices in major cities continue to rise.

Longer-term forces also pose economic challenges.

China's labor market is changing. The workforce, now approaching 800 million, is growing more slowly each year than in the past and is forecast to begin declining in 2015, as China's one-child policy brings fewer young people into the labor pool and as workers retire as early as age 55. An aging population and growing competition for workers from the service sector are leading to labor shortages, pushing up industrial wages.

Rising wages and production costs are pricing out some low-end manufacturing. Government investing and bank lending has increased job opportunities throughout the country, but skilled, high-productivity workers are in short supply. Protests over wages and working conditions at contract manufacturers have forced change.

The role of unions as employee advocates has strengthened; a 2008 law requires formal labor contracts with employees that meet minimum wage, benefit and workplace standards, although the minimum wage was frozen in most areas of the country in 2012 due to the slowing economy.

Private sector wages grew by 14 percent in 2012, according to the National Bureau of Statistics, reflecting increases of 16.3 percent for rural workers, 12.5 percent for urban workers and 11.8 percent for migrant workers. While these figures represented a slowing from 2011, wage growth has diminished China's competitiveness as an offshore manufacturing center, particularly when compared to lower cost counties such as Vietnam or Indonesia.

Chinese government sources suggest that as many as one-third of Chinese manufacturers of low-end products such as shoes, textiles and garments have moved all or part of their production outside China, primarily to Southeast Asia. While this reflects government policy to encourage Chinese companies to move upscale to produce more advanced, higher-value-added products, it also reflects the reality of rising wages, thin profit margins, and increased competitive pressures faced by China's traditional manufacturing base. These pressures mirror the forces that drove the large-scale shift of manufacturing

from Hong Kong and Taiwan to the mainland decades earlier.

Higher wages + higher prices = higher inflation. Inflation is a perennial concern. Consumer and producer prices have been volatile in recent years, surging in 2007–08; falling off dramatically as economic activity stalled in 2009; then rising sharply again until the second half of 2012. For the whole of 2012, CPI rose just 2.6 percent, compared to a 2011 year-on-year increase of 5.4 percent. Higher prices for food, housing, consumer goods and services have led CPI gains. CPI for the first half of 2013 grew at an annualized rate of 2.4 percent.

Debt is an issue. Though still considered manageable, the surge of spending that grew out of China's 2008–09 stimulus program has increased China's domestic debt-to-GDP ratio (estimated at 180–200 percent of GDP) and impacted its credit rating. Banks and local governments that embarked on large scale spending projects are particularly burdened.

In 2011, China's National Audit Office found that local governments had accumulated debts of RMB 10.7 trillion, equivalent to 26.5 percent of GDP. Other estimates, however, run as high as 60 percent. (The figure in the U.S. is 18 percent). While the central government probably has the resources to backstop the debt to prevent a crisis, concerns are growing about implications for growth.

The banking sector is also vulnerable. While the level of non-performing loans at Chinese banks is officially low—below 1 percent—the growth of lightly-regulated off-balance-sheet financing devices (shadow banking through trusts and other wealth management products) has raised concerns about China's financial transparency and its potential vulnerability to financial disruptions.

The yuan is up 27 percent since 2005. Until 2005, the yuan had been pegged to the U.S. dollar at an exchange rate of 8.277. At that point, China began a "managed float" of its currency that has since accelerated.

At the end of 2012, the exchange rate had fallen to 6.230, with an average 2012 exchange rate of 6.309; at the end of June 2013 the rate was 6.137.

Exchange Rates: Yuan per U.S. Dollar

	2004	2005	2006	2007	2008	2009	2010	2011
End of period	8.277	8.070	7.809	7.305	6.835	6.828	6.623	6.301
Average of period	8.277	8.194	7.973	7.608	6.949	6.831	6.770	6.461

Source: Asian Development Bank

Measured on an internal real exchange rate (IRER) basis that also tracks prices of goods and services that cannot be imported or exported, the rate has risen by 35 percent. Before the managed float was allowed, early estimates were that the yuan had been undervalued under the peg by as much as 40 percent, but with its recent depreciation it does not appear wildly out of alignment.

In political terms, the exchange rate poses an ongoing challenge for both China and its trading partners, which have accused China of keeping the yuan artificially undervalued to effectively subsidize exports. With exports slowing, China has an interest in keeping the yuan undervalued and interest rates low, to encourage investment in infrastructure and property development and support employment in construction. But the strategy also discourages consumption and favors saving by eroding purchasing power.

Is the economy rebalancing? The savings, in turn, have often been misallocated by the biggest, least efficient borrowers—public projects designed to bolster cities and provinces' prestige. SOEs alone account for 35 percent of China's total business investment; local government debt equals 20 percent of China's GDP.

Rating agency Fitch reports that lending expanded over 2008–10 from 122 percent of GDP to 171 percent. China's impressive savings rate, at 52 percent in 2011, provides a helpful cushion for Chinese banks, and the government's large foreign reserves provide added security against serious financial disruption. But recent trends highlight the difficulty of rebalancing the economy toward reduced reliance on exports and fixed investment and increased reliance on consumption.

The 12th Five-Year Plan

In March 2011, the National People's Congress and the Communist Party of China (CPC) formally adopted China's 12th Five-Year Plan. The Plan

provides a broad strategy for addressing the problems described above and taking China's economy forward through 2015.

The Five-Year Plan begins by identifying 10 factors that threaten continued development of the economy:

- resource constraints, particularly in energy and raw materials
- a mismatch in investment and imbalance in consumption
- income disparity
- weak capacity for domestic innovation
- a production structure too heavily weighted toward heavy industry relative to services
- an inadequate and declining agriculture sector
- lack of coordination between urban and rural development
- an imbalanced employment system
- worsening "social contradictions" leading to unrest
- persistent obstacles to scientific development that are difficult to remove

In response, it sets a series of targets to be completed during the 2011–15 period:

Economy

- a 7 percent average annual GDP growth
- at least 45 million jobs to be created in urban areas, with a 4 percent increase in the urbanization rate to 51.5 percent of the population
- service sector value-added output to increase from 43 percent to 47 percent of GDP; coastal regions to transition from traditional manufacturing to hubs for R&D, advanced manufacturing and services
- research and development spending in seven target sectors—energy efficiency and environmental protection; next generation information technology; biotechnology; advanced equipment manufacturing; new energy; new materials; and new-energy vehicles—to account for at least 2.2 percent

of GDP; value-added output of emerging strategic industries to account for 8 percent of GDP by 2015 (up from 3 percent in 2010)

- transformation of the economy from an export focus to a balance of exports, imports and domestic consumption; from a reliance on foreign technology to domestic innovation; and from traditional to low-carbon/new materials industries

Environment/Energy

- a 30 percent cut in water consumption
- a 16 percent cut in energy consumption per unit of GDP, and a 17 percent cut in carbon dioxide emissions
- non-fossil fuel use to increase to 11.4 percent of primary energy consumption, with hydro-power to account for more than half of that total by 2020
- reforestation projects aimed at increasing both forest coverage and stocks

Agriculture

- minimum grain production of 540 million tons annually

Investment Reform

- agriculture, high-tech and environmental protection sectors opened to foreign investment
- qualified enterprises to be encouraged to list on stock markets; reform monopoly industries to achieve easier market entry and increased competition

Livelihood

- population to be capped at 1.39 billion; one-year increase in average per capita life span
- 36 million apartments for low-income families to be constructed or renovated
- per capita income to be increased to \$10,000 by 2020; 13 percent average annual increases in the minimum wage through 2015
- pension plans to be extended for all rural residents and 357 million urban residents; publicly-funded healthcare services to be expanded to ensure basic coverage

China's government faces conflicting pressures as it attempts to restrain runaway credit, but at the risk of further dampening a slowing economy. The rebalancing of China's economy away from its historic focus in fixed investment and export dependence, and toward increased domestic consumption, has been identified by Chinese leaders as critical to future growth and stability. For that to occur, more financial resources will need to be directed away from infrastructure and state-owned enterprises and toward consumers and private enterprises. Increased consumption will require continued wage growth, which will be hard to sustain without increased productivity. This is one factor behind government policies to accelerate indigenous innovation.

Change doesn't come easily, however, even with the government's extensive policy tools. In 2012, the share of fixed investment in China's GDP rose to 46.1 percent from 45.6 percent in 2011; at the same time, the share accounted for by household consumption was flat at 35.7 percent, as reported in *The Wall Street Journal*. In the first half of 2013, household consumption's contribution to GDP growth fell significantly compared to the same period in 2012, while investment's contribution to GDP growth rose—suggesting a continued trend. At this writing, China appears to be sustaining growth using traditional levers. The shift to greater consumer-led growth is still a strong bet but is likely to take years.

As China's economy continues to mature, the days of double-digit annual growth are unlikely to return. But while it faces significant near and long-term challenges, China continues to present a large and growing market, and with that, important opportunities for economic exchanges in fields where Bay Area companies, institutions, entrepreneurs and investors excel—agriculture, life sciences, clean energy technology, environmental protection, cloud computing and 4G mobile Internet, and entrepreneurship to name only a few.

2. THE BAY AREA CHINESE COMMUNITY

Beginnings

The first Chinese immigrants in California were two men and a woman, arriving on the brigantine *Eagle* on February 2, 1848, and brought over as servants for the family of C. V. Gillespie, a San Francisco merchant and importer from China.

The following year, merchant ships calling at Canton brought news of gold discovered in California. Overpopulation and famine in China after the Taiping Rebellion prompted families to send young men abroad to earn money. Most of the arrivals were from rural areas in the Pearl River Delta of Guangdong Province: of the estimated 47,000 Chinese immigrants on the West Coast in 1860, fewer than 600 were women. Shipowners promoting *Gam Saan*, "Gold Mountain," as a land of opportunity were eager to attract passengers traveling "steerage" in cramped quarters below decks. The voyage to San Francisco took 45 days and cost \$55.

Many Chinese immigrants traveled to the U.S. under labor contracts with merchants in China or with American middlemen who solicited them and arranged their passage. They worked as servants, cooks and waiters, and in laundries and cigar or shoe factories. But contracts often proved unenforceable and many laborers ended up mining or prospecting on their own in the Sierra foothills.

In later years, Chinese laborers made up most of the workforce laying track for the San Jose Railroad, the California Central Railroad from Sacramento to Marysville, and the transcontinental California Pacific Railroad from Sacramento to Promontory Point, Utah. They also were instrumental in constructing levees in the Sacramento River Delta area that later enabled the large scale development of agriculture in the Sacramento Valley.

Chinese Communities Take Shape

As early as 1849, Chinese merchants in San Francisco formed a *gongsi*, or association, to mediate disputes within the Chinese community, facilitate commercial dealings with outside interests, and participate in civic events. From 1851–54, six benevolent associations were formed representing immigrants from particular districts within Guangdong Province. These associations offered aid with the immigration process, housing and local customs. They lent money, helped start businesses and represented Chinese interests in countering discrimination. Churches with missionary ties to China taught English to parents and children.

Family associations were established (including protective societies known as *tongs*), along with a separate benevolent society to arrange medical care and lend money for return to China or to arrange burial of remains in China for the elderly. In 1862, a *kung saw*, or neutral public association, was formed to settle disputes among associations. Out of this business and commercial network, the Chinese Six Companies were formed in 1882.

From the 1850s on, the Bay Area Chinese community was a significant contributor to local economies. The dozen or so square blocks that formed San Francisco's Chinatown spread out from the Long Wharf that linked the financial district and northern waterfront, with its restaurants, residential hotels and small factories. In the 1870s, Chinese fishermen came to dominate the shrimping industry, with more than 20 camps along the section of southeast San Francisco waterfront now known as Hunter's Point, and on the San Rafael estuary that is still called China Camp.



This illustration, showing customs officers inspecting belongings of Chinese immigrants as others enter the room from a ship, appeared on the Feb. 3, 1877 cover of Harpers Weekly, entitled "Chinese Immigrants at the San Francisco Custom-House."

In 1870, 24 percent of Chinese immigrants in the U.S. resided in the Bay Area; by 1900 that percentage had nearly doubled to 45 percent. Chinatowns became fixtures in San Francisco, Oakland, San Jose, Sacramento and Stockton. In the East Bay, Chinese laborers worked in factories and on dam projects and sold fruit and vegetables in Oakland's five Chinatowns.

During this time, discrimination against Chinese immigrants—centering mainly on jobs—was an unfortunate reality. Calls for tougher enforcement of labor contracts, a head tax on foreign miners and outright immigration curbs were all beaten back, but each time by smaller margins. Economic depression in the 1870s, speculative investing and drought cost many Californians both fortunes and jobs, providing a tipping point that turned an 1877

San Francisco labor solidarity rally into three nights of anti-Chinese rioting.

Congress subsequently passed the 1882 Immigration Act, also known as the Chinese Exclusion Act, barring U.S. entry for Chinese laborers entirely, and allowing in merchants, their servants and families, diplomats, travelers, teachers and students, but prohibiting them from obtaining citizenship. The Act remained in effect until 1943.

The 1906 Earthquake

Chinatown was among the areas of San Francisco totally destroyed during the earthquake and fire of April 18, 1906. The earthquake proved both a blessing and a curse, producing a more permanent and resilient Chinese community and offering a

way around the Chinese Exclusion Act. Denied any form of government relief, thousands of Chinese fled the city in the aftermath of the earthquake. Most came to Oakland, where Lew Hing, himself a refugee from the quake, opened the two city blocks of his Pacific Coast Canning Co. to the new arrivals. He provided food, tents and medical attention to those in need. Later, to help finance the rebuilding of San Francisco's Chinatown community, he partnered with merchant Look Tin-eli to establish the Bank of Canton in 1907. A year later, it was the principal bank for 100,000 overseas Chinese in the U.S. and Mexico.

Lew Hing, Look Tin-eli, the Six Companies and various family associations were instrumental in Chinatown's reconstruction. Heading off efforts by City Hall to condemn and raze Chinatown after a false bubonic plague scare, Look brokered construction of pagoda-style replacement buildings, by Irish contractors and workers, that helped make the city-within-a-city a permanent landmark.

One benefit for Chinese immigrants arising from the 1906 earthquake was the destruction of most San Francisco citizenship and residency records. Prior to 1906, the Chinese Exclusion Act had restricted travel between China and the U.S. to specific exempt classes of immigrants, primarily merchants and families of citizens. After, the West Coast saw a spike in immigration applications from young men known as "paper sons," most claiming to be children of citizens.

Two-Way Trade Grows

Steel, oil and textile producers formed the American-Asiatic Association in New York in the 1890s, lobbying President McKinley to enforce an "open door" China trade policy. Their target was a vast China market of as many as 400 million people, where European and Japanese competitors were trying to establish exclusive trade concessions and port leases.

Some 30 percent of U.S. imports from China and 17 percent of U.S. exports to China moved through the Port of San Francisco in 1898. Northern California exported large volumes of agricultural products and lumber to China, and Northern California companies introduced milled flour and kerosene heating oil to the Chinese market.

Bay Area exports to China grew from \$2.6 million in 1894 to \$8.7 million in 1906, according to Chamber of Commerce reports. The San Francisco Chamber of Commerce lobbied the McKinley administration to make it easier for Chinese merchants to enter the United States. San Francisco shipping and lumber magnate Robert Dollar led the first business delegation to China in 1910 at the urging of the Chinese Chamber of Commerce, "to create and increase the friendly feeling between China and the United States, and to increase our commerce."

The Immigration Profile Changes

Bay Area Chinatowns flourished in the decades that followed, home to thousands of small businesses with their own newspapers, telephone exchanges, banks, theaters and opera houses.

Angel Island Immigration Station, on San Francisco Bay, served from 1910–40 as the country's principal entry point for Chinese immigrants. Despite practices subjecting applicants to aggressive interrogations, medical examinations, separation of families and detention averaging two to three weeks but in some cases as long as two years, over 175,000 Chinese immigrants were processed before the eventual repeal of the Exclusion Act.

A 1965 overhaul of U.S. immigration policy, fueled in part by Cold War tensions, began to reshape the Bay Area Chinese community in important ways.

The Immigration and Naturalization Act of 1965 eliminated the previous Eurocentric country quota system, and permitted more skilled workers and family members from around the world to enter the U.S. At the same time, a flood of some 5 million Chinese refugees displaced by the Cultural Revolution had crossed into then-British Hong Kong, which had no way to absorb them. Across the Taiwan Strait, conflicts routinely flared between Beijing and the Kuomintang (KMT) government of General Chiang Kai-shek—which maintained its claim to be the rightful government-in-exile of all China. The KMT, in a constant state of siege at that time, had become autocratic and its economy had

stalled. While Bay Area Chinatowns were mostly made up of Cantonese-speaking rural immigrants from Southern China, there was also a KMT affinity dating back to the early 1900s. Many Chinese immigrants had returned home after the 1906 earthquake, seeking work opportunities and relief from persecution, during the relatively peaceful, prosperous KMT rule of Dr. Sun Yat-sen.

In the 10 years following passage of the Immigration and Naturalization Act, the Chinese community in the U.S. nearly doubled. Many skilled business owners and professionals left Hong Kong.

Young Taiwanese arrived initially as students, sent to eventually establish a business foothold in the United States. Family-owned companies typically dispatched their eldest sons to learn about new technologies and processes. They were often set up in homes, on a path to a green card, as

an insurance policy in case political instability forced the family to pull up roots in future.

Hong Kong arrivals set up traditional businesses, such as restaurants and laundries, but they also assimilated to a greater degree than preceding generations, buying property, becoming doctors and lawyers, opening insurance offices and accounting practices, and working for Bay Area companies. Taiwanese students gravitated toward science, engineering, mathematics and business.

None of these new immigrants fit well into the established Chinatowns that were designed as insular communities of tiny apartments built for unskilled workers with no families. The new arrivals, over time fluent in English, moved out into the residential neighborhoods of San Francisco, Oakland, San Jose and beyond, joining and adding to the cultural fabric of the wider Bay Area community.

3. CHINESE STUDENTS AT BAY AREA UNIVERSITIES

Land of Opportunity

Chinese students have made a critical contribution to technology innovation and economic growth in the Bay Area over the past three decades.

Since the late 1980s, the best and brightest students emerging from mainland China's technical universities with undergraduate degrees in science, technology, engineering and mathematics (STEM) fields have gone abroad to complete their education, with the U.S. and California among their top destinations. Before them, a wave of Taiwanese science and engineering students arrived in the early days of personal computing and networks, as Taiwan was building its reputation as a leading global original equipment manufacturer.

Chinese and Indian graduates formed much of the talent pool for Silicon Valley innovation throughout the 1990s, moving from basic computing and networks to the Internet, mobile communication and social media.

Graduates in STEM fields have become an integral part of an emerging cross-border innovation

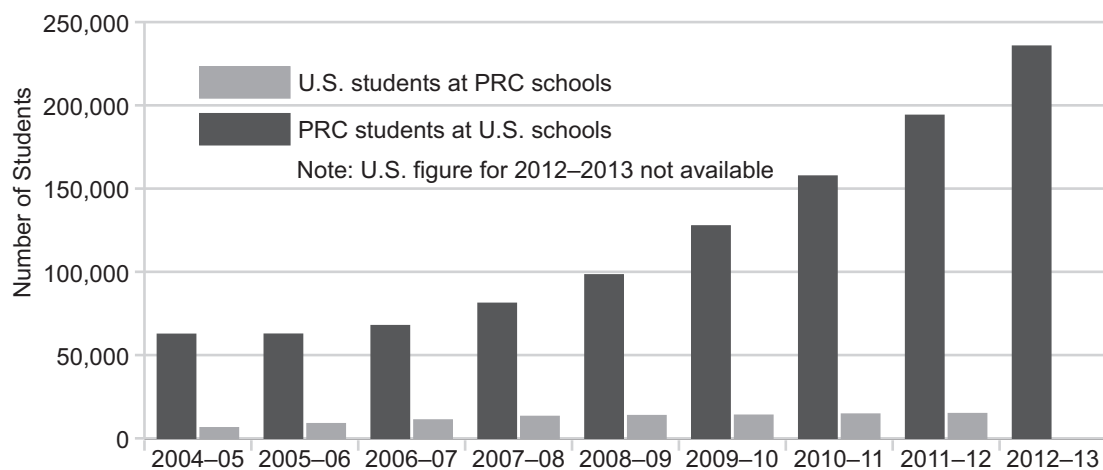
ecosystem, launching start-ups, redeploying wealth as angel investors, widening access to the China market, and giving back through endowments and participation in alumni networks.

But changing demographics in China are beginning to alter the mix of students arriving in the region, with significant implications for the new arrivals, the institutions they attend, and the Bay Area's innovation ecosystem.

Numbers Tell the Story

An emerging urban Chinese middle class with rising household incomes, property ownership and a near 50 percent savings rate has enabled families from Tier 2 and Tier 3 cities in China's interior, and from rural areas, to self-fund their children's study abroad—an opportunity further aided by China's one-child policy. It is a trend that has both increased the number and altered the mix of students arriving in California and the Bay Area.

Exchanging Students



Source: Institute of International Education

The number of students from greater China at U.S. colleges and universities grew from about 95,600 in 2004–05 to more than 225,300 in 2011–12. By contrast, U.S. students studying abroad in greater China grew during that time from about 7,300 to more than 17,100; with most studying over a summer or semester, not in a degree program. The People's Republic of China (PRC) sent no students to the U.S. until 1974. By 1988 it was the leading country of origin for foreign students and has held the number one or two position since. In the 2004–05 academic year, the PRC sent 62,523 students to the U.S., according to the Institute of International Education (IIE). By 2012–13, the number had more than tripled to 235,597.

Numbers of Taiwanese students in the U.S. peaked in 1993–94 at about 37,500; they fell from just under 26,000 in 2004–05, to just over 23,000 in 2011–12. Hong Kong students peaked in 1992–93 at just over 14,000, leading up to the 1997 handover of the British territory to China. By 2004–05, Hong Kong enrollments had dropped by half to just over 7,100 and in 2011–12 they stood at about 8,000.

IIE reported 75,000 international students in California for AY 2004–05, with a combined 18 percent, or 13,600 students, from greater China. In 2012–13, over 111,000 foreign students enrolled in the state, with 28.7 percent from mainland China, 4.6 percent from Taiwan and a smaller share, perhaps 2–3 percent, from Hong Kong. This suggests that about a third of total foreign students in California—almost 37,000—are from greater China.

A survey of leading Northern California academic institutions by the Bay Area Council Economic Institute in 2006 indicated that more than 5,500 graduate and undergraduate students from mainland China, Taiwan and Hong Kong were enrolled at Bay Area colleges and universities during AY 2004–05. Those students contributed an estimated \$149 million annually to the state and regional economies in tuition, living expenses and discretionary spending.

Updated figures developed by the Economic Institute, in combination with IIE data, suggest that the number of students from greater China enrolled in Bay Area colleges and universities grew to some 7,000 in 2011–12. Using IIE's

formula for per-student expenditures in that year, those students contributed some \$218.9 million to the state and regional economies.

Leading fields of study by Chinese students have remained fairly constant over time: business and management; engineering; mathematics and computer science; economics; and physical and life sciences. Since the global downturn, however, emphasis has gradually shifted from STEM fields to business and economics, particularly among undergraduates.

A variety of factors—the bursting of the tech sector bubble in 2000–01, post-9/11 visa restrictions, reduced foreign travel due to the SARS and avian flu scares, and recruitment competition from U.K., Canadian and Australian universities—contributed to a slowing in Chinese student enrollment from 2002–05. But those numbers have expanded each year since then; the number of PRC students has tripled.

The mix of students by academic level is significant: a fairly constant 54 percent of Taiwanese students apply at the graduate level, while 70 percent of Hong Kong students have been undergraduates. But while PRC undergraduate and graduate students have both grown in absolute numbers, IIE data reveal a dramatic shift: undergraduates as a share of total PRC students have grown from 31 percent to 38 percent since 2010, while the graduate share has declined from 52 percent to less than 46 percent.

Graduate schools nonetheless continue to see significant Chinese student enrollment. Annual surveys of schools nationwide by the Council of Graduate Schools show PRC applications up by an annual average of 20 percent over 2010–12, with the highest percentage growth in applications at schools in the western U.S.

Education as an Investment

The U.S., and California in particular, are a draw for Chinese students. Higher education is viewed as key to career opportunities for the country's burgeoning middle class. In the past 10 years, Chinese universities and polytechnic schools have seen growing enrollment, today turning out some 8 million graduates annually. But rapid expansion

of the system has led to uneven quality. Classes often focus on lectures and rote learning, with little interaction between student and professor or collaborative learning among students.

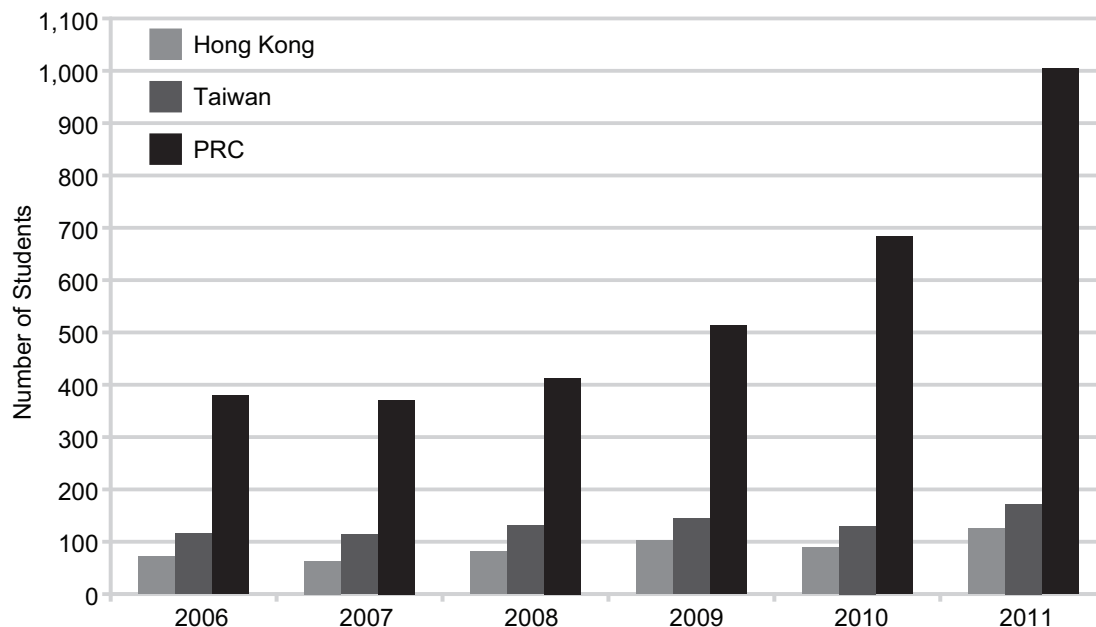
Middle-class families aspiring to greater educational opportunities for their children are often at a disadvantage in the competition for spaces at better schools at home; most high schools are boarding schools that charge for tuition, books, exams and added tutoring. English proficiency is required for the national exams that decide university acceptance and English teachers are in short supply. Parents often lack the education needed to help children with their studies. Ironically, children scoring lower on the national exams are typically channeled into lower-quality, three-year polytechnic schools that can cost up to twice the tuition and fees of elite schools because they receive less in government subsidies.

This creates a perverse set of incentives for families. Facing a more costly, less competitive outcome for a son or daughter at home, Chinese

families from all walks of life are saving, borrowing or selling assets to send children to school abroad. Here the Bay Area enjoys a number of advantages—shorter travel time, fewer time zones, one of the largest Chinese communities outside of China, world-class universities and an educational focus on critical thinking, and collaboration and innovation that extends into an entrepreneurial business culture. The 2013 Academic Ranking of World Universities, conducted by Shanghai Jiao Tong University, places Stanford and Berkeley as number two and three out of 500 institutions rated, strengthening the appeal of the region for families seeking prestigious institutions.

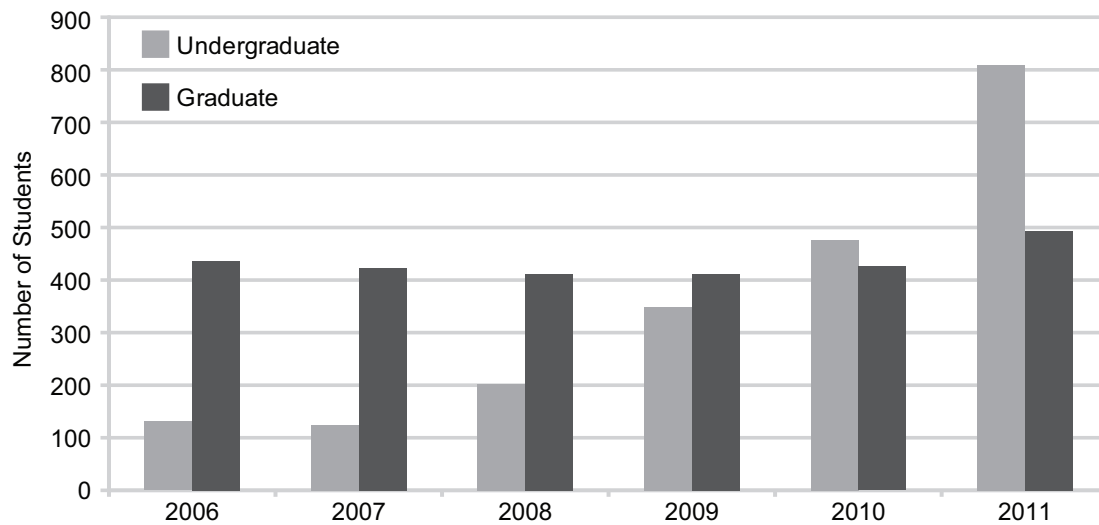
Rising tuition costs at California schools have not, so far, put them at a serious disadvantage in the competition for students; a weaker dollar has helped offset rising costs, and although financial aid is less available, it is estimated that fewer than 10 percent of international students receive scholarships.

Chinese Students at UC Berkeley, 2006-11 (by Place of Origin)



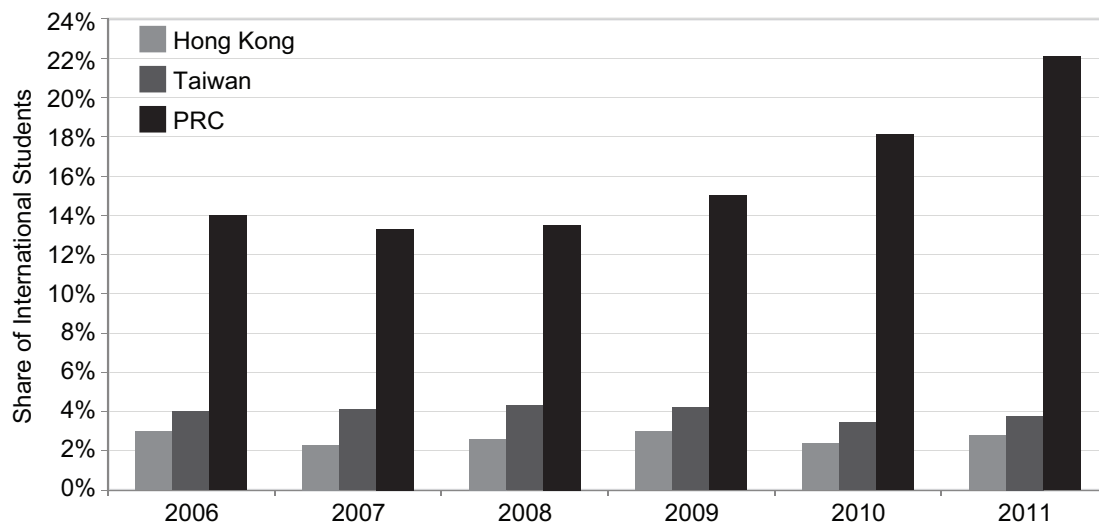
Source: U.C. Berkeley; analysis by Bay Area Council Economic Institute

Chinese Students at UC Berkeley, 2006-11 (Undergraduates and Graduates)



Source: U.C. Berkeley; analysis by Bay Area Council Economic Institute

Chinese Students at UC Berkeley, 2006-11 (Percent Share of Total Intl. Students)



Source: U.C. Berkeley; analysis by Bay Area Council Economic Institute

Student Trends

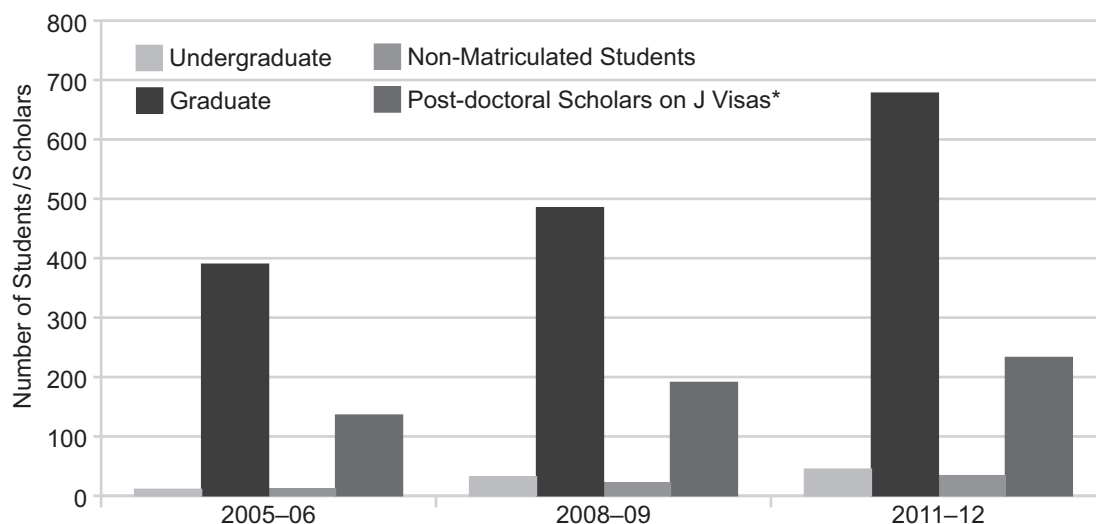
A survey of Bay Area universities mirrors the Chinese student enrollment trends reflected in national figures:

- Taiwan and Hong Kong students have remained relatively constant in number and

share of the student population since 2006, while enrollments from the PRC have increased steadily.

- PRC undergraduate enrollment is up sharply relative to graduate applicants.
- A growing share of those undergraduates comes from Tier 2 and Tier 3 inland cities in China.

Chinese Students and Scholars at Stanford University



Source: Stanford University

*Includes post-doctoral students, research associates, faculty and staff on H visas (135 as of January 1, 2012).

- Principal areas of study have diversified beyond the STEM fields, primarily into business and economics.

UC Berkeley data shows that the overall number of students enrolled from greater China has grown in every year but 2007, from 567 in that year to 1,301 in 2011. The numbers of Taiwan and Hong Kong students have increased modestly from relatively small bases.

At Stanford University, the numbers have been different, with continued emphasis on graduate and post-doctoral students, primarily in the scientific and engineering fields.

UC Davis, with its emphasis on agriculture, medicine (including veterinary medicine) and engineering, has been a strong draw for Chinese students, as China grapples with feeding and providing adequate healthcare for its people.

More than 20 percent of the 2,481 international graduate students entering Davis in 2011—555 students—were from greater China. About 30 percent (or 160) of those students were enrolled in the College of Agricultural and Environmental Sciences. Another 109 studied medicine, 105 studied engineering and nearly 60 others studied biology and veterinary medicine. Davis also enrolled 150 undergraduates from China,

either as freshmen or as transfers—double the number enrolled in 2010.

In all, nearly 800 Chinese students attended UC Davis in 2011—about 560 from the PRC, 121 from Hong Kong and 101 from Taiwan. The 225 enrolled Chinese undergraduates each pay non-resident tuition of \$38,000 annually, according to a report in the *Sacramento Bee*; add in living expenses, insurance, healthcare and other costs, and the total can reach \$54,000. The number of undergraduates at Davis has increased ten-fold since 2007. By contrast, Peking University costs the equivalent of \$950 per year; even at prestigious Chinese universities the quality of education is not considered as good as it is in better U.S. schools—classes are large and consist mostly of lectures, with grades heavily dependent on final exams and little opportunity for student collaboration or interaction with professors.

For 2012, **San Francisco State University (SFSU)** reports 1,542 degree-seeking international students from 90 countries. Of those, 670 are from greater China—560 from the PRC, 58 from Taiwan and 52 from Hong Kong. While the numbers of Taiwan and Hong Kong students have fallen modestly but steadily from 2003, the numbers of PRC students have steadily increased.

It should be noted that the Chinese student profile at SFSU is different from other schools; it is made up primarily of children of immigrants and is overwhelmingly undergraduate. Thus, the relative changes in the SFSU Chinese student population may have more to do with the changing demographics of the previous generation of arrivals and their families than with new students coming directly from China.

This fast-growing undergraduate cohort extends throughout Bay Area campuses, with important implications.

Schools such as Stanford, Berkeley, UCSF and Davis have strong specializations that attract graduates pursuing advanced degrees, and they have seen their student profiles remain relatively constant. For example, Stanford accepts international undergraduates, but the numbers are small; most students from China are still graduate-level and heavily concentrated in the science, technology, engineering and mathematics fields.

It is at institutions like the **University of San Francisco (USF)** that the demographic changes can be seen in sharpest contrast, reflecting trends at smaller private and public universities throughout the U.S.

USF, a Jesuit university, draws on the religious order's long history and deep connections in China dating back to the 16th century when Jesuit priests served as scientific advisors to the Imperial Court and ran the Imperial observatory. Jesuit schools, libraries, observatories and churches can be found throughout China today, particularly in and around Shanghai.

Those connections, plus USF's location in San Francisco and the reputation of its School of Management and Business, have attracted applicants from China in large numbers. According to USF managing director of China programs and professor of management Stanley Kwong, of the 781 Chinese students now attending USF, some 600 are undergraduates. Nearly all of these undergraduates are business majors. Many are from Tier 2 and Tier 3 inland cities and provinces like Qinhai, Yunnan, Chongqing or Anhui. They are not elite graduates, but the children of an emerging middle class whose parents have put a premium on a quality education abroad that they

hope will either result in a better job back home or enable them to run the family business.

The competition for international undergraduate students has also created market opportunities for new players. In 2010 and 2011, for example, the for-profit **Academy of Art University** in San Francisco made the Institute of International Education (IIE) Top 5 list of academic institutions accepting international students in California, with more than 4,400 foreign students enrolled in 2012, all in the Bay Area. IIE does not break down state totals by country of origin, but applying the combined statewide share of students from the PRC and Taiwan, 26.8 percent, it is reasonable to extrapolate that as many as 1,000 Chinese students—many of them children of immigrants, as in the case of the CSU system—may attend the Academy's various campuses.

Unintended Consequences

International students make an increasingly important contribution to cash-strapped university budgets nationwide, paying tuition rates that are typically twice the in-state level or more. Students from China are especially welcome since the vast majority are self-funded and do not request financial aid. But for students under intense pressure to succeed, the rigors of higher education, in a foreign country and a second language, are taking a toll.

Many newly-admitted Chinese undergraduates at USF are not as English-proficient as they should be. Most are pushed by family to pursue a business degree but lack the verbal and comprehension skills to follow the lectures and required reading or collaborate on student projects. Screening overseas applications is difficult, and a cottage industry of "placement agencies" in China charges families \$5,000 or more to fill out applications, write essays and in some cases forge transcripts and recommendation letters. Most students cannot afford a preliminary trip to the U.S. for orientation and arrive days before classes begin; they do not know what to expect and schools are unable to do needs assessment.

Many of these students are under intense financial pressure; often parents have sold property and/or cashed out savings to send them abroad.

On tight budgets, with inadequate language and social skills to navigate a foreign culture, many of these students rarely leave their dormitories. Without proper counseling or language support, a growing number fall behind and even drop out.

At USF, international students pay annual tuition of \$36,000 plus living expenses. The university “conditionally” admitted a number of Chinese students with weak English language skills, to the point that they initially needed translation headsets for their orientation. They have had difficulty keeping up in their courses and collaborating with other students. In response, the university has been in talks with California State University officials to partner on English-language course programs for USF Chinese undergraduates, in return helping CSU market its less well-known Bay Area campuses in Asia.

Since the trend is relatively new, no concrete statistics on student success rates will likely be available before 2015. Stanley Kwong estimates that 15–20 percent of the students he sees will complete college in five years, given the extra time spent attaining language proficiency. Another 5 percent will complete their four-year programs in less time by taking on more than a full load of classes. About 80 percent of USF Chinese master’s graduates return to China; most undergraduates stay on for graduate school.

At UC Berkeley, a public university, International Office director Ivor Emmanuel says successive years of budget cuts have reduced state funding to only 11 percent of Berkeley’s budget. As a partial response, the university has raised its admission target for non-resident students to 20 percent, half from out of state and half from outside the U.S. International students currently make up about 9 percent of the student body.

A rising flood of undergraduate applications from China caught Berkeley off-guard; most Chinese undergraduates apply as economics or business majors—subject areas heavily dependent on language skills—Emmanuel says. Entering freshmen often are not able to make a separate trip from China for orientation and so are at a disadvantage when selecting and signing up for classes. Once in class, they may have trouble following lectures and discussions.

Precise numbers are not readily available for the numbers of foreign undergraduates who do not complete four-year programs (Korean students have faced similar difficulties); anecdotally the numbers are small but growing. Emmanuel believes the answer over time will entail expanded counseling services and parallel English instruction throughout the school year, but ramping up such programs has been a challenge.

A larger issue—especially for a public university—involves the broader demographic student body makeup, as higher-paying out-of-state and international students fill more admissions slots relative to in-state students.

What happens after a student graduates has particularly important economic impacts. A July 2013 article in *The Economist* cites estimates from the China Western Returned Scholars Association that, of some 2.6 million Chinese students going abroad to complete their studies since 1978, some 1.1 million have returned to China—suggesting that 1.5 million have not.

Many students who have chosen to remain in the Bay Area have become successful technologists, entrepreneurs and investors, magnifying their contribution to the economy. Those that return to China bring a Bay Area/Silicon Valley perspective and often serve as two-way bridges, developing products and operating companies in both countries. For returnees, the transition may not always be easy. Recent “sea turtles” are finding a bleaker picture in China. Slower economic growth has curtailed hiring, and returnees face longer waits to land lower-paying positions. As a distinct, uniquely Chinese Internet emerges, tech entrepreneurs with Silicon Valley backgrounds can find themselves out of step with indigenous technology, applications and customer tastes and have difficulty managing local engineers and programmers.

Also, an overseas degree may no longer carry the same cachet with Chinese employers, as top students from leading universities are snapped up by global employers while students with less aptitude or questionable degrees find employment prospects weaker.

“Sticky” Students

Why are such trends important? The absolute numbers and growth rates for international students applying to Bay Area universities, the levels at which they apply and the subjects they pursue are determinants in whether and how long they stay on after graduating—to work, start new businesses, form households and make a lasting contribution to the regional economy.

In a 1999 report, “Silicon Valley’s New Immigrant Entrepreneurs,” AnnaLee Saxenian, dean of UC Berkeley’s School of Information Management Systems (SIMS), found that more than 2,000 Silicon Valley technology firms had been launched by Chinese entrepreneurs, many of them graduates of Bay Area universities. Those companies accounted for \$13.2 billion in annual sales and nearly 42,000 jobs—17 percent of the Valley’s high-tech economy at its peak.

In a 2007 update to that study, “America’s Immigrant Entrepreneurs,” Saxenian and colleague Vivek Wadhwa, Pratt School of Engineering executive-in-residence at Duke University, further noted that

- of approximately 28,000 technology and engineering firms launched during 1995–2005 nationwide, more than 6,000 were established in California;
- 52 percent of the Silicon Valley technology and engineering firms launched during 1995–2005 had at least one foreign-born key founder, compared with 39 percent for California as a whole and 25 percent nationwide;
- in 2005, 33 percent of the tech population in Silicon Valley was foreign-born;
- 96 percent of the Indian, mainland Chinese and Taiwanese founders interviewed nationwide held bachelor’s degrees, and 74 percent held graduate and post-graduate degrees, mainly in engineering, computer science and information technology, applied sciences and mathematics;
- half of Chinese founders, and 55 percent of Taiwanese founders, had graduated from four elite schools in the PRC and two on Taiwan;
- PRC government initiatives to expand university enrollment have put stress on the higher education system, and the uneven quality of

education has led more undergraduates to pursue study abroad;

- just over half of immigrant founders from all countries received their highest degrees from universities in the U.S., a list that included large and small, public and private institutions;
- of the immigrant founders surveyed, 52 percent initially came to the U.S. to study; 43 percent came as the result of a job opportunity; only 1.6 percent came with the intent to start a business.

In a June 2012 report by the New York-based Fiscal Policy Institute, analysis of 2010 U.S. Census Bureau data revealed that immigrant business start-ups have grown by 50 percent over 1996–2011—from 12 percent to 18 percent of total small businesses in the U.S.—and that Chinese immigrants alone account for more than 34,000 small businesses nationwide, nearly 5,000 of those in STEM-related fields.

In his 2012 book, *The Immigrant Exodus*, Wadhwa suggests that the flow of immigrant entrepreneurs to the U.S. and Silicon Valley may have peaked, as foreign graduates with advanced degrees return home or are lured by incentives other countries offer. Wadhwa contacted a sampling of 2,042 companies nationwide and found that the proportion of immigrant-founded companies had slipped from 52.4 percent five years earlier to 24.3 percent. Among the 335 companies surveyed in Silicon Valley, the share was 43.9 percent.

Immigration policy and recession have both played a role in the decline. Wadhwa’s overarching point is that as other countries join the competition for highly-skilled global talent, including graduates with advanced degrees from U.S. institutions, the U.S.—and by implication, Silicon Valley—cannot afford to take for granted its current leadership role in fostering global entrepreneurship:

- **Australia** has an annual cap of 126,000 visas for skilled immigrants and their families—comparable to the 140,000 limit in the U.S.—for a country with a population 10 percent the size of the U.S.; regional governments can award preferences in special skill categories; qualified international students can remain in the country for 18 months after graduating, compared to 12 months for the U.S.

- **Canada** evaluates green card applicants based on age, education, work experience and other factors using a points system; undergraduate and graduate degree holders can get work permits to stay in Canada for up to three years without first having a job; PhDs in STEM fields can begin the application process for permanent residency while still in school; entrepreneurs with viable business plans can obtain visas, even without prior funding.
- **China's** National Medium- and Long-Term Talent Development Plan offers returning graduates and entrepreneurs educated overseas generous cash bonuses, free or subsidized housing and multi-year exemptions from business taxes.
- **Singapore** offers skilled immigrants an Employment Pass that allows them to work and later apply for permanent residency; spouses are allowed to work; under the EntrePass program, an immigrant with a government-approved business plan and \$50,000 in outside investment is granted a one-year pass to start a business, with visa renewals and even government matching funds in certain fields if the business is initially successful.

While the lure of an overseas degree may be diminishing as a determinant of job and income prospects in China, affluent families of elite STEM students still see benefits to an overseas degree, and to the pursuit of opportunities abroad. An October 2012 *New York Times* article highlighted a growing trend of professionals emigrating from China, citing Organization for Economic Cooperation and Development (OECD) data that 508,000 Chinese nationals moved to the 34 OECD countries in 2010—up 45 percent from 2000.

In 2012, U.S. Department of Homeland Security figures show more than 81,000 Chinese nationals establishing permanent residence in the U.S.—easing from 87,000 in 2011 but up from 73,000 in 2010. China's share of new permanent residents over 2010–12 has increased steadily from 7 percent to 8.2 percent. The reasons include quality of life concerns among a rising middle class and affluent population about overcrowded cities, air quality, food safety, education and healthcare; political concerns about corruption, a lack of transparency and prospects for upward mobility; and

complaints that small and mid-sized private businesses are disadvantaged relative to state-owned enterprises.

A growing number of wealthy Chinese families are exploring the option of an EB-5 investor visa (see “The EB-5 Advantage” in the Connectors chapter), under which a minimum \$5 million investment in a job creating venture—either directly or through a government-approved regional center investment entity—can lead to a conditional visa in two years and permanent residence in five years, for as many as 10,000 investors annually. A provision in the law allows qualified EB-5 investors to enroll their children in college at in-state tuition rates.

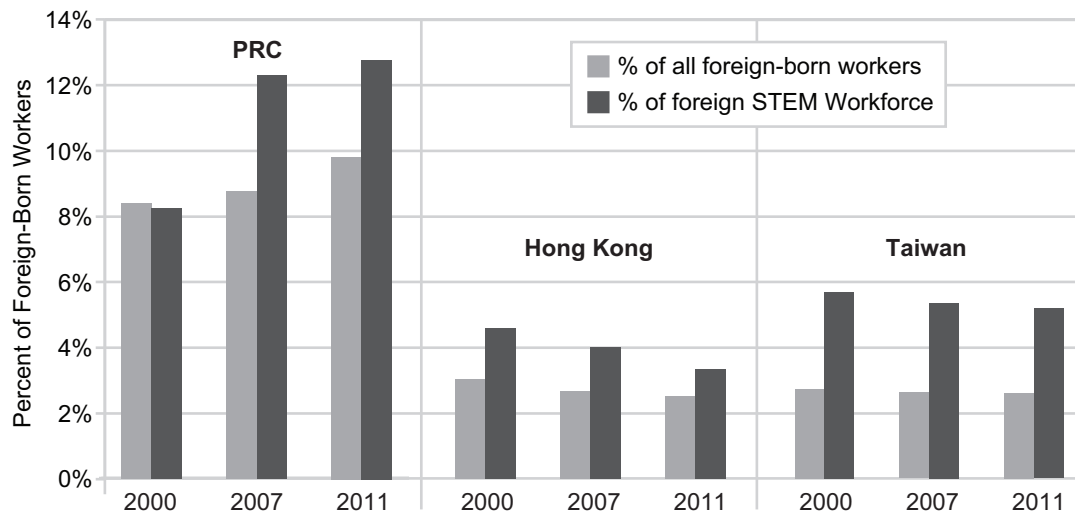
Even many less well-off Chinese are willing to gamble on a new life overseas, working as taxi drivers, farmers, and fishermen or in restaurants. China's Ministry of Commerce reports that some 800,000 Chinese nationals work abroad; extended families pool funds to send a son or daughter to school as a first step toward emigration.

Significantly, leading Bay Area schools such as Stanford, Berkeley or UCSF report that 90 percent of graduates with advanced degrees stay in the U.S., often in the Bay Area and California; among Chinese students overall, the share who stay on drops to an estimated 60 percent.

Over the last decade, immigrant workers from mainland China have grown as a percentage of the Bay Area's foreign-born workforce, especially in science, technology, engineering and math (STEM) occupations. Between 2000 and 2011, Chinese immigrants increased from 8 percent to 10 percent as a share of foreign-born workforce. In STEM occupations, Chinese workers increased from 8 percent to 13 percent of the foreign-born STEM workforce, adding an additional 7,053 workers.

STEM talent from Taiwan and Hong Kong, while still substantial, has declined in absolute terms and as a share of total foreign-born workers. There were 3,633 fewer Hong Kong-born STEM workers in the Bay Area in 2011 than in 2000, falling from 4.6 percent to 3.4 percent of total foreign-born STEM talent. While the total number of Taiwanese workers grew by 3,724 in the region over this period, there were 2,422 fewer STEM workers in 2011 than in 2000.

Chinese Immigrant Workers in the Bay Area



Source: American Community Survey, 3-Year Estimate; analysis by Bay Area Council Economic Institute

Cross-Border Academic Collaboration Runs Deep

Over more than three decades, Bay Area universities have developed and strengthened relationships with Chinese academic institutions, and with government and businesses, through joint research and other collaborations.

Stanford and the UC Berkeley, Davis and San Francisco campuses in particular have assisted China in areas of law, finance, corporate governance, architecture and planning, alternative energy, environmental mitigation, healthcare and agriculture. Earlier initiatives are detailed in our 2006 report.

More recently, despite economic volatility and fluctuations in U.S.-China political relations, these academic connections have quietly, consistently continued their work. The following are a few key examples:

- The Stanford Law School China Guiding Cases Project deploys a team of 60 legal scholars in China, Hong Kong and the U.S. to translate Supreme People's Court of China "guiding cases" that are intended to establish legal precedents in civil, criminal and administrative law.
- The Stanford Program on Regions of Innovation and Entrepreneurship (SPRIE) has partnered with

Taiwan's Industrial Technology Research Institute (ITRI) since 2004 on clean technology and green cities innovation, through annual conferences, shared research and joint programs.

- The Berkeley-Tsinghua University Program for Advanced Study in Psychology, funded in part by HTC co-founder Cher Wang and VIA Technologies CEO Wen Chi Chen, is coordinating global research to address the rise in reported factory suicides and violent crime in China.
- Berkeley's Department of City and Regional Planning (DCRP) has teamed with scholars from Shanghai's Tongji University to develop transportation and environmental solutions to meet the needs of residents in outlying areas of Shanghai.
- UC Davis and BGI-Shenzhen, a non-profit research arm of the Beijing Genomics Institute, formed the BGI@UC Davis Partnership in 2011 to undertake joint genomic research relating to food security, human and animal health and wellness, biodiversity and environmental health.
- The China Center for Energy and Transportation (C-CET), a partnership of researchers and advisors from the UC Davis Institute of Transportation Studies, Tsinghua and Tongji Universities, Ford Motor Co., the World Bank, the Energy Foundation and Lawrence Berkeley

National Laboratory, is researching advanced vehicle energy systems and future rural and urban vehicle designs.

- Peking University Center for Theoretical Biology researchers are at UCSF doing systems biology research to understand biological processes and engineer treatments at the molecular level, under a fellows program funded by Chinese industrialist Li Ka-Shing's Li Foundation.
- UCSF's AIDS Research Center has partnered with the Chinese Center for Disease Control to address shortages of HIV/AIDS researchers and clinical investigators in China.

In an effort to extend their reach to students, scholars and alumni in China without the need to travel on a visa, Stanford and Berkeley have each opened China-based facilities.

Stanford's history with Peking University (PKU) dates back to the 1970s, when the two schools launched an exchange between their language programs as Stanford first began accepting Chinese graduate students. In 2004, Stanford began offering study abroad and internship programs in collaboration with PKU.

The Stanford Center at Peking University (SCP KU), completed in March 2012, is a 36,000-square-foot, \$7 million facility available to Stanford students, researchers and faculty working in China. Principal funding came from the family foundation of Chinese investor and alumnus Chien Lee. The Center provides an extension of the university, supporting its own scholars and programs—the Asian Liver Center, the Rural Education Action Project, the Center for Sustainable Development & Global Competitiveness, and the schools of business and engineering, among others—and a venue for hosting conferences and research collaborations in China.

Berkeley signed an agreement in November 2011 to establish a center for its School of Engineering in the Zhangjiang High-Tech Park outside Shanghai. The 50,000-square-foot building opened in November 2013, with a primary focus on university and industrial research collaboration and is seen as a first step toward creating a full-scale academic center. It is being provided to the university rent-free for five years by the

government-supported park, with additional funding from corporations. Haas School of Business and the Boalt Hall School of Law are exploring similar arrangements.

A rich platform for even deeper academic collaborations is provided by alumni giving and networks. UC Berkeley in particular enjoys a large, well-placed network of alumni in China. The process works both ways, as Tsinghua, one of China's leading universities, has 10,000 alumni in the Bay Area—more than anywhere in the world outside Beijing.

Endowments

The virtuous cycle of immigrant Chinese entrepreneurship is readily visible in university endowments from successful entrepreneurs and investors who made their fortunes in Silicon Valley and throughout the Bay Area, as well as from prominent Chinese alumni and family members.

Donations range from major health research centers and libraries, to endowed chairs and fellowship programs for visiting scholars in specific fields, to individual scholarships fostering student exchanges.

Reported endowments from Chinese donors to UC Berkeley and Stanford alone in the past two decades total more than \$150 million. Among the largest are the \$40 million Tan Kah Lee Hall, a chemical engineering research laboratory, and the \$40 million Li Ka-Shing Center for Biomedical and Health Sciences, at Berkeley; the \$30 million-plus Li Ka-Shing Foundation donation to Stanford's School of Medicine; and the \$6.4 million from Taiwan alumni to fund the Kwoh-Ting Li professorships in engineering, economic development, medicine and Chinese culture.

More recent gifts include \$30 million from NVIDIA Corporation founder and CEO Jen-Hsun Huang, to help build Stanford's 130,000-square-foot Jen-Hsun Huang School of Engineering Center, and a \$2 million Li Ka-Shing gift to fund "precision medicine" research—merging genome research and molecular biology with big data analytical tools toward more personalized predictive clinical care—at UCSF.

Visas: The School-to-Work Transition



The link between international students and U.S. immigration policy is a crucial one for the Bay Area. Foreign students typically enter the U.S. on F-1 visas; visiting exchange scholars, professors and researchers enter the U.S. on J-1 visas.

F-1 students must be enrolled full time at institutions approved by the U.S. Citizen and Immigration Services (USCIS), and they must be proficient in English, financially self-sufficient and have a permanent residence abroad. J-1 applicants must additionally provide documented evidence of specific academic proficiency or accomplishment. J-1 visas are for a set term; holders must return to their home countries within 30 days of expiration for a minimum of two years before then reapplying for a new visa to re-enter the U.S. to work.

Remaining in the U.S. to work in STEM fields typically involves an H-1B visa for persons of special skills and abilities. U.S. visa regulations allow students holding F-1 visas to transition to H-1B work visas by earning work credit during their time at university and immediately upon graduating.

The USCIS imposes an annual cap of 65,000 on the issuance of H-1B visas. An additional 20,000 visas are exempted from the cap and reserved for applicants holding advanced degrees from U.S. academic institutions. Another 6,800 slots are set aside outside the cap for new "H1B1" applicants under recently signed Free Trade Agreements with Singapore and Chile.

Employers at universities, non-profit research facilities and government offices and facilities may apply for H-1B visas on behalf of employees year-round and are exempt from the cap. Also exempt are new visas issued to those already holding H-1Bs, to extend their stays in the U.S. or to reflect a change in job status. As a result, more than 117,000 H-1B visas were issued in FY 2010–11; more than 129,000 were issued in FY 2011–12.

After a full academic year in school, F-1 students can undertake Curricular Practical Training (CPT), an internship with an outside employer in their fields of study, during the summer or part time. After graduating at either the bachelor's or master's degree level, students can remain under university sponsorship for 12 months and take jobs, known as Optional Practical Training (OPT), related to their fields of study.

Since 2008, qualified STEM students have been eligible for a further extension of OPT for up to 17 months with an employer registered under the USCIS E-Verify program, the Internet-based system that allows businesses to determine employees' eligibility to work in the U.S.

Visiting scholars holding J-1 visas do not have access to equivalent options to CPT or OPT; limited extensions and waivers are possible, but at the discretion of USCIS, and they are difficult to obtain.

Another immigration option for prospective students is the EB-5 investor visa, created by Congress in 1990. It makes up to 10,000 visa slots available to foreign nationals investing a minimum \$500,000 to

\$1 million in job-creating business ventures over a five-year period once job-creation requirements for the investment are fulfilled. Children of investors in the U.S. under age 21 during the five-year period are eligible to enroll in college or university at in-state tuition rates. (For more detail, see “The EB-5 Advantage” in the Connectors chapter.)

The current annual limit of 140,000 green cards has produced a five-year backlog of applicants; for priority workers, advanced degree holders and persons of exceptional ability from China, the wait is 1–3 years; for the skilled workers category, it is 5 years or more.

For H-1B visas, an application period opens each April 1, for the coming fiscal year. In periods of peak demand, the quota has been filled in as little two days, as it was in 2007 for the 2008 fiscal year. For 2011 it took 10 months; for 2012 the cap was reached in November 2011; and for 2013, the quota was filled by mid-June 2012. The fiscal year 2014 H-1B visa quota was closed on April 5, five days after the application period opened, by which time the USCIS had received 124,000; the quota was filled by computer lottery.

Congress has grappled for more than two years with a range of proposals to reform the U.S. immigration system, including changes to the H-1B and EB-5 programs. The Senate passed S. 744, the Border Security, Economic Opportunity and Immigration Modernization Act, in June 2013.

Among its provisions, S. 744 eliminates country-specific limits for employment-based visas but leaves the overall worldwide cap at 140,000; exempts STEM graduates and their families from the worldwide cap, raises the special allocation for master’s and doctoral degree holders to 25,000 and allows spouses in the U.S. to work; permits foreign graduates with PhDs and/or STEM graduates with master’s or doctoral degrees to apply directly for green cards; exempts STEM graduates and J-1 visiting scholars from the visa labor certification process; increases the H-1B visa allocation to a range of 110,000–180,000 each year, depending on demand; raises the H-1B allocation for advanced degree holders to 25,000; reserves unused EB-5 visas for qualifying entrepreneurs launching start-ups in the U.S.; and permits F-1 student visa holders to enter the U.S. with “dual intent” to study and to immigrate.

As of this writing, the House of Representatives is taking up immigration reform in a series of bills rather than a single one, and it is divided as to whether it will offer them as companion legislation in a joint conference to pass a single bill for signing.

In June 2013, the House Judiciary Committee passed the Supplying Knowledge Based Immigrants and Lifting Levels of STEM Visas Act (H.R. 2131), known as the SKILLS Visa Act. The bill would reallocate 55,000 visa slots currently reserved under diversity and family reunification programs to increase the number of H-1B visas, offer green cards to advanced-degree STEM graduates, establish a new entrepreneur visa, strengthen the investor visa program and repeal the country-specific cap for employment-based visas.



4. PROFESSIONAL NETWORKS/ASSOCIATIONS

Staying Connected

Chinese immigrant networks in the Bay Area date back to the Chinatown family benevolent associations of the 1800s. Modern professional networking organizations developed beginning in 1980 with the Asian Business League (ABL) in San Francisco and the Asian American Manufacturers Association (now the Asia America MultiTechnology Association or AAMA) in Silicon Valley. ABL was comprised of Asian small business owners and professionals in law, finance, real estate and other fields. AAMA's membership included technology professionals in the semiconductor, computing and network fields.

These associations had common objectives: networking opportunities, a sense of community, and shared support in navigating a business environment that at times involved discrimination and a glass ceiling in hiring and promotions. Their growing schedules of annual dinners, monthly meetings with speakers, award programs and weekend trips provided opportunities to share ideas, make valuable business connections and socialize.

AAMA's early focus was tech, and its founders were mainly Taiwanese, primarily in chip, PC and network systems manufacturing, reflecting Taiwan's emergence as a hardware OEM. As tech broadened during the 1980s into software, graphics and the beginnings of the Internet, and as mainland Chinese students began to arrive in Silicon Valley in the late 1980s, a new crop of smaller, industry-specific associations emerged for professionals in semiconductors, networking, storage, wireless, optoelectronics and other fields. And as venture capital (VC) spurred entrepreneurs to launch new companies, associations adapted their structure and activities. Traditional lunch and dinner meetings gave way to pitch sessions, mentorship programs and discussions about management strategy and IPOs.

Strategic competition between Taiwan and a rapidly developing PRC gave birth to two associations, the Monte Jade Science and Technology Association, a Taiwan-centric organization formed in 1989 with seed funding from the Taiwanese government, and the Hua Yuan Science and Technology Association (HYSTA), a similar PRC government-supported group launched in 1999. Both were tied to science and technology parks—Hsinchu in Taiwan and Huayen in Shenzhen—which included incubators that offered tech start-ups offices, lab space, funding and contacts to domestic companies. The goal was to entice the best and brightest tech graduates back home, rather than lose them to Silicon Valley.

By the mid-1990s, these groups had contributed to a cross-fertilization that gave rise to "astronauts," scientists and engineers in constant transit back and forth across the Pacific, innovating and forming companies, and to "sea turtles," young graduates striking out on their own with new start-up ideas, often launched in Asia and funded in California. Transnational "innovation clusters" formed, with entrepreneurs leveraging the comparative advantages of Silicon Valley, Taiwan and China to pursue R&D, execute designs and test concepts, and manufacture finished products for market.

AAMA, Monte Jade and HYSTA grew quickly in size and influence, institutionalizing the network model for sharing information, making business connections, funding start-ups, and mentoring entrepreneurs on corporate leadership and governance. Each had more than 1,000 individual members and some 200–300 corporate members from tech fields and offering support services in finance, banking, law and consulting.

Annual meetings attracted as many as 1,500 attendees and hosted CEOs from major tech

companies in Silicon Valley, Taiwan and China, as well as government leaders and rising entrepreneurial stars discussing disruptive new advances. AAMA launched a VC/entrepreneur program and opened Beijing and Shanghai chapters; Monte Jade opened 12 U.S. chapters and organized an executive mentorship program and an annual tech study tour to Asia; HYSTA opened a Beijing chapter, expanded ties to multiple science and technology parks in China, and formed a venture capital group and an emerging leaders forum.

The three major Silicon Valley groups as well as the smaller associations were catalysts for innovation. They provided Chinese engineers, programmers and entrepreneurs with venues to meet, share ideas, develop concepts for new businesses and products, access capital, find mentors and strike out on their own.

Today AAMA, Monte Jade and HYSTA remain the dominant Silicon Valley organizations dedicated to fostering cross-border tech business formation and growth with greater China. Most of the industry-specific organizations remain active to varying degrees, the largest and most prominent of these being the Chinese American Semiconductor Professional Association (CASPA). AAMA and Monte Jade have Bay Area membership numbers that have remained fairly constant over time, reporting 1,100 and 1,200 members, respectively, on their web sites; HYSTA, meanwhile, claims a Bay Area membership of 8,000, up from 6,000 in early 2011 and 2,000 as of 2006.

New economic forces have recently converged to re-shape the focus and influence of professional networks:

- China's relative economic resilience early in the 2008–09 downturn attracted continued investment and growing numbers of returning Chinese entrepreneurs.
- PRC-Taiwan political tensions have eased, resulting in expanded cross-Strait trade and investment.
- Semiconductor, PC, server and other costs have dropped and more innovation is now being done in the cloud on open-source platforms, making incubator facilities less important to start-ups.
- More options are available to entrepreneurs to access the China market and engage in

cross-border collaboration, through alumni, company, investor and other contacts outside traditional associations.

- A 2010–11 controversy over accounting and valuation discrepancies in “reverse merger” public listings of Chinese companies (merging them into a dormant, already public shell company to expedite the listing process) dampened cross-border M&A activity and narrowed VC exit options.
- Traditional associations have struggled to maintain relevance amid an explosion of new consumer-based technologies in areas such as mobile, cloud and social media.

Each of these changes has challenged the role of traditional associations. Associations have responded by broadening their programming and membership development into new industries and geographic markets, opening offices in China, Taiwan, Singapore and Korea, and partnering with businesses and government to host networking events on both sides of the Pacific. They have maintained ties to government-funded programs and incubator facilities, but more as a value-added service to members than as a central purpose. In addition to business formation alone, new program emphasis has been placed on more customized mentorship and on cultivating next-generation leaders.

Core activities remain largely the same: large, themed annual events attracting senior-level tech professionals and highlighting growth trends; mentorship initiatives to help young entrepreneurs; targeted networking events, including formal pitch contests where start-ups present new business ideas to prospective investors; and hosting of regular cross-border trips offering introductions to business and government leaders.

HYSTA executive director Leslie Yuan says interest in his group and in the China market grew steadily throughout the global recession, as domestic U.S. markets dried up and China remained a relative bright spot. An annual trip to China has been expanded to three times a year; for the 2012 trip there were 100 applicants for a maximum 25 slots. The 2012 annual conference in Santa Clara, “China and Technology's Impact on the Global Economy,” featuring Baidu co-founder and CEO Robin Li and Microsoft Online

Services President Dr. Qi Lu, drew more than 1,000 attendees.

Yuan, a former Hewlett-Packard executive, says the relationships among organizations today are less competitive and more a question of serving different customer niches toward the same end; today there is a greater sense of a single overseas Chinese—or even pan-Asian—network focused on exploring potential business opportunities through many points of contact.

A big difference for entrepreneurs today, Yuan acknowledges, is that the cost of launching a tech start-up has fallen dramatically. "Chips, PCs, phones and network equipment have come down in price; more software is open source or cloud based," he says. "Advances that used to take months or years and cost millions of dollars now take weeks, if not days, and cost thousands." Talent, he adds, can be accessed globally, on a 24/7 basis; China's consumer market is poised to pass Japan's in the near future at current growth rates, and more Chinese national champions like Lenovo, Huawei, ZTE and Haier are venturing abroad, so there is less need to lure entrepreneurs back home to the science parks after university.

With a new wave of Chinese investment already beginning to enter California, looking for exactly the kind of setup, management, compliance and other expertise HYSTA members can now offer in the reverse direction, Yuen says "we're going to see more billion-dollar deals coming, and we would be selling ourselves short if we focused only on tech."

AAMA has also diversified, both geographically and in terms of member industry sectors. Replacing the word "Manufacturers" with "MultiTechnology" in its name signaled a broadening of its scope beyond chips, PCs and peripherals. The group now has members and puts on programs in the full range of tech fields including cloud, big data, gaming and social media, as well as tech-reliant verticals such as automotive and healthcare.

AAMA executive director Charlene Yu Vaughn notes that while three of the group's Asian chapters are in China, its interests extend throughout Asia to India, Singapore and Japan, and it has opened a Seoul chapter in cooperation with the Korea Trade-Investment Promotion Agency.

Like Yuan, Vaughn credits the U.S. downturn with spurring activity for her organization, as businesses here sought out new markets and as immigrant entrepreneurs saw more opportunity back home. In both cases, cross-border networks were important. She agrees that historic lines separating professional organizations, alumni chapters, tech incubators and other entrepreneurial channels are blurring: "My whole philosophy is that it should be a collaboration more than a competition," she says. "Chinese students may come to the U.S. for their education and return to China if they see greater opportunity, or work here for a couple of years, gain experience and go home; many have opened offices here and in China as well. Entrepreneurs will go where the opportunities are."

As the flow of Chinese investment into the U.S. increases, Vaughn agrees that AAMA and other groups can serve an important function as a bridge in both directions, linking China with what is unique in Silicon Valley and the Bay Area: "In China you don't see corporate management or entrepreneurship based on sharing information; it's not part of the culture. And you can't just transplant the VCs, lawyers, professors, and schools and have another Silicon Valley; it's a very special place in the world."

As the major associations broaden their missions, and as their memberships become more diverse, new organizations are stepping in to fulfill their earlier national objectives.

The **Chinese Enterprise Association (CEA)** of Northern California, formed in 1997 as a social networking organization to help successive waves of Chinese STEM students and entrepreneurs in Silicon Valley adjust to unfamiliar ways of life and business customs, has more recently evolved into an association of Chinese companies headquartered in China but with a presence in Silicon Valley.

"A couple of years ago the Chinese government saw more companies going abroad and decided to recognize us as an official organization and provide more direct support to help organize events and build bridges with local associations and with government," says CEA Northern California chapter president Ben Chen, who is also west region operations president for China Unicom Americas.

Chen sees CEA's benefits flowing in both directions, introducing member firms to Bay Area business and government leaders, but also making them accessible to prospective local partners, vendors and suppliers. CEA's more than 80 members include the major Chinese telecom service providers and solar companies; mobile handset and networking firms Huawei Technologies and ZTE Corp.; Internet firms Tencent, Alibaba and Sina; PC manufacturer Lenovo; Chinese banks and credit card processor China UnionPay; Air China; and People's Daily.

Along similar lines, the **Silicon Valley Taiwanese American Industrial Technology Association (TAITA-SV)** began with Taiwan government support in 2003. TAITA-SV is Taiwan-specific and represents a more tightly-coordinated effort in support of the cross-border ecosystem of Taiwan tech industries, government-funded science parks and overseas Taiwanese entrepreneurs. Its stated mission is to

- facilitate technological exchanges between Silicon Valley and Taiwan,
- foster Silicon Valley entrepreneurs and U.S. businesses to explore cross-border opportunities,
- promote U.S.-Taiwan industrial, scientific and technological talent exchanges, and
- help Taiwan industries expand their reach in global markets and raise their international profiles.

Sponsoring members include ITRI, TECO's science and technology division, and the Taiwan Trade Center and Hsinchu Science Park, plus modem and router manufacturer **Actiontec**, network server firm **Supermicro**, Chunghwa Telecom unit **CHT Global**, and **Innobridge Capital Management**, a Santa Clara early-stage investor in Taiwanese and Silicon Valley hardware start-ups.

And it was only a matter of time before a truly global, partly virtual professional network appeared on the scene. The Beijing-based **Great Wall Club (GWC)** is a for-profit networking group for mobile Internet professionals, with a U.S. branch in Mountain View, as well as branches in Japan, Singapore, Taiwan and Finland.

In addition to monthly meetings, study trips and networking events organized in China, GWC hosts dual annual Global Mobile Internet Conferences (GMICs) in Beijing and Silicon Valley. The 2012 Silicon Valley event, held at Moscone Convention Center in San Francisco, drew 5,400 attendees and 170 exhibitors from 58 countries. Exhibits included a dedicated room for mobile app developers to demonstrate their latest creations. HYSTA and AAMA have been GMIC co-sponsors.

As larger established groups broaden their missions and scope of activities to accommodate industry changes, few new groups have surfaced in the past decade and many that did have not lasted. One group that has seen expansion is the **Silicon Valley-China Wireless Technology Association**, formed in 2000. SVC Wireless membership is younger and caters to start-ups and venture and angel investors offering early-stage capital (from the Bay Area and China) and incubators.

Its 2013 annual conference, "Mobile Pivots Future of Computing," emphasized the technology paradigm shift from PC to mobile and beyond; the symbiosis between Silicon Valley and China in the mobile revolution; and cross-border opportunities for entrepreneurs. In addition to discussions on wearable technology, mobile healthcare, connected cars, big data and patent filing in China, a Showcase pitch session brought together entrepreneurs and investors.

The group also sponsors an annual Silicon Valley Youth Innovation Award to deserving high school students. SVC Wireless claims 5,000 members and 30 alliance partners. Among its sponsors are IBM, Marvell Technologies, Microsoft, China Unicom and Weibo.

The rise of new incubator and accelerator facilities throughout the Bay Area—some of the largest with close ties to China—is augmenting but also providing an alternative to established associations. These new office park and industrial site developments offer start-ups lab, office and meeting space; technology and business mentorship; seed funding; and connections to next-stage capital, production capacity and prospective business partners on both sides of the Pacific. (See the Investment section for more information.)

The Asia Foundation: Supporting Development and Reform



Under the current Five-Year Plan, China faces a tipping point in its development.

In four key policy areas—law and governance, the environment, opportunities for women and the poor, and disaster management—the San Francisco-based Asia Foundation is on the ground in China helping to address challenges and contribute to reform. The Foundation also supports programs that encourage constructive U.S.-China relations.

"We're trying to understand the very complex currents we see in China's society, economy and government, and the extent to which they're coming together to create policy change," says Foundation vice president Gordon Hein. "It's a top-down process, but partly it's also bottom up, in terms of citizens' demands and expectations; that's the space in which we operate."

The Foundation has been active in China since 1979, beginning with a fellowship program with China's Ministry of Foreign Affairs. Since 1980, over 90 emerging leaders from the Ministry have taken part in the fellowship program, earning master's degrees in international relations from the most prestigious universities in the U.S.

A major focus is on increasing citizen participation in lawmaking and policy and improving the transparency and accessibility of public information. Toward that end, The Asia Foundation has worked with Peking University, the Administrative Law Research Association, local law schools and government legislative affairs offices to support administrative law reforms in a number of provinces and cities and to offer legal consultations through walk-in clinics, hotlines and community visits. The Foundation also supports study tours in the U.S. for Chinese academics and government officials to better understand open government processes.

Pilot projects have increased public involvement in budget reform in Heilongjiang Province, management and disbursement of poverty alleviation funds in Ningxia Autonomous Region, local people's congresses and legal counseling to handle citizen complaints in six provinces, and training and education to increase public participation in local development in Anhui Province.

The Foundation has collaborated with the Ministry of Civil Affairs, the Chinese Academy of Governance, Chengdu Education Foundation, Sichuan University and others on disaster management programs—including on leadership and interagency coordination, community-based mitigation initiatives, earthquake recovery/housing rehabilitation and risk reduction in schools.

To support the government's efforts to balance rapid growth with environmental protection and sustainability, the Foundation works to build local environmental protection capacity and to encourage policy and technological innovations through increased dialogue and communication among stakeholders. The Foundation's programs in China have trained officials from municipal environmental protection bureaus

(EPBs), judges from people's courts and representatives from environmental organizations, on the use of alternative dispute resolution for the increasing number of conflicts over environmental pollution. Other programs support work in southern China to better engage small and medium-sized enterprises in low carbon economy planning at the city level.

Partnering with research institutes, local EPBs, civil society organizations and business associations, the Foundation is also helping to implement milestone directives on environmental information transparency and public participation in environmental decision-making. In four diverse pilot cities, the Foundation and its partners are working to foster constructive collaboration among government, civil society and business. Drawing on the Foundation's extensive work to strengthen good governance in China, the project aims to develop and test practical mechanisms by which the public can access information about local pollution or make their voices heard in decisions about local environmental issues.

"The way China initiates reforms is through experimentation at the provincial and local levels," Hein explains. "Everything is tested at lower levels and then expanded, so that the process is centralized enough that they can make decisions and implement them, but decentralized enough that they can experiment."

Other groups with deep connections to greater China and the Bay Area Chinese professional community also have significant educational and policy orientations.

The **California-Asia Business Council (Cal-Asia)** was formed in the early 1990s as the California-Southeast Asia Business Council, and in 2000 extended its focus on industry sector trends and economic policy to include China. It has hosted senior-level briefings from government and business leaders, visiting Asian delegations and—partnering with other local organizations—business-focused China programs on legal reform, banking, online gaming, Hong Kong's film industry and Tianjin city planning.

The **Hong Kong Association of Northern California**, founded in 1984, provides a focal point for businesses and individuals interested in business and trade with Hong Kong. Its activities include social events, business forums, trade missions, and meetings with Hong Kong officials.

A nationwide group of Chinese-American business, arts and community leaders (architect I.M. Pei and cellist Yo-Yo Ma are among the founders), the **Committee of 100** was formed in 1990 to foster positive U.S.-China relations

through communication and exchanges and to enhance the image, visibility and participation of Chinese Americans within the U.S. It has commissioned nationwide surveys on American perceptions and attitudes regarding China, lobbied policymakers on cross-border trade and commercial issues, pushed to expand classroom teaching about Asian-Americans and Asian history and culture, and in 2005 launched a national mentorship program for university students and young adults.

A senior-level, policy-focused organization, the **1990 Institute** was formed by Unison Group Chairman C. B. Sung, along with former U.S. Undersecretary of State Philip Habib, Federal Reserve Bank of San Francisco president Robert Parry, UC Berkeley Institute of East Asian Studies director Robert Scalapino and others. Established to provide independent policy-based research in the U.S., focusing on economic and social development and China's modernization, the Institute has sponsored studies and conferences and promoted exchanges of research scholars in the U.S. and China.

The **Dui Hua Foundation** was founded in 1999 by former Occidental Chemical Co. executive and American Chamber of Commerce-Hong

Kong president John Kamm. Dui Hua (meaning "dialogue" in Chinese) works with government officials in Washington, embassies and consulates in China, foreign governments, human rights and other non-governmental organizations to keep international attention focused on specific political prisoners and secure their release. In 2004, Kamm, credited with the release of more than 400 political and religious prisoners in China, received the MacArthur Foundation prize for his work. In 2005, Dui Hua was granted special consultative status by the Economic and Social Council of the United Nations.

Founded in New York in 1956 by John D. Rockefeller III to promote greater knowledge of Asia in the U.S., the **Asia Society of Northern California** fulfills its educational mandate through a wide range of cross-disciplinary programming that has expanded in more recent years to include Asian American issues, the effects of globalization, and issues in Asia including the status of women, environmental challenges and rapid urbanization. The Northern California chapter opened in 1998, hosting a variety of business-focused, cultural and high-level policy-related events.



5. TRADE AND TOURISM

Poised for a Breakout?

The flow of goods, services and visitors between countries, while not presenting a full picture, is perhaps the most direct indicator in an economic relationship.

Direct economic benefits from manufactured trade passing through an area where major harbors and international airports are located—cargo handling, warehousing and distribution, fueling and repair services, tug and barge operations, cargo vessel and jet maintenance and repair, freight brokerage, trade finance and legal services, etc.—are obvious.

Measuring trade using only data from ports of entry and departure often misses the bigger question of where primary value is added; data can fail to capture intercompany transfers and e-commerce, where more trade today is now conducted; tourist arrival and departure data alone does not give a full picture of the economic contribution of a visit. It is important to go beyond raw numbers to understand the overall exchange of goods and services.

In the five years following China's 2001 entry into the World Trade Organization, U.S. exports to China grew from \$19.2 billion in value to \$55.2

billion; U.S. imports from China grew from \$102.3 billion to \$287.8 billion. China's two-way trade with the world more than tripled, from \$509.7 billion, to \$1.76 trillion.

U.S. West Coast harbors and airports were swamped with Chinese import cargo. China's low wages, government subsidies, concessionary loans and tightly controlled currency pegged to the dollar brought down global manufacturing costs. Low-cost Chinese products provided welcome breathing space for U.S. consumers at a time of stagnant wage growth, depleted savings and overextended credit.

This perfect storm fed a wave of discount retailing that, by 2005, added port calls, prompted expansion of cargo handling facilities and spurred new harbor warehousing and distribution center development along the I-80 and I-580 corridors, as far north as Reno, Nevada and east to Stockton and Tracy. Import container traffic from China through the Port of Oakland more than tripled over 2001–06, from 55,000 40-foot equivalent unit (FEU) containers to 188,000; exports doubled over 2002–05 from 52,000 FEU to 102,000.

China's Trade with the United States, 2002–12 (USD billions)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
U.S. exports	22.1	28.4	34.7	41.8	55.2	65.2	71.5	69.6	91.9	103.9	110.5
Percent change*	+14.7	+28.9	+22.2	+20.5	+32.0	+18.1	+9.5	-2.6	+32.1	+13.1	+6.5
U.S. imports	125.2	152.4	196.7	243.5	287.8	321.5	337.8	296.4	364.9	399.3	425.6
Percent change*	+22.4	+21.7	+29.1	+23.8	+18.2	+11.7	+5.1	-12.3	+23.1	+9.4	+6.6
U.S. balance	-103.1	-124.0	-162.0	-201.6	-232.5	-256.3	-266.3	-226.8	-273.1	-295.5	-315.1

Source: U.S. International Trade Commission (ITC), U.S. Department of Commerce

*Calculated by The US-China Business Council. U.S.; exports reported on a free-alongside-ship basis; imports on a general customs-value basis.

China Services Trade, 2011 and 2012 (USD billions)

	Imports		Exports	
	2011	2012	2011	2012
Travel	2.691	2.812	5.689	6.486
Passenger Fares	0.614	0.678	2.051	2.284
Other Transportation	3.081	3.142	2.358	2.308
Royalties and License Fees	0.186	0.5	4.114	4.817
Other Private Services	4.757	5.858	12.49	14.138
Total Private Services	11.329	12.990	26.702	30.033

Source: Bureau of Economic Analysis (BEA), U.S. Department of Commerce

Top Bay Area imports included furniture, electronics, computers, toys, plastic products, tools, tires and sporting goods. Top exports were aluminum ingots and shapes, animal feed, beverages, industrial clay, cotton, dried fruits and nuts, pharmaceuticals, earths/minerals, food products and hay. Non-containerized bulk exports included scrap metal, wood pulp, petroleum products and chemicals.

Nearly \$9 billion in Chinese air cargo imports entered San Francisco, Oakland and San Jose International Airports in 2005. Products ranged from fashion apparel and luggage to pharmaceuticals, seafood, gems, fresh-cut flowers and electronics. Some \$6.8 billion in Bay Area exports included fresh and frozen fruit and vegetables, vitamins, cosmetics, lab reagents, semiconductors, medical devices, machine tools and data processing equipment.

Total two-way manufactured trade with greater China through the San Francisco Customs District in 2005 was nearly \$27 billion: \$18 billion in imports, and \$9 billion in exports.

Since then, from 2006–12, two-way U.S.-China trade has grown steadily, with the exception of 2009 at the peak of the world recession. U.S. exports to China doubled, while imports from China increased by nearly half (48 percent); the U.S. trade deficit grew by over 35 percent.

In 2012, the U.S. was China's top trading partner, its top export destination and its fourth largest import supplier; China grew to become the third largest market for U.S. manufactured exports, after Canada and Mexico.

Regarding services, the U.S. Commerce Department's Bureau of Economic Analysis (BEA)

reports that in 2012, China ranked fourth globally as a purchaser of U.S. service exports (\$30.03 billion) and tenth as a provider of services to the U.S. (\$12.99 billion). This trade is broken out in the table above.

U.S. service exports to China have increased steadily every year since 1992, and have tripled from \$8.4 billion in 2005. Imports of services from China have increased in all but three years since 1992, and have doubled from \$6.15 billion in 2005.

The "Other Private Services" category referenced above is mainly comprised of education, financial services, insurance services, telecommunications, and a catch-all category, "business, professional and technical services," which is where the bulk of total U.S.-China services trade is conducted. Of the nearly \$12.5 billion in 2011 "Other Services" exports to China, \$10.3 billion was direct, unaffiliated trade, while another \$2.2 billion was inter-company business involving U.S. parent firms or affiliates. U.S. firms exported nearly \$5.2 billion in business, professional and technical services to China in 2011—the largest single services category. Topping the list of these services, in order, were

- architecture, engineering and construction;
- installation, maintenance and repair of equipment;
- management consulting;
- operational leasing; and
- industrial engineering.

Chinese firms provided nearly \$4 billion in business, professional and technical services to U.S. customers. The top services categories were

- research, development and testing;

- computing/data processing; and
- installation, maintenance and repair of equipment.

During 2005–11, U.S. services exports to Hong Kong increased from \$3.8 billion to \$6.1 billion, while imports grew from \$5.0 billion to \$6.9 billion. During that same period, service exports to Taiwan increased from \$5.8 billion to \$10.5 billion, and imports rose from \$6.4 billion to \$6.7 billion. As with mainland China, most of the services moving in either direction involved business, professional and technical services.

Drilling Down to the Regional Level

California two-way trade with China totaled nearly \$142 billion in 2012—\$127.7 billion in imports and \$14 billion in exports, according to the Governor's Office of Business and Economic Development. A report from The US-China Business

Council (USCBC) lists the California's top exports to the PRC as follows:

Computers and electronics	\$3.9 billion
Waste and scrap	\$2.4 billion
Machinery (except electrical)	\$1.4 billion
Transportation equipment	\$1.4 billion
Chemicals	\$878 billion

USCBC's estimate of \$13.6 billion in California exports to China in 2012 is down slightly from \$13.9 billion in 2011, but well above the \$10.7 billion reported in 2008.

The Council's report, "U.S. Congressional District Exports to China: 2003–12", cross-references U.S. Census Bureau, U.S. Department of Agriculture and Moody's Analytics trade and business databases to obtain a more detailed snapshot of export origination by congressional district and county. Its export profiles for 12 Bay Area congressional districts are as follows:

District 2: Marin, Napa, Sonoma and other Counties

2012 China exports:	\$216 million
Export growth to China, 2003–12:	297 percent
Top 5 exports to China:	Crop production; computers/electronics; seafood; machinery; waste/scrap.

District 5: Contra Costa, Napa, Solano and Sonoma Counties

2012 China exports:	\$226 million
Export growth to China, 2003–12:	310 percent
Top 5 exports to China:	Crop production; computers/electronics; beverages; machinery; petroleum/coal products

District 9: Contra Costa and other Counties

2012 China exports:	\$207 million
Export growth to China, 2003–12:	310 percent
Top 5 exports to China:	Transportation equipment; crop production; processed foods; waste/scrap; petroleum/coal products.

District 11: Contra Costa County

2012 China exports:	\$179 million
Export growth to China, 2003–12:	287 percent
Top 5 exports to China:	Petroleum/coal products; transportation equipment; chemicals; primary metal manufacturing; computers and electronics.

District 12: San Francisco County

2012 China exports:	\$45 million
Export growth to China, 2003–12:	176 percent
Top 5 exports to China:	Waste and scrap; seafood; computers/electronics; chemicals; primary metals manufacturing.

District 13: Alameda and San Francisco Counties

2012 China exports:	\$255 million
Export growth to China, 2003–12:	202 percent
Top 5 exports to China:	Transportation equipment; waste/scrap; computers/electronics; machinery; chemicals.

District 14: San Francisco and San Mateo Counties

2012 China exports:	\$177 million
Export growth to China, 2003–12:	78 percent
Top 5 exports to China:	Transportation equipment; computers and electronics; waste and scrap; crop production; machinery

District 15: Alameda and Contra Costa Counties

2012 China exports:	\$386 million
Export growth to China, 2003–12:	210 percent
Top 5 exports to China:	Transportation equipment; computers and electronics; machinery; waste/scrap; petroleum/coal products.

District 17: Alameda and Santa Clara Counties

2012 China exports:	\$1.33 billion
Export growth to China, 2003–12:	58 percent
Top 5 exports to China:	Computers/electronics; machinery; transportation equipment; chemicals; electrical equipment.

District 18: San Mateo, Santa Clara and Santa Cruz Counties

2012 China exports:	\$442 million
Export growth to China, 2003–12:	54 percent
Top 5 exports to China:	Computers and electronics; machinery; chemicals; transportation equipment; miscellaneous manufacturing.

District 19: Santa Cruz County

2012 China exports:	\$327 million
Export growth to China, 2003–12:	20 percent
Top 5 exports to China:	Computers/electronics; machinery; transportation equipment; waste/scrap; miscellaneous manufacturing.

District 20: Santa Clara, Santa Cruz and other Counties

2012 China exports:	\$141 million
Export growth to China, 2003–12:	135 percent
Top 5 exports to China:	Computers/electronics; waste/scrap; machinery; processed foods; crop production

Bay Area companies across a range of industries have secured a foothold in the China market. The industries span technology and a wide range of services as well as consumer goods. In the apparel sector, for example, outdoor apparel company **North Face** has grown its sales in China from \$60 million to \$1.7 billion in the last ten years, with year-on-year growth averaging 50 percent. North Face clothing is carried in more than 600 stores throughout China. **Levi Strauss** has operated in China for more than a decade. In the China market for only two years, by the fall of 2013 **Gap Inc.** already had 73 stores in 19 cities in mainland China, with plans to go to 80 by early 2014. The company's first Old Navy store in China will open in Shanghai in the spring of 2014, and the Gap brand will expand to Taiwan.

Retailers such as North Face, Levi Strauss and Gap benefit from strong brand awareness—for which many customers are prepared to pay a premium—and a consumer market that is moving upscale. Brand awareness has also exacerbated problems with counterfeit goods, which are rampant. Increasingly, affluent Chinese consumers are gravitating to the prestige and quality of recognized brands. For companies such as North Face, however, the scale of the knock-off market may exceed actual company sales.

The Bay Area's Tesla Motors faces similar opportunities and challenges. **Tesla** first tested the market in Hong Kong, with a robust response (hundreds of would-be purchasers paid \$500–\$42,500 for reservations). Pre-order Model S bookings on the mainland opened in August 2013, with an 8,000-square-foot LEED Platinum certified showroom scheduled to open in Beijing. While Tesla is in a strong position to establish itself in the high-end market, competition for the mass market from domestic companies such as BYD will be strong. The company has also been engaged in a trademark dispute with a Chinese businessman who acquired rights to the Tesla

name (in Chinese characters), the Tesla T logo, and the Tesla logo. While uptake on all-electric vehicles has been slow to date, the Chinese government is actively supporting alternative energy vehicle deployment, with subsidies of up to \$10,000 for all-electric cars.

U.S. Census trade data focuses on the various harbor, airport and inland gateways that make up the San Francisco Customs District. As a result, figures include not only goods produced in or destined for end users in the Bay Area, but also cargo passing through en route to and from other locations. Still, gateway data is a useful indicator of aggregate transportation, cargo handling and related trade support activities in the region.

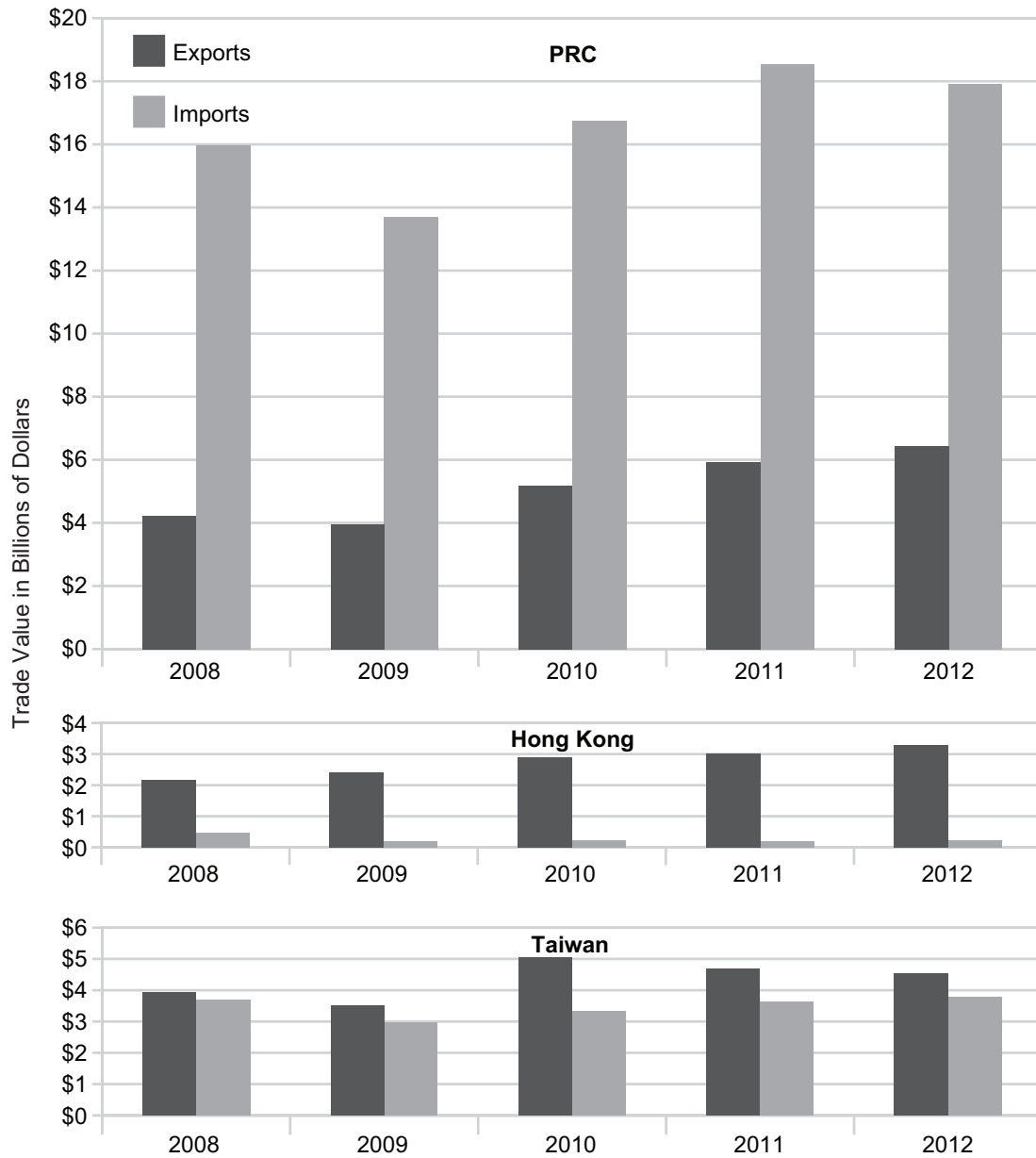
PRC imports destined for the San Francisco Bay region and throughout the U.S. continue to outpace exports, but the Bay Area enjoys a more balanced trade with Taiwan. An apparent trade surplus with Hong Kong may actually reflect increased transshipment cargo into China or elsewhere in Asia.

When the USCBC congressional district/county origin data is overlaid onto the Census District PRC trade figures, a significant data point emerges: some \$4 billion of the total \$6.4 billion in 2012 U.S. exports moving through the San Francisco Customs District to China—nearly two-thirds—originated within the San Francisco Bay region.

While the San Francisco district runs a net trade deficit with China by value, exports moving by volume—petroleum products, soybeans, steel, machinery, bulk minerals and oils, industrial clays and earths, fertilizer—well exceed imports. Most of these cargoes move via bulk shipping.

Higher-value imports—auto parts, retail merchandise, home and garden supplies, furniture, appliances, electronics—move in containers, most via Oakland. Richmond and Martinez alone saw cargo growth in 2012 reflecting increased shipments of bulk petroleum products and, at Richmond, automobile imports.

Trade Flows through San Francisco District Ports/Airports, 2008–12 (USD billions)



Source: U.S. Census Bureau USA Trade Online; analysis by Bay Area Council Economic Institute

Imports from China through Top Bay Area Ports/Airports, 2011–12 (by USD value)

By Water	2011	2012
Port of Oakland	13,436,625,321	12,499,541,756
Port of San Francisco	356,152,974	313,295,501
Port of Richmond	40,087,607	63,608,394
Port of Stockton	30,223,451	51,887,287
By Air	2011	2012
SF Intl. Airport	4,691,884,425	4,947,998,921
Oakland Intl. Airport	2,704,509	1,368,710
San Jose Intl. Airport	1,026,297	2,099,891
Sacramento Intl. Airport	207,094	170,639

Source: U.S. Census Bureau USA Trade Online

Top 10 Import Commodities, 2011–12

By Air	By Water	By Value	By Volume
Electric machinery	Mineral fuel/oil	Electric machinery	Home furnishings
Integrated circuits	Crude oil	Nuclear power eqpt.	Plastics products
Nuclear power eqpt.	Vehicles	Data processing eqpt.	Electric machinery
Data processing eqpt.	Nuclear power eqpt.	Telecom eqpt.	Glassware
Optical/medical eqpt.	Electric machinery	Office machine parts	Nuclear power eqpt.
Telecom eqpt.	Data processing eqpt.	Integrated circuits	Iron/steel products
Office machine parts	Petroleum/coal oil	Broadcasting eqpt.	Fertilizers
Repaired/returned goods	Beverages/spirits	Optical/medical eqpt.	Toys/games/sports eqpt.
Semiconductor eqpt.	Home furnishings	Elect. transmission eqpt.	Vehicles
Semiconductor devices	Apparel	Television/video eqpt.	Chemicals/rare earths

Source: U.S. Census Bureau USA Trade Online

Exports to China through Top Bay Area Ports/Airports, 2011–12 (by USD value)

By Water	2011	2012
Port of Oakland	2,901,691,057	3,028,182,134
Port of San Francisco	204,083,731	116,800,361
Port of Richmond	75,598,188	68,943,631
Martinez	59,730,473	19,619,484
Port of Stockton	48,144,556	43,752,910
By Air	2011	2012
SF Intl. Airport	2,553,475,445	3,100,132,932
Oakland Intl. Airport	12,737,009	10,897,942
San Jose Intl. Airport	12,288,667	14,409,205
Sacramento Intl. Airport	4,291,777	4,087,991

Source: U.S. Census Bureau USA Trade Online

Top 10 Export Commodities to China through U.S. Airports/Ports

By Air	By Water	By Value	By Volume
Electric machinery	Wood Pulp	Electric machinery	Wood pulp
Optical/medical eqpt.	Wastepaper	Nuclear power eqpt.	Wastepaper
Oscilloscopes	Fruits/nuts	Optical/medical eqpt.	Mineral ore
Telecom eqpt.	Meat	Telecom eqpt.	Iron ore
Nuclear power eqpt.	Optical/medical eqpt.	Data processing eqpt.	Mineral fuel/oil
Data processing eqpt.	Aluminum products	Semiconductor eqpt.	Petroleum coke
Integrated circuits	Nuclear power eqpt.	Oscilloscopes	Iron/steel
Semiconductor eqpt.	Aluminum scrap	Semiconductor devices	Scrap iron
Semiconductor devices	Cotton/yarn/fabric	Integrated circuits	Forest products
Medical instruments	Photographic products	Test/measurement eqpt.	Plastics products

Source: U.S. Census Bureau USA Trade Online

Strong Export Potential for California Wine

China's wine market has grown dramatically in recent years, with sales of 266 million liters valued at \$41 billion in 2012, up 20 percent from 2011; China's wine imports are projected to grow by 54 percent over 2011–15, according to research prepared for Vinexpo, a trade show held alternating years in Hong Kong and France. Per capita consumption is still only a small fraction of that in Western countries.

The U.S. ranks sixth among exporting countries supplying the China market, with about a 5 percent share—well behind France (48 percent) and Australia (13 percent), Spain (10 percent), Chile (8 percent) and Italy (7 percent).

California accounts for 90 percent of total U.S. wine exports, according to the San Francisco-based **Wine Institute**. The state shipped \$1.43 billion in exports overseas in 2012, up 2.6 percent from 2011. China imported \$74 million worth of California wines in 2012, up 18 percent from 2011 and double the value shipped in 2010, making it California's fifth largest wine export market.

A major growth constraint is perception. Chinese consumers are largely unaware of higher-end California wines, and distributors expect a low price point—and volumes—that craft wineries often cannot meet. Hanson Li, head of cross-border investment banking and private equity firm **Hina Group's** San Francisco office, says California's wine export dilemma lies in the United States' huge domestic market, which consumes most of what is produced and where the biggest wine distributors are owned by large food companies. "When a Napa winemaker decides to expand, the wine goes to Atlanta, New York or Boston," he says. "They don't know how to export."



China sales growth has partly stemmed from tourism, with Napa and Sonoma Valley increasingly on the itineraries of affluent Chinese visitors, plus more aggressive marketing by the state. The Wine Institute, for example, partnered with the public-private trade promotion agency Visit California to organize two wine delegations to China in April and June 2013, linked to Governor Brown's visit. It also coordinated participation of 120 California wineries in a California Wines Pavilion at the Vinexpo Asia Pacific trade show in May 2012.

Most California wine exports to greater China ship via Hong Kong, which eliminated duties and administrative controls on wine in 2008 in order to position itself as a regional wine trading and distribution hub offering specialized logistics and warehouse storage, as well as promotional events. Under the Mainland-Hong Kong Closer Economic Partnership Arrangement (CEPA), wine fermented and bottled in Hong Kong can enter China duty-free; imported wine entering via Hong Kong pays a 20 percent tariff. Wine imported directly into the PRC incurs duties and taxes of 38–56 percent.

From 2007–12, Hong Kong wine imports increased four-fold, to 50.6 million liters valued at HKD 8.1 billion; 37 percent was re-exported, mostly to the mainland and Macau, with the rest consumed in Hong Kong. That included HKD 1.2 billion in sales of premium, investment-grade wines at auction in 2012. U.S. wine exports to Hong Kong represented only 6.4 percent of that market in 2012.

A recent Bain Capital study of the global luxury goods market cited in SVB's 2013 Wine Report, points to broadening interest in wine among affluent Chinese consumers, from very wealthy collectors of rare French vintages to younger professionals, especially frequent travelers, with a concurrent rise in e-commerce, direct-to-consumer winery sales and wine tourism.

In September 2012, China UnionPay, San Francisco-based card processing and co-branding intermediary **NuPay System International**, **East-West Bank** and San Francisco e-commerce marketer **The California Place** hosted a St. Helena seminar to support area wineries with direct-to-consumer sales as well as exports to China. NuPay's My Wine Card—a premium gift card currently offered initially through Chong Hing Bank in Hong Kong, provides special discounts on duty-free red wines popular with Chinese consumers. The card enables Chinese tourists to easily buy wine in California and have it shipped home, and includes a concierge 'help desk' service. The California Place is opening an e-commerce portal in 2013, and a physical store in Shanghai in 2016, that will import and sell California wines through Chinese foreign trade zones.

A Matter of Geography

More than a third of U.S. container imports from Asia enter the U.S. through Southern California, a massive population and manufacturing center in its own right and a major gateway to rail corridors serving the East, Midwest and Sunbelt states. Importers can alternatively shave 1–2 days off transit time to Chicago or New York by shipping via the Pacific Northwest. As a result, container lines tend to run loop services calling at Seattle-Tacoma or Los Angeles-Long Beach first, then calling at the Bay Area before returning to Asia. Relatively few lines call at Oakland first with inbound cargo. Two-way container cargo through Oakland has held steady in a range of roughly 850,000–900,000 FEU annually since 2005, totaling 889,000 in 2012. The difference has been in the balance of imports versus exports. In 2005, both were almost exactly in balance; in 2012, imports totaled 396,000 FEU while exports totaled more than 493,000.

That difference, in large part, is due to an ebb in China trade during the global downturn that has continued since; China accounts for 48 percent of containerized imports moving through Oakland, but less than 17 percent of exports, which continue to grow but from a smaller base. Slower demand has inhibited growth in new harbor warehousing and inland distribution center development tied to the Port, and in trucking and rail traffic.

Amid the rapid growth in 2004–05, the Port of Oakland was able to obtain federal funds to complete dredging of harbor channels and terminal berths to accommodate larger container-ships. Lines expressed interest at the time in inbound first calls and held trials. As cargo demand eased, however, those services proved unsustainable. The Port is making a bet on future growth with the \$500 million development of the vacant 160-acre former Oakland Army base—now the Gateway Industrial District—with added container terminal acreage, near-dock rail access and logistics facilities.

Another critical piece of the puzzle for Oakland is the widening of the Panama Canal to accept larger ships, a project that will be completed by the end of 2014. Canal expansion is expected

to mean less inbound container cargo from Asia that is destined for transshipment by rail to the east, as more shipping moves by water via Panama directly to Atlantic and Gulf Coast ports.

In 2010, the Port strengthened its ties with China through a memorandum of understanding with China Merchant Holdings (International) Company Limited (CMHI), a leading Chinese container terminal operator and logistics provider. The agreement creates a strategic relationship by establishing joint services and benefits for shippers and ocean carriers. CHMI currently controls one-third of Chinese container traffic.

Up in the Air

On the air freight side, few international carriers operate pure air cargo services out of San Francisco, Oakland or San Jose international airports, because regional volumes similarly tend to concentrate in Southern California. Niche international airlines in Asia are maintaining pure air cargo service for specific customer bases, but most airlines are scaling back and combination passenger-cargo service is declining. The strongest growth has been at package express carriers such as Federal Express, United Parcel Service and DHL, with an expanding online fulfillment cargo base from retailers like Amazon.com.

Oakland remains the dominant Bay Area airport for these services, with FedEx and UPS hubs, but San Jose has been gaining market share due to improved facilities and proximity to Silicon Valley, where companies originate shipments of high-value, time-sensitive electronics products and components. FedEx, meanwhile, is undertaking a \$30 million upgrade to its 75-acre Oakland sorting facility, where it employs 1,300 workers. The expansion will increase international sorting capacity four-fold and domestic capacity by 40 percent, and will accommodate larger, more fuel-efficient Boeing 777 planes. The added capacity is tied, in part, to the opening of new FedEx hub facilities in China and India.

U.S.-China Trade in Perspective

As mentioned previously, weaknesses in the data make it easy to inflate the economic impact of

trade with China, particularly in discussing trade imbalances. In a 2011 economic letter, "The U.S. Content of 'Made in China'," the Federal Reserve Bank of San Francisco (FRBSF) examined the share of U.S. consumer spending allocated to goods and services "made in China" and how much of that share reflects the actual costs of Chinese imports paid to a Chinese seller.

FRBSF conducted its research in part to understand the true scope and impact of the U.S. merchandise trade deficit with China, but also to measure the potential impacts of Chinese inflation on consumer prices over time. The study produced some noteworthy findings. Among them are the following:

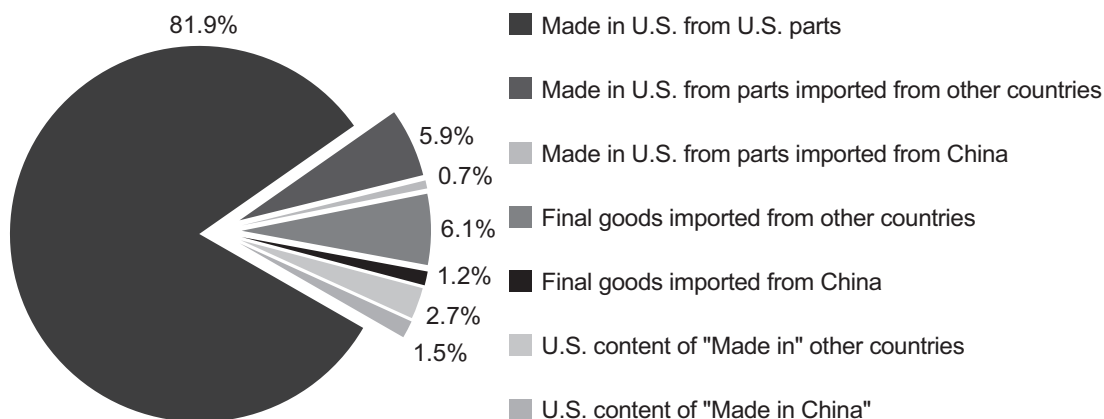
- Imports amounted to 16 percent of U.S. GDP in 2010, but imports from China comprised only 2.5 percent of U.S. GDP.
- Chinese-made goods sold in the U.S. are still concentrated in a small number of retail and industrial sectors; they comprise 20 percent of U.S. consumer purchases of furniture, household goods/appliances and electronics; 35 percent of clothing and footwear purchases; and smaller shares in other categories like tools, hardware, toys, bicycles, sporting goods, building and garden supplies, and so on.
- Foreign goods make up only 11.5 percent of total U.S. consumer spending, with Chinese goods accounting for a quarter of that at 2.7 percent.

- Less than half of that 2.7 percent share—1.2 percent of consumer spending—represents the actual cost of the imported Chinese goods after U.S. transportation, marketing and branding, warehousing, distribution and retail activities are backed out.
- Of every dollar spent by U.S. consumers on goods labeled "Made in China," an average of 55 cents is spent on services originating in the U.S.
- Factoring in the cost of Chinese-produced inputs to consumer goods sold in the U.S., the Chinese share of U.S. consumer spending is 1.9 percent.

FRBSF also cites the example of an Apple iPhone sold in the U.S. in 2009 for \$500 (a portion of that cost carrier-subsidized), with an estimated \$179 cost of "manufacture" in China. Of that amount, \$172.50 was for components sourced globally (including \$10.75 in U.S.-made inputs to foreign-sourced components) and \$6.50 was for assembly in China.

Along these same lines, McKinsey & Company developed a domestic value-added exports (DVAE) measure in 2010 as part of an effort to assess Chinese exports' actual contribution to China's GDP during the global downturn. This was done by backing out raw materials, parts and sub-assemblies imported for use in the manufacture of finished export products.

Geography of U.S. Personal Consumption Expenditures, 2010



Source: Bureau of Economic Analysis, Bureau of Labor Statistics, Census Bureau; analysis by FRBSF

Measuring total export growth relative to total GDP growth, a standard benchmark, China's exports have typically been characterized as contributing an average of 60 percent to real GDP growth since 2000. Using the DVAE measure, McKinsey estimated that only about half of the total value of Chinese exports reflects actual value added in China, and that exports contributed only 19–33 percent of annual GDP growth from 2002–08.

At the same time it should be noted that China's export mix is gradually moving up the value chain and, as it does, domestic content is increasing as a share of finished product. Over 2011–12, Chinese exports of electronics products and components, computers, auto parts and optical devices grew 24 percent to \$129 billion, even as apparel and footwear shipments increased only 5 percent to \$47 billion. This is also in part a reflection of rising PRC production costs and the migration of lower-end manufacturing to elsewhere in Asia or to Latin America. Analyses by the WTO and OECD confirm that the share of local content in Chinese exports overall is rising. *The Wall Street Journal* cites a Hangzhou company, Inventronics, Inc., as an example of the trend. The company, founded in 2007, makes LED lighting power supply units and has grown in six years to a workforce of 1,000. Inventronics units power the nighttime light display on the San Francisco Bay Bridge; while its primary suppliers are in China, the integrated circuits in its units are from the U.S.

Policy Concerns

In its 2012 Report to Congress on China's WTO Compliance, the Office of the United States Trade Representative (USTR) asserts that by 2006, having substantially met its commitments as a WTO member, China was moving to consolidate and strengthen its state-owned enterprises (SOEs) in ways that "led to institutionalized preferences for state-owned enterprises and the creation of national champions in many sectors." Key issues that were raised included

- technology transfer requirements as a precondition for foreign direct investment in China;

- use of antidumping and countervailing duties investigations as retaliation for unrelated actions by foreign countries that China finds objectionable;
- inadequate enforcement of intellectual property rights, particularly with regard to trade secrets and to online and software copyrights;
- delays in opening China's government procurement system to foreign suppliers as required under WTO rules;
- export restrictions on rare earths, tungsten and molybdenum, for which there is significant global demand and China is the dominant global producer, and on upstream raw materials used in the production of aluminum and chemicals, where China also competes with buyer countries;
- China's establishment of a national champion, UnionPay, as the exclusive provider of electronic credit card payment processing services, through which all foreign credit card firms must process transactions for a fee, versus using their own networks; and
- central government and provincial subsidies to auto parts manufacturers in regions of China designated as "export bases."

More recently, a dispute directly affecting Northern California surfaced regarding tech exports. WTO talks over expanding a multilateral 1996 Information Technology Agreement (ITA) broke down in July 2013 over China's objection to including 148 technology products on a list of 256 targeted for tariff elimination. Among the products in contention were semiconductor manufacturing equipment, high-end memory chips, medical devices and audio-visual equipment such as DVD players and video cameras. The expanded product list would cover an additional \$800 billion in trade and would translate into a further \$2.8 billion in U.S. exports annually. China maintains that the items in contention are "sensitive" and is reportedly reluctant to abandon the tariffs it uses to encourage indigenous innovation.

High levels of government subsidy to industry have raised issues of competitive fairness for many foreign companies and their governments, leading to a range of investigations and in some cases significant compensatory tariffs (for example, for telecommunications equipment, automobiles,

steel and solar panels). One recent analysis finds that companies listed on China's stock exchanges received more than \$13 billion in subsidies in 2012, up 23 percent from 2011 and equivalent to 4 percent of those companies' total profits.

Subsidies come from both national and local government in the form of cheap land, tax rebates, support for loan repayments, and cash, often connected to economic development, R&D, environmental or other goals, such as the creation of national companies that can lead in global markets. Analysis by Hithink finds that more than half of the 2,400 companies listed in mainland China receive government support, of which more than half are state-owned enterprises.

Intellectual property (IP) protection and cyber security are also continuing concerns, particularly for many Bay Area companies whose product value is IP-based. A 2013 report by the independent bipartisan Commission on the Theft of Intellectual Property found that annual losses to the U.S. economy from international IP theft total some \$300 billion per year, 50 percent to 70 percent of which (depending on the industry) is linked to China.

The report, reflecting analyses from a variety of sources, attributes this to industrial policy goals that encourage IP theft and an extraordinary number of Chinese business and government entities engaged in the practice. While, under foreign pressure, administrative improvements have been made that address these concerns, their application has been uneven and, if anything, cyber attacks are increasing.

High-profile hacks of the *New York Times*, *Wall Street Journal*, Google and other firms have been reported. In early 2013 Mandiant, a major private security company, traced "one of the most prolific cyber espionage groups in terms of the sheer quantity of information stolen" to a People's Liberation Army intelligence facility in Shanghai, one of 20 Advanced Persistent Threat (APT) groups it had been tracking in China.

Mandiant found that the unit has "systematically stolen hundreds of terabytes of data from at least 141 organizations" spanning "broad categories of intellectual property, including technology blueprints, proprietary manufacturing processes, test results, business plans, pricing documents,

partnership agreements, and emails and contact lists from victim organizations' leadership," adding that the targeted companies "match industries that China has identified as strategic to their growth, including four of the seven emerging industries that China identified in its 12th Five-Year Plan."

Finally, it should be noted that political issues can impact trade in both directions, particularly for larger U.S. companies doing business with government-affiliated entities. Sales by Bay Area IT companies, for example, were likely impacted by public disclosures in 2013 of the National Security Agency's monitoring of global communications, as well as by issues surrounding market access in the U.S. for Chinese companies.

A Nascent Two-Way Tourism Trade

Tourism is an especially high-value services trade. Its benefits ripple out beyond air fares, hotel rooms and car rentals, to include restaurant and retail sales, and support services from taxis to tour guides to conference organizers, parking services, sporting events and the arts.

While business travelers arriving in the U.S. from China are hardly a new phenomenon, it was only in December 2007 that China granted the U.S. "approved destination status," allowing Chinese citizens to visit as tourists. At that time, 397,000 Chinese nationals visited the U.S. annually, spending an average \$6,000 per person while here, for an average three-week stay. An estimated 275,000 visited California in 2008.

As China's emerging middle class broadens its horizons, Chinese vacation travelers are emerging as a fast-growing market. The Bay Area is a prime destination, for many reasons: it is the closest destination on a long trans-Pacific flight; many visitors have friends or family here; the region boasts the largest Chinese community outside of China and cultural ties dating back 160 years; and it is home to iconic attractions such as the Golden Gate Bridge, cable cars, Chinatown, Silicon Valley and the Napa-Sonoma wine country.

The U.S. Department of State, which issues travel visas and records visitors on a fiscal year basis (October 1 through September 30), reports

nearly 1.5 million Chinese visitors in the U.S. during 2012, up from 1.18 million in fiscal 2011; China's National Tourism Administration (NTA) forecasts 2 million visitors annually by 2015.

Until early 2012, many prospective Chinese visitors were discouraged from traveling to the U.S. by the burdensome tourist visa process, an outgrowth of 9/11 security initiatives. Visas could only be obtained through the U.S. Embassy in Beijing and four consulates in Chengdu, Guangzhou, Shanghai and Shenyang. An in-person interview is required and high demand created two-month average wait times in Beijing and Shanghai in 2011.

China views this as a trade issue: the visa process disadvantages its international air carriers because they are heavily reliant on outbound travelers for their core business. As a result, the government has been slow to expand landing rights in Tier 2 and Tier 3 cities to U.S. passenger airlines—another reason is that China's military only opens 30 percent of the country's airspace for commercial flights—and the existing international airports are limited in number and are at or near capacity.

Beginning in 2012, the State Department has expedited Chinese tourist visas with expanded embassy and consulate waiting areas and office space, more interview windows and added staff, cutting wait times in most cases to about a week; repeat visitors can renew their visas through a bank drop-off service, with processing as quickly as five days. In the first two quarters of fiscal 2012, State had issued 453,000 visas. By the end of the third fiscal quarter (June 30), a year-to-date total of more than 1 million visas had been issued.

Tourism Trends

An average Chinese tourist's stay in the U.S. is two weeks. Most trips center on some mix of four destinations: San Francisco, Los Angeles, Las Vegas and New York City. Most visitors book their trips through travel agents, and tend to use agents in the big cities with more experience and relationships with major tour groups.

China's NTA has opened a Visit USA Center in Shanghai, and has made presentations in Tier 2

cities such as Chongqing, Chengdu, Shenyang and Dalian to educate agents about U.S. travel. In November 2011, Visit USA teamed up with the U.S. Commerce Department to host a U.S. tour by more than 30 agents, to connect them with pre-screened travel providers.

The Chinese Tourism Academy reports that vacations now make up 85 percent of outbound Chinese travel, owing to several factors, among them an appreciating Chinese currency, more public holidays, reduced travel restrictions, more travel product and service options, and more Approved Destination Status countries.

Top travel trends among Chinese visitors going abroad include the following:

- Sightseeing and shopping are the major purposes of leisure trips.
- Travel spending grew by 25 percent in 2011, to \$69 billion, and is estimated to have reached \$85 billion for 2012.
- Travel is highly seasonal, in May, October and December.
- Younger, high-income professionals account for much of the growth in travel demand.
- More visitors are moving away from price-based tours to more individualized visits.
- Most travelers research trips online, but most bookings are still made through travel agents.

Recent visitors spend more time at fewer locations for a more in-depth experience; cost is still the main driver in choosing a destination; other factors include safety, good food (preferably Asian), comfort (Chinese-style service standards, cultural sensitivity) and world-famous landmarks. Shoppers look for Chinese-friendly service, bilingual staff, acceptance of China UnionPay credit cards and international shipping.

San Francisco International Airport (SFO) is the only Bay Area airport with scheduled passenger flights to and from greater China. In 2012, 4.3 million passengers traveled to and from Asia via SFO—about 45 percent of its total 9.5 million international passengers, and a 5 percent increase from the nearly 4.1 million Asia passengers in 2011. SFO is one of only 10 U.S. airports with non-stop connections to China, Taiwan and Hong Kong.

The airport does not provide a breakdown of Asia regional data by country, and total passenger

numbers include travelers passing through on connecting flights. San Francisco Travel (formerly the San Francisco Convention and Visitors' Bureau) estimates that San Francisco hosted some 4 million international visitors in 2011, up 10 percent from 2010 and 30 percent from 2009. Of that 2011 total, some 800,000 visitors arrived from Asia, including 198,000 from China, 60,000 from Taiwan and about 50,000 from Hong Kong.

More than a third of Chinese visitors were traveling on vacation, and more than a quarter came for business, 19 percent visited family or friends, and 13 percent were students. Up to 60 percent were connecting through to other U.S. locations, while 40 percent were staying in the area.

Most visitors from China still arrive in tour groups, spend a day and night in the Bay Area taking photos of major attractions, drive down the coast to Los Angeles, and from there head east to Las Vegas, stopping on the way at outlet malls that have sprung up in Barstow and elsewhere along the route. From there they continue either to the East Coast, mainly New York City, or to Hawaii before returning home.

San Francisco Travel executive vice president for tourism Tom Kiely says that little by little, however, the market is trending younger, more affluent and more sophisticated. "They're moving away from traveling in groups on a budget; they're staying at more affluent hotels, not out at the airport," he says. "They're shopping at some very high-end stores, but it's just beginning. We're working very hard to get them to stay in the city longer to enjoy all we have to offer. We expect to see a real shift over the next five to ten years."

The growing impact of Chinese shoppers can be seen at the Livermore Premium Outlets mall in the East Bay, where more than 54 buses of Chinese shoppers visited in the month of October 2013. More than half of Chinese visitors to the mall are individuals who are not on organized tours, suggesting that more than 5,000 Chinese visitors made purchases in Livermore in that month alone.

Kiely expects a short-term uptick in Taiwan visitors, following an October 2012 announcement by the U.S. Department of Homeland Security (DHS) adding Taiwan to its Visa Waiver Program (VWP). Under the VWP, visitors from 37

countries that meet DHS security and information requirements can obtain advance online authorization through the DHS electronic system for travel authorization (ESTA) and can visit the U.S. for up to 90 days without a visa. After South Korea was admitted to the VWP in 2008, Kiely said, the number of Korean visitors to the Bay Area nearly doubled. Singapore and Japan are the other Asian countries on the VWP list.

Rolling Out the Red Carpet

China became California's number one source of international visitors in 2012, when an estimated 677,000 Chinese tourists spent almost \$2 billion in the state, a 31 percent increase over 2011. Continued strong growth in tourism from greater China is expected, and California and the Bay Area have laid the groundwork for receiving it. In 2009, despite the recession and budget pressures, the California Travel and Tourism Commission (CTTC) opened offices in Beijing, Shanghai and Guangzhou to promote the state as a destination. San Francisco Travel has opened offices of its own in Shanghai and Beijing.

CTTC's marketing arm, Visit California, hosted 20 tour groups with a combined 650 Chinese visitors to the state in early 2012. It has also launched China Ready, a package of educational and promotional materials to help travel professionals better understand the culture and service requirements of Chinese visitors. Hotels and travel professionals have also established online presences on Chinese search portals like Baidu, and on travel sites such as Ctrip, where visitors research and plan their vacations.

Hilton, Starwood, Marriott and other hotel chains have introduced Chinese-friendly services at select hotels in areas popular with Chinese tourists, including in the Bay Area. Hilton's Huanying program, for example, provides a front desk team member fluent in Chinese; tea kettles, slippers, Chinese TV programming and a Chinese welcome letter in the room; and traditional Chinese breakfast, including congee, dim sum, Chinese tea and fried rice or noodles. Hilton reports that Chinese bookings at participating hotels in the first seven

months of 2012 increased 129 percent over the same period in 2011.

In 2012, four airlines—United, Cathay Pacific, Singapore and Air China—offered a combined 49 non-stop flights each week to Hong Kong, Beijing and Shanghai via SFO, with a combined weekly capacity for more than 16,000 passengers.

In March 2013, Air China increased capacity from B747 combi aircraft (passenger-cargo) to full-passenger aircraft, adding some 450 seats per week on its daily Beijing service. Later, in August, Air China extended this service with one-stop same-plane service via Beijing to the

interior city of Chongqing. China Eastern Airlines launched daily non-stop Shanghai flights in April with continuing one-stop same-plane service to Wuhan and Qingdao on alternating days, thereby adding over 1,600 seats per week to China.

In 2014, United Airlines will reinstate daily non-stop service to Taipei at the end of March, connecting San Francisco with the main hub of the new Star Alliance member, EVA Airways. Additionally, United will launch three-times-weekly, same-aircraft service to the interior city of Chengdu, via Shanghai, in June.

6. GROWING BUSINESS TIES

Affiliates and Invention

As China's economy grows and diversifies, its business ties to the Bay Area continue to grow and evolve. Earlier chapters described how Chinese immigrants represent increasing shares of science, technology, engineering and math occupations in the region as well as students in Bay Area universities. Chinese professional associations and networks help new immigrants get a foothold in the region's economy and help entrepreneurs get their businesses going.

While the Chinese community is diversifying and growing locally, cross-border invention and investment are also increasing. These activities that generate shared value serve to deepen the ties between the Bay Area and China. The presence of Chinese companies is on the rise in the Bay Area, as is the presence of Bay Area businesses in China.

Business Presence

Foreign companies make up an important part of the Bay Area's innovative ecosystem. Increasingly, foreign companies are opening up R&D centers in the region to tap into local talent pools and research facilities. The Bay Area is home to 96 affiliates of Taiwanese companies, 51 affiliates from China, and 38 from Hong Kong.

The PRC ranks second as a top location for Bay Area business affiliates abroad. Currently, there are 795 Bay Area affiliates located in the PRC, making up 8.6 percent of all Bay Area affiliates abroad. The Bay Area's representation abroad also includes 303 business locations in Taiwan and 216 in Hong Kong.

Research Collaboration

Bay Area inventors are increasingly collaborating with inventors in China. Patent registrations that

include a Bay Area inventor and at least one co-inventor located in China increased 422 percent between 2002 and 2012. In absolute terms, these patents have increased from 6 to 259 over the decade. Co-patenting activity with China-based inventors represents a growing percentage of all foreign co-patenting in the region, expanding from less than 1 percent in 2002 to 9.9 percent in 2012.

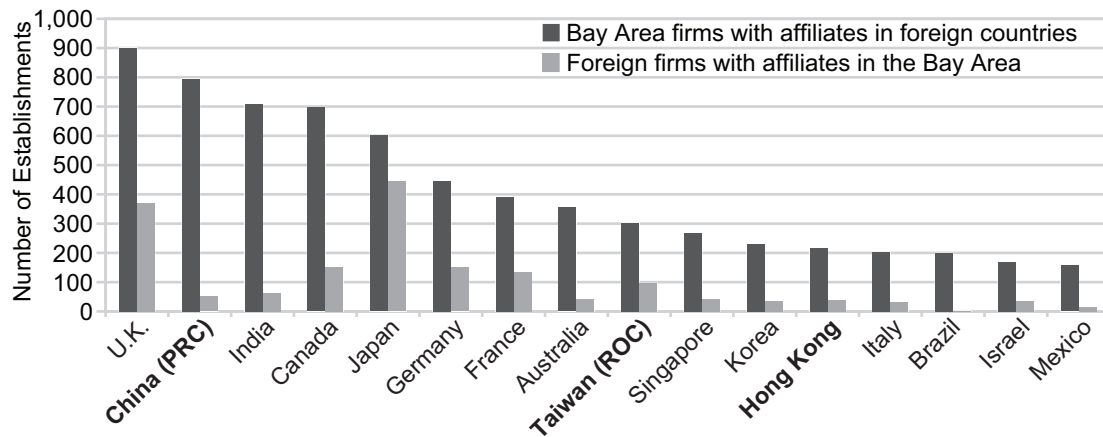
Co-patenting with China has increased particularly quickly in key technology areas. For example, since 2005–2006, registrations have increased by a factor of 5.7 in Computers, Data Processing & Information Storage and by a factor of 8.5 in Communications. With the exception of three technology areas—Apparel, Textiles & Body Adornment; Dispensing & Material Handling; and Furniture & Receptacles—all other technology areas have witnessed growth of at least 100 percent.

Financial Investment

Since the economic downturn in 2000, private equity and venture capital investment abroad by Bay Area firms has grown significantly. Venture capital in particular represents not just the flow of cash but also the flow of business acumen, as well as access to talent and technology. These high-value transactions require relationships of trust. Therefore, the growth of this activity is an indicator for growing interdependencies between economies.

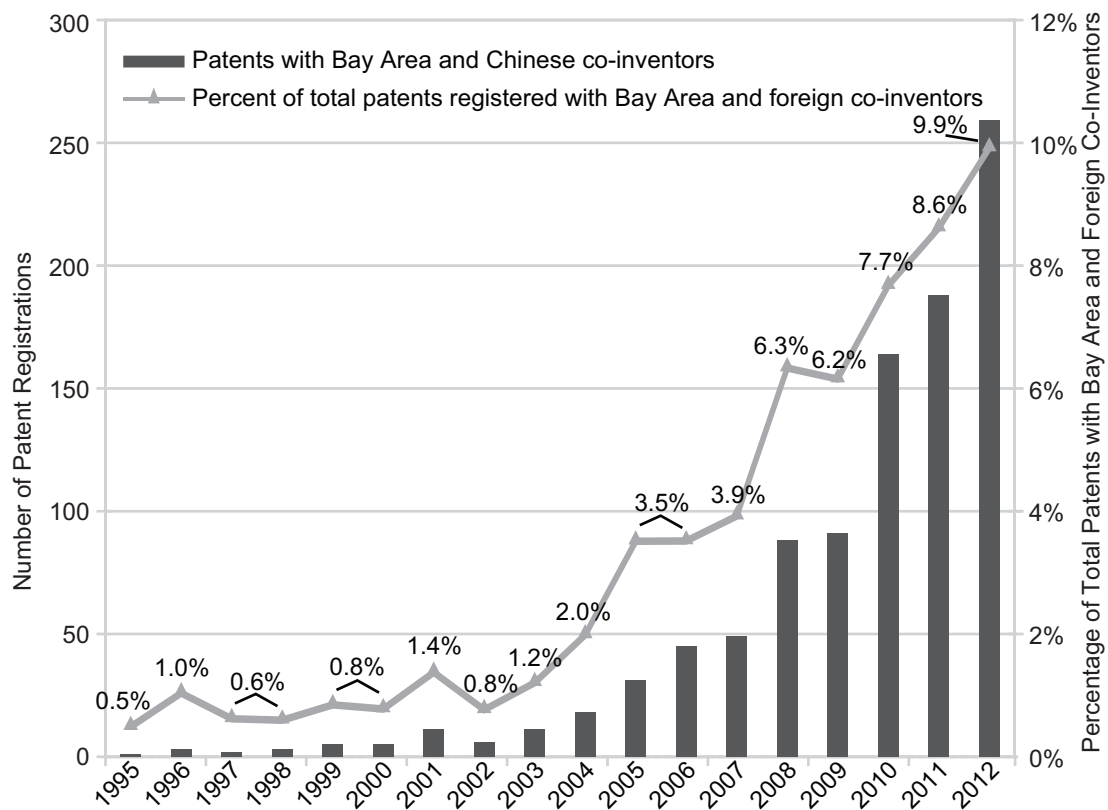
China accounts for a major part of this growing activity. While total investment waned in 2008 with the global financial crisis, the region's interest in investing in China held strong. Investment to China reached \$2.7 billion in 2011, representing 38 percent of all Bay Area investment abroad.

Foreign Affiliates in the Bay Area and Bay Area Affiliates Abroad, 2013



Source: Uniworld 2013; analysis by Bay Area Council Economic Institute

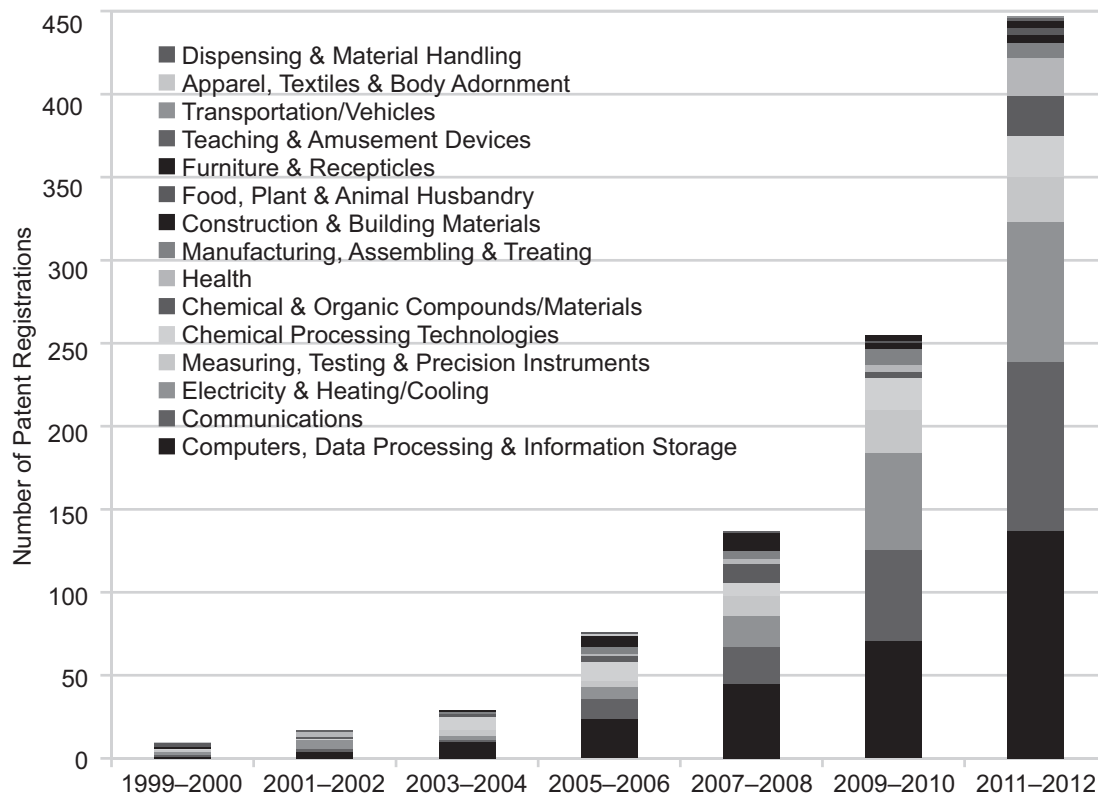
Patents with Bay Area and Chinese Co-Inventors



Source: U.S. Patent and Trade Office; analysis by Bay Area Council Economic Institute

Note: Patent counts refer to all patents with an inventor from the Bay Area regardless of inventor sequence number.

Bay Area and Chinese Co-Inventor Patent Registrations by Technology Area



Source: U.S. Patent and Trade Office; analysis by Bay Area Council Economic Institute

Bay Area Global Investment Flow, 1995-2012 (USD billions, inflation adjusted)



Source: Thomson Reuters investment database; analysis by Bay Area Council Economic Institute

Note: Investment includes private equity and venture capital deals.

China is also a growing investor in the Bay Area. Reaching \$495 million in 2011, Chinese investment in the region represented 7 percent of all foreign private equity and venture capital that flowed into the Bay Area that year.

The launching of companies on foreign stock markets is on the rise globally. An initial public offering, or IPO, is the event in which shares in a company are offered for sale to the public on a stock market. Particularly with high-tech companies, this has served as the primary exit for

investors to recoup their investment and to raise capital to support a company's expansion.

Cross-border IPOs accounted for 19 percent of all global activity from 2002 to 2011. London and New York are the most international exchanges; 41 percent of all cross-border IPOs took place in London and 23 percent in New York. Growing numbers of Chinese companies are choosing to go public abroad. Over this period, 135 Chinese companies exited in the U.S., accounting for 51 percent of total IPOs in the U.S.

7. KEY INDUSTRY SECTORS

A New Set of Synergies

Less than a decade ago China's economic relationship with the San Francisco Bay region—as with the U.S. overall—was fairly straightforward. With WTO membership, China emerged as the world's contract manufacturer and the beneficiary of a flood of foreign manufacturing investment initially aimed at delivering low-cost goods in home markets and later at serving the emerging China market.

Trade is still largely composed of equipment and raw commodities flowing into China and finished consumer and business goods flowing out. But the more than \$3 trillion in foreign exchange reserves from that trade is funding a modernization of China and its economy that is taking place at impressive speed.

Bay Area architects are building high-rise office towers, retail corridors and mixed-use neighborhoods in Shanghai, Beijing, Shenzhen, Hangzhou and a growing number of inland cities. China's core Internet architecture, government and university computer networks, and the enterprise software running many of its largest state-owned banks and industrial companies originated in Silicon Valley.

Early exchanges initiated by Bay Area lawyers, judges and law schools assisted China in advancing its system of civil and commercial law and in modernizing its courts. Lawrence Berkeley National Laboratory, alongside California utilities and regulatory agencies, have provided training and technical support in developing energy efficiency, renewable energy and utility demand-side management programs. Bay Area tech firms and venture investors have funded some of China's most successful banks, technology firms, health-care providers and retailers.

Investment has been welcomed, but not without conditions—ownership limits, joint venture and local content requirements, and technology transfer in exchange for market access—all to ensure that domestic industries are modernized and become competitive. Navigating this

landscape often involves a complex exchange, as a mandatory local partner can easily become a long-term competitor.

In recent years, significant business activity has begun to flow in both directions. Chinese firms have located in the Bay Area to be closer to research and innovation clusters and to serve the U.S. market. They have initiated M&A to achieve scale and vertical integration, and they are investing in technology incubators, extending the science park model to Chinese and U.S. entrepreneurs in STEM and life sciences fields.

In this chapter we will examine current cross-border exchanges in key Bay Area business sectors, along with future areas of growth potential.

ARCHITECTURE AND URBAN PLANNING

From Buildings to Towns and Districts

China has been a major market for foreign architects since the 1990s. Internationally renowned firms not only bring innovative designs to city skylines, but also lend cachet that raises lease and occupancy rates. Bay Area architects and planners additionally bring to the table expertise in green design, achieving energy and environmental efficiencies that, over time, more than pay for themselves.

The Landscape

Foreign architectural firms typically compete at the high end of the market on high visibility, signature developments. China has embraced western design practices, but has limited foreign firms to preparing and providing design services and lending aesthetic, structural, materials, energy efficiency, spatial use and other expertise. Completed and accepted design drawings are handed off to "local design institutes" (LDIs) of architects, construction engineers and building code compliance specialists.

Requested drawings may be only 50–75 percent complete—compared to more detailed plans submitted in the U.S.—allowing flexibility for the LDIs to lock in a final design. A developer may retain a representative of the foreign firm to work with the LDI through the construction phase or may terminate its relationship once drawings are submitted. Foreign construction firms can serve as general contractors, but the actual construction work is subcontracted to local firms.

Lower overall labor costs and shorter lead times required to break ground have resulted in a highly advanced market, often incorporating new building technologies that have not yet been implemented in the U.S.

Because land is owned by the government, public projects are awarded by government-sponsored competition. Private development projects entail a “scheme gathering” solicitation to design firms to prepare concepts. These are submitted to “expert” panels that evaluate and rank design concepts for creativity, relationship to context and constructability. Top finalists receive stipends; winning design firms have an opportunity to negotiate to provide further design services.

A Volatile Market

Property development has been a key driver of China’s economic growth: according to the Urban Land Institute (ULI), the real estate sector accounts for 13 percent of the country’s GDP; 80 percent of development activity is in residential property.

China’s property market has been on a roller coaster since the global downturn began in late 2007. At that time, property prices in major Chinese cities fell by as much as 30 percent, and new projects dried up as foreign and domestic investors pulled money from managed funds and cashed out shares in property developers.

The government’s \$585 billion stimulus program, with its major housing construction component, helped to restore confidence and lure investors and developers back into the market, spurring a flood of land acquisition deals and project proposals. The result, by 2009, was a binge of overbuilding and reports of vacant, underperforming or delayed projects, mainly in the Tier 1 cities of Shanghai, Beijing, Shenzhen and Guangzhou.

While office and retail construction had outpaced demand, China’s financial markets remained neither deep nor liquid, leaving individual investors with few options beyond real estate or stocks. They flooded into real estate, borrowing to buy multiple homes and bidding up residential prices.

In the government’s view, the problem in both cases is speculation: “hot money” flowing in from overseas, distorting prices and crowding out domestic investment; and, fueled by excessive bank lending, individual investors driving home prices and rents out of reach for most Chinese.

Beginning in 2010, new rules limited project approvals, project financing and the formation of project companies. These were followed by tighter restrictions on foreigners investing in or acquiring domestic real estate entities and on foreign purchases and use of properties. In 2010, Chinese insurance firms were permitted to allocate up to 5 percent of their holdings to real estate, in an effort to encourage more stable, long-term institutional investment.

Additional measures have subsequently been put in place to cool the residential market: restrictions on the number of units purchasers could buy; higher minimum down payments on second homes and luxury first homes, as well as for first-time homebuyers; suspension of new mortgage loans for non-local residents or for purchases of third homes; and an increase in mortgage interest rates. Despite a decline in sales, foreign buyers continued to shore up prices in larger cities, rushing to buy in anticipation of an appreciating currency.

Demand for high-end office, large-scale retail and government projects remained strong in the major cities. But land and labor costs were rising, and development sites were increasingly scarce. Developers searching for yield turned their attention to Tier 2 cities—Dalian, Tianjin, Chengdu, Suzhou and Hangzhou—and beyond, to Qingdao, Chongqing, Xiamen and Wuhan, where costs were lower and investment and ownership rules were less restrictive. The focus in these outlying areas was residential and retail, followed by grade-A office space and finally by hotels and logistics/distribution facilities.

Local investors and developers jumped into the market, supported by pan-Asian private equity,

Chinese banks and insurers, and local governments that saw new projects as ways to broaden their revenue base through transfer taxes.

Results were mixed. Land expropriation for development increasingly sparked corruption claims and threatened public unrest. Average apartment rents were 8–10 times the average nationwide income in 2012 in many Chinese cities; in Beijing and Shanghai the ratio approached 30 times the average. Mortgage defaults were on the rise.

By 2011, second home mortgages required a 60 percent down payment and carried interest rates of 110 percent; second homes sold within five years of purchase were subject to high transaction taxes. Pilot property tax programs were introduced in Shanghai and Chongqing. The city of Beijing established a five-year residency requirement for buyers not holding a Beijing *hukou* permanent residency registration and limited the number of homes local and non-local buyers can own.

Home prices fell in late 2011 by a cumulative 0.3 percent across 70 cities; investment fell nearly 4 percent. Office space under construction nationwide fell 8.8 percent as projects were put on hold or cancelled; residential floor space contracted nearly 25 percent. China's National Bureau of Statistics reported a 54 percent year-on-year drop in foreign fund investment in the China property market in the first half of 2012.

Projects on the drawing boards for Tier 2 and Tier 3 cities have fallen off sharply, as more speculative proposals dried up. The shakeout has left the mature office and retail segments in Tier 1 cities more or less intact but also growing more slowly. Occurring as the economy was already slowing, the economic effects have been unsettling, impacting both property values and municipal finances that are highly dependent on land sales. Property markets turned up again in 2013, but concern with unsold inventories and a potential asset bubble remain.

Foreign investors are slowly returning, but investments are selective. In August 2012, for example, the **California Public Employees Retirement System (CalPERS)** announced a \$530 million investment in two new funds offered by ARA Asset Management, part of Li Ka-Shing's Cheung Kong

Group. The pension fund's last China investment was in 2007.

In August 2013, a Blackstone Group Asia-focused real estate fund made a \$322 million bid to acquire Chinese property developer Tysan Holdings, Ltd. A month earlier, Texas private-equity firm Century Bridge Capital invested USD 44.4 million in a joint venture with Hong Kong-listed property developer Coastal Greenland Ltd. to build a residential project in Wuhan.

Bay Area Architects Ride Out the Storm

Even with volatility and a market slowdown in 2011–12, Bay Area architectural and urban planning firms have seen their business in China grow. "We were clearly in a highly speculative stage of the real estate economy leading to 2008–09," recalls Gene Schnair, managing partner for the San Francisco office of **Skidmore, Owings & Merrill LLP (SOM)**. "Opportunities for the most part seemed random. The first generation of real estate developers put up cash for their investments because it was one of the few places beyond a very limited equity market to invest."

The move to Tier 2 and Tier 3 cities reflected government policies and the trend toward mass urbanization. "Government has to raise revenue at the municipal level, and land transactions are the most direct way to do that," Schnair says. "To maximize the value of development rights, cities caught on to the fact that they need master plans to create value. This spawned a whole cycle of large-scale, mixed-use developments."

Surviving stable projects outside the major cities have tended to involve established developers with strong government connections and support and no strong public opposition. Schnair says SOM benefitted from longstanding relationships with major developers, following them as they moved into Tier 2 and Tier 3 markets. But for the most part, his firm has focused on Tier 1 projects. Among these are the Ritz-Carlton Financial Street Hotel, the U.S. Embassy, the China World Trade Center, and the Poly International Plaza office complex in Beijing; the Huawei Technologies Corporate Campus and the Knowledge and Innovation Community technology park in Shanghai; and the 71-story solar and wind temperature-controlled Pearl River Tower in Guangzhou.



Poly International Plaza, Beijing

Source: SOM

San Francisco-based **Gensler** currently has 35 million square feet under construction in China—equivalent to the entire financial district of San Francisco—with another 35 million nearing construction. A further 20 million square feet are in the conceptual design stage.

Included are projects such as the Shanghai Tower, the second tallest structure in the world, with an even taller tower about to break ground in Suzhou.

The spiraling, wind-powered Shanghai Tower is considered a model of sustainable construction in China, having earned both LEED Gold and the equivalent China Green Building Design Label three-star ratings. Gensler clients include General Motors, retailer Diesel, and Chinese headquarters companies such as Tencent and ICBC Bank. Most of these projects are in cities in China's interior, not Beijing or Shanghai, which may lead Gensler to open an office in Chengdu.

The firm is working on master planning projects ranging from individual blocks to a city-scale 100-square-kilometer site in Zhuhai. Gensler's Asia practice head Dan Winey notes that sustainability and green design are in growing demand and that 90 percent of the firm's buildings in China are either China three-star or LEED certified. But the big answer to sustainability, he believes, is in how you design cities.



Shanghai Tower

Source: Gensler



Guangzhou Textile Industry & Trade Complex

Source: Heller Manus Architects

With 300 employees in China now, and 500 expected in the next few years, 80 percent of the firm's clients are Chinese companies. This is having secondary payoffs, as Chinese clients are starting to call on the firm's services as they expand outside of China: new projects include a 10,000-square-foot office for Tencent in Palo Alto, and a regional headquarters in Laos for ICBC Bank.

Steps taken by the Chinese government to cool the property market focused on housing, hitting the newer, more speculative projects hardest. Jeffrey Heller, president of **Heller Manus Architects**, said China accounted for two-thirds of his firm's business at the beginning of 2012; a year later it was around half. "Suddenly everything was on hold, going in slow motion; people were slow to pay. I checked with colleagues; everyone was in the same boat."

San Francisco-based landscape architecture firm **SWA Group** confirms the experience of other firms—that China business provided a lifeline for architecture, planning and design firms in the lead-up to and during the global downturn, but that improving markets at home are leading to a rebalancing. Since its establishment in 2010, SWA's Shanghai office has grown to thirty employees, and during the recession China accounted for more than 50 percent of its business. While

committed to China, the firm is looking now to take more advantage of domestic opportunities.

The shakeout has not been entirely negative; many projects that fell by the wayside were neither well-planned nor fully funded and ate up time and resources with proposals that went nowhere. "From our view, the 'slowdown' in China validated our focus on working with seasoned clients capable of supporting high quality development," says Carsten Voecker, a director of **Woods Bagot** based in San Francisco. "We certainly shared our colleagues' concern, but ultimately the new government policies have helped to stabilize the market."

Woods Bagot—with U.S. studios in San Francisco and New York and China studios in Beijing, Shanghai and Hong Kong—has designed a wide range of projects in the region. The firm's Beijing projects alone include Sunshine Insurance CBD headquarters; the Vanke Retail and Mixed-Use Center; and the 1.5-million-square-foot, 790-foot-tall mixed-use CBD Tower Z11. Other current projects include Wanxiang Century Center, a three-tower mixed-use development in Hangzhou; the master plan for the 900-acre China Southern Airport City in Guangzhou; the master plan for Dalian Harbour, a mixed use waterfront development in the port city of Dalian; the award-winning master

plan for Xiasha Eco Business Park in Hangzhou; the Pinggu Eco-Resort in the Zhejiang province; and GT Land's Landmark Plaza East twin mixed-use towers, each measuring 920-feet, in Guangzhou.

Woods Bagot's global studio model also supports U.S. clients in building their overseas presence. The firm's San Francisco and Hong Kong studios have partnered with one highly recognized company based in California to deliver projects in China. High-level design work is carried out in San Francisco in collaboration with the client, while documentation and construction administration is delivered from one of the Woods Bagot local Chinese studios.

In Pursuit of Green

Bay Area firms bring specific expertise to the table in bidding for China projects. The region is strong in urban planning, with a focus on livable communities and sustainable, green development. Leadership in Energy and Environmental Design (LEED) certification from the U.S. Green Building Council (USGBC) carries cachet in China, suggesting advanced design, materials and processes that command higher sale and lease prices while lowering overall operating costs.

LEED-certified building space amounting to some 80 million square feet was completed in China by the end of 2011—more than any other country outside the U.S. The first LEED-certified facility in China in 2006 was the \$18 million Suzhou manufacturing and design center for Santa Cruz-based maker of Bluetooth headsets

Plantronics, designed and constructed by another Bay Area firm, **Bechtel Corp.**

China's own equivalent of LEED, the Green Building Design Label three-star system launched in 2006, has certified more than 200 mostly government buildings. The Ministry of Housing and Urban-Rural Development program is a points-based rating system that offers developers more flexibility than LEED to choose the credits they want to pursue, with ratings in each of six categories—land savings and outdoor environment; energy savings; water savings; materials savings; indoor environmental quality; and operations and management—that range from one to three stars.

Woods Bagot's Carsten Voecker, with his special interest in the design of high-performance building systems, says that the comparatively young China market is particularly exciting because the rapid pace of change has encouraged an openness to new ideas. "There is a more immediate focus on finding the best solution and a peer-review-based approvals system to support innovation," he explains. "Here, our more established practices and relative conservatism have made it harder to advance new approaches."

Architects agree that working with the local design institutes (LDIs) has not been a constraint, as they have become increasingly sophisticated in terms of design, and the LDI relationship is important in the same way as the developer relationship in navigating a volatile market.



Xiasha Eco Business Park, Hangzhou

Source: Woods Bagot

Government has also embraced clean technology and energy conservation, as it faces mounting demand from a growing urban middle class to address poor air and water quality—much of it from coal-fired utility plants and state-owned factories. For the longer term, attention is focused on the concept of “eco-cities” that feature zero-energy buildings, zero-emissions transport, recycled resources and sustainable development. A 30-square-kilometer prototype city of 350,000, a cooperative venture of China and Singapore, is under construction outside Tianjin, with completion scheduled for 2020.

Demand for master-planned commercial districts, residential neighborhoods and new communities has grown in recent years. Larger projects need to address issues like transit, climate, energy and water supplies, and open space.

Jeffrey Heller says that most master plan projects are real and are going forward, especially now that uncertainty over the 2013 government transition has been resolved. For Heller-Manus, Tier 2 cities are where the new opportunities are. The firm began working in China in 2006, with an emphasis on large, planned, sustainable projects, including the China Automotive Technology & Research Center in Tianjin; the Guangzhou International Fashion Center; master planning for the Guangzhou city center and business district; the Xiangyun Island International Cruise Terminal in northeast China; the Nansha Eco-City master plan at the mouth of the Pearl River; and the Ulanhot Hedong District urban design in inner Mongolia.

Steinberg Architects has a 60-year history in the Bay Area, and played a leading role in the development of Silicon Valley from what had been mostly orchards. As the Santa Clara residential market matured, the Steinberg Group expanded throughout the Bay Area and later into Southern California.

Rob Steinberg graduated from UC Berkeley, joined his father's firm in 1977 and took over as president in 1994. His exposure to China came in 2007, just before the global downturn. “We had a general awareness that China was a market we should look at but we weren't sure how to go about it,” Steinberg recalls. Through architect David Nieh, (formerly chief architect for the City of San Jose, then director of SOM's urban design

studio in Shanghai and later with Shui On Land), Steinberg arranged a trip in 2008 that led to his first China project—a 25-year master plan for the 175-acre City University in Hong Kong.

From there, an employee connected Steinberg with his fellow Tsinghua University alumnus working with a local design institute. That led to a dinner meeting in Chengdu with the CEO of a major Chinese development firm, Overseas Chinese Town Group, who asked Steinberg to look over some design drawings and offer his thoughts. Not long after, Steinberg Architects was managing the design for a 5-million-square-foot 5,000-unit residential project in Chengdu.

From a cramped representative office in Shanghai, Steinberg won the contract for a 150-acre master plan for the city of Chengdu and two mixed-use projects in downtown Shanghai. By 2011, Steinberg had 15 China projects in the works. In early 2012, it began design for the 7,000-acre, 80 million square foot Changsha Songya Hu residential/office/retail complex in southern China, working with developers Songya Lake Co. and Aptech. Steinberg Architects now has a staff of 25 in Shanghai that is expected to double over time. China accounts for about 20 percent of the firm's total business.

Bay Area architectural and planning firms see a new set of opportunities on the horizon, as Chinese investment in businesses and property outside China ramps up. So far, outbound investment has been modest and has not extended to signature projects, but that is expected to change. When it does, the skill sets of local firms in pushing the design envelope while navigating the complex system of building codes and planning review will be essential. And existing relationships with Chinese clients, investors and developers will provide a helpful competitive edge.

ENERGY/ENVIRONMENT

Small Steps Matter

China is second only to the U.S. as a consumer of energy. With domestic consumption rising and increased production of shale oil in the U.S., China is expected to become the world's largest oil importer by 2014. It is also the world's largest generator of CO₂ emissions.

Coal is a uniquely important issue in China. By the end of the 11th Five-Year Plan in 2011, China ranked first in coal production, with an output of 3.18 billion tons; first in hydropower generation, with 230,000 megawatts (MW) of installed capacity; and first in nuclear power, with 15 operating plants and 26 more on the drawing boards with a combined generating capacity of nearly 42,000 MW. China was the leader in wind generation, with 47,000 grid-connected MW.

China boasts 90 percent energy self-sufficiency, largely because of coal, which generates 77 percent of the country's electricity and is the leading fuel for heating and industrial production. In addition, while urban residential use is banned, coal and biomass are the principal fuels for heating and cooking in rural areas.

Chinese coal demand has risen steadily since 2000, growing at about 6 percent annually. So has mine output, growing from 1 billion tons in 2000 to 3.8 billion tons in 2012. In 2008, the government shut down some of its mines for safety or environmental violations. Coal shortages in turn closed nearly 60 utility plants and led to electricity rationing and outages. For the first time, China became a net coal importer; imports have increased each year since 2009, reaching 227 million tons in 2012. Similarly, oil imports accounted for 57 percent of consumption in China in 2011, up from 32 percent in 2000.

China sees coal as essential to its continued economic development and its overall energy security: oil exploration and drilling at home involves foreign joint ventures, and imports are vulnerable to geopolitics, supply disruptions and price volatility in global markets. Coal is a low-cost, plentiful, accessible, domestically available energy source. It is also taking a toll, however, on health and on air and water quality across China and, because China burns more coal than all other countries combined, on global CO₂ emissions.

As one of many indicators pointing to environmental pollution as a source of political discontent among Chinese citizens, a recent study by MIT, Peking University, Tsinghua University and Hebrew University of Jerusalem found that in parts of China, life expectancy had been cut by more than five years due to coal combustion.

Even if coal were not the dominant energy source in China, explosive economic growth and urbanization would be taking an environmental toll. Residential and commercial buildings account for about 20 percent of China's total energy consumption. China adds an average 1.7 billion square meters of building space annually. Building energy consumption increased by 150 percent from 1996–2008, particularly in cities in the hot summer/cold winter areas of China's interior. An estimated 20–25 billion square meters of urban residential and government buildings will be constructed over 2010–20.

Such dramatic growth has amplified the shortcomings of China's conventional energy infrastructure. Notably, political uncertainty and "quality of life" issues, including health concerns from environmental degradation, are among the most commonly cited factors driving an estimated \$225 billion in capital flight abroad in the 12-month period to the end of September 2012. Respiratory ailments are common in major cities, particularly among children. In 2013, severe air pollution in Beijing led the city to introduce new regulations that shut down factories, limit vehicle use, and suspend classes when conditions are particularly bad. In October, heavy smog in Northeast China forced the closure of all expressways and a major airport due to poor visibility as well as the suspension of primary and middle school classes in Harbin as a health precaution. Visibility in Harbin was down to 20 meters.

In the face of these pressures, China has embarked in the past decade on a nationwide program of energy restructuring, including heating, cooling, window, lighting and insulation retrofits for buildings and a heightened focus on sustainable and green design principles. In part to address growing environmental concerns, and in part to create national industries that can penetrate global markets, China is also aggressively promoting the research and deployment of renewable energy and electric vehicles.

China's electric vehicle market is the world's fifth largest after Japan, the U.S., France and Germany. Despite substantial government subsidies for purchases of domestically-produced electric vehicles (EVs), high costs have limited consumer uptake. With central government encouragement,

however, EV producers are aligning with local governments to develop large-scale pilot programs throughout the country.

The 12th Five-Year Plan includes an “all-of-the-above” energy diversification strategy that

- caps annual coal consumption through 2015;
- expands coal mitigation measures, from washing and land reclamation at mines to liquefied coal and methane capture technology;
- mandates greater energy efficiency for industrial plants and commercial buildings;
- sets targets for non-fossil fuel as a share of total energy consumption—11.4 percent in 2015, rising to 15 percent in 2020;
- sets reduction targets for energy consumption in 2015 at 16 percent below 2010 levels, and for CO₂ emissions at 17 percent below 2010 levels; and
- creates new energy efficiency and conservation standards.

Despite these initiatives, China’s reliance on coal and other fossil fuel sources is unlikely to change soon.

In September 2013, China took another step to rein in its coal consumption, banning new coal-fired power plants in the vicinity of Beijing, Shanghai and Guangzhou. But even as China moves to cut coal’s share of primary energy consumption, the absolute amount of coal burned will continue to increase.

California companies, utilities, government agencies, non-governmental organizations, entrepreneurs and investors are involved at virtually all levels in advising on and helping with implementation of China’s Energy Development Plan—from shale gas drilling joint ventures and consulting on nuclear plant design, to start-ups offering new energy metering and sensor technologies, to pilot projects bringing cleaner, energy-efficient motors, boilers and solar cookers to rural areas.

Conventional Energy

Chevron Corp. sold kerosene for lamps and home heating in China as early as 1904, later opening service stations and sales outlets in major Chinese cities and marketing petroleum products under the Caltex brand. It re-entered China in 1979 as an offshore exploration and drilling partner with China National Petroleum Corp. in

the Pearl River Mouth Basin of the South China Sea, discovering oil in 1985 in the Huizhou oil fields. Production began in 1990.

Today Chevron has production-sharing contracts covering eight oil and gas exploration blocks in China. In four of these, Chevron has an operating interest—one for deepwater drilling in the South China Sea, two signed in 2012 for shallow-water blocks in the Pearl River Basin, and a fourth onshore at the 487,000-acre Chuan-dongbei gas field in Sichuan Province. The company is developing two other fields in the area and is building two gas processing plants with a combined daily capacity of 740 million cubic feet at a combined cost of \$6.4 billion. First-phase completion is scheduled for late 2013 as initial exploratory wells are drilled.

In 2012, Chevron began exploratory drilling for shale gas in the Qiannan Basin in south-central China, with additional drilling to commence in 2013. It is also a 50 percent partner in the CPChem polystyrene plant in Zhangjiagang, which produces 100,000 metric tons of petrochemical resin annually for use in manufacturing plastics products.

San Francisco-based construction and engineering firm **Bechtel Corp.** has offices in Beijing, Shanghai, Shenzhen, Hong Kong and Taipei and has been active in China since 1979 with more than 80 projects. Its signature energy-related project was managing construction of the \$4.3 billion CSPC Nanhai Petrochemicals Project in Huizhou, a CNOOC-Shell complex of 11 plants—including an 800,000-ton annual capacity ethylene cracker—completed in 2005.

In April 2012, Bechtel signed a consulting agreement with the China Nuclear Power Engineering Co. (CNPE) to provide training and education in project management, as the government moved to end its moratorium on new nuclear plant approvals and complete inspections of existing plants following the March 2011 Fukushima plant meltdown in Japan. China has since restored nuclear power to the mix of non-fossil fuel energy sources, along with renewables, with a target to generate 30 percent of the country’s power by 2015.

Chinese energy firms, meanwhile, are eyeing the fast-growing U.S. natural gas market: in

February 2013, China Petroleum & Chemical Corp. (Sinopec), Asia's largest refiner, announced it would pay \$1.02 billion for half of Chesapeake Energy Corp.'s 850,000-acre Mississippi Lime shale reserves in Oklahoma. Sinopec had already bought a third of Devon Energy's interest in five gas fields for \$2.2 billion in January 2012. Sinochem Group bought a stake in Pioneer Natural Resources Co.'s Wolfcamp shale field assets in Texas for \$1.7 billion in January 2013.

Chinese clean energy producer ENN Group Co. Ltd. announced in March 2013 a limited partnership with CH4 Energy Corp. of Salt Lake City (operating as Blu LNG) to build 50 natural gas fueling stations along U.S. highways in its first year. ENN already operates a network of similar stations in China. The move is a "build it and they will come" effort to meet projected future demand in the long-haul trucking and fleet vehicle markets across the nation, including California.

Efficiency and Conservation

In June 1987, Lawrence Berkeley National Laboratory (LBNL) researchers Mark D. Levine and Bo Adamson presented a paper, "Energy Use in Buildings: The U.S. Experience and Lessons for China," at a joint U.S.-China symposium in Nanjing sponsored and organized from the U.S. side by the U.S. Department of Energy.

The report noted that commercial and residential buildings accounted for 36 percent of total U.S. energy consumption at the time; outlined potential energy savings from better insulation, window glazing, lighting and passive design, and more efficient heating, cooling and appliances; discussed policy options for encouraging adoption of best practices, from new government standards to rebates and low-interest loan programs; and stressed, as a first step, the need for comprehensive energy consumption data collection in Chinese cities.

LBNL at that time already had a track record advising Southeast Asian governments on energy efficiency. But interest and projects growing out of that initial presentation led Levine to found a separate China Energy Group (CEG) at the Lab in 1988, to manage joint research and technical support projects with companion institutes and government bodies in China. Today

CEG receives roughly a third of its funding from each of three sources: government, mainly the Department of Energy, Department of State and the U.S. Environmental Protection Agency (EPA); foundations and nongovernmental organizations, in particular the San Francisco-based Energy Foundation; and other sources such as in-kind gifts from private companies.

Energy conservation and efficiency have become key components of Chinese policy regarding not only energy production, but also the management of economic growth and urbanization. This is occurring as an emerging middle class and mass migration from rural areas to cities is generating major impacts in transportation, utility usage and construction, making this a national priority. The air quality impacts of energy use are receiving even greater attention recently, and there are numerous efforts to link improved energy efficiency with reduction in local air pollutants.

LBNL's research and consulting work has accordingly expanded in recent years, helping to build the policy framework and introduce technological advances to support increased adoption of energy efficiency. Some examples include the following:

- CEG supported the development of government regulations for appliance energy efficiency standards and labeling, testing manufacturer claims and compliance, and improving efficiency for over 30 consumer appliances.
- CEG helped draft China's building energy standards in the 1990s. It has advised on building codes in Shanghai and four cities in southern China and has rolled out a pilot windows rating and labeling program in Guangzhou.
- The Group introduced the concept of negotiated agreements through a pilot project which led to China's Top-1,000 (now Top-10,000) Energy-Consuming Enterprises program. The Group provides resources and technical assistance for this program, including benchmarking the performance of China's major energy-consuming industries such as steel and cement production.
- Modeling tools developed by CEG enable cement, steel, textile and process heating firms to analyze relative environmental and cost impacts of various strategies.

The China Energy Group also provides advice and training for the China Energy Conservation and Environmental Protection (CECEP) group, a state-owned enterprise charged with developing conservation, emissions reduction and environmental protection technologies and projects. CECEP, with more than 170 subsidiaries and a workforce of 40,000, oversees \$3.7 billion in central government investment in some 3,000 projects in China.

In all, LBNL has over 50 active projects underway in collaboration with China, involving future low-emissions pathways, low-carbon eco-city development, policies for low-carbon markets, energy system planning and grid integration, low emission and efficient industries, and low emission and efficient buildings and equipment.

The China Energy Group's U.S.-China Clean Energy Research Center for Buildings Energy Efficiency (CERC-BEE)—one of three centers established at U.S. universities and national laboratories—was launched in 2011 following meetings between President Obama and Chinese President Hu Jintao. The LBNL center is specifically focused on building energy efficiency. The two other centers, at the University of West Virginia and the University of Michigan, are devoted to research on clean coal and energy-efficient vehicles, respectively.

LBNL has partnered with CalCEF, a non-profit venture-funding group created to accelerate cleantech breakthroughs to market, and with CalCharge, a consortium of more than 30 battery-technology start-ups, to form a Joint Center for Energy Storage and Research (JCESR). JCESR has been approved as a U.S. Department of Energy innovation hub, and CalCharge hopes to partner with Chinese companies to manufacture lighter, cheaper, longer-life vehicle and industrial batteries.

In a related effort, the Lab hosted a battery technology workshop in China in April 2013, coinciding with a China delegation led by Gov. Jerry Brown, during which Fremont-based **Tesla Motors** announced the opening of Beijing and Shanghai dealerships for its line of high-performance electric cars. As part of that delegation, LBNL co-hosted a conference at Tsinghua University on the "California Carbon-Free Economy," examining the effectiveness and implications of

California's recently-adopted carbon trading program. China currently has cooperative cap and trade pilot programs with the European Union in Beijing, Guangdong, Shenzhen and Tianjin, and it plans a nationwide market as part of the 12th Five-Year Plan.

In June 2013, following on the governor's trip, the California Air Resources Board (CARB) signed a memorandum of understanding with the Shenzhen Development and Reform Commission (SDRC) to exchange information and expand cooperation relating to their pilot cap and trade programs. The collaboration is intended to monitor research, share best practices and build effective systems for data gathering, emissions verification, market monitoring, compliance and enforcement. As a further outgrowth of the governor's trip, and additional MOU was signed in San Francisco in September 2013 with the National Development and Reform Commission for the sharing of low-carbon strategies and the development of China-California joint ventures for cleantech. The agreement is believed to be the first on climate change between the Chinese government and a U.S. state.

The Energy Foundation, a San Francisco-based sustainable energy grantmaking entity formed by major philanthropic foundations—among them the William and Flora Hewlett Foundation, the Kresge Foundation and the David and Lucile Packard Foundation—launched **Energy Foundation China** with Packard Foundation seed funding. It currently has more than 100 partner institutions in China, including research institutes, think tanks, universities and government agencies, as well as partners in California, including the California Public Utilities Commission, the California Energy Commission, and UC Davis.

The Energy Foundation has a representative office in Beijing with sponsorship from the government's National Development and Reform Commission (NDRC). Its Senior Policy Advisory Council includes ministerial-level officials and it counts ministry director-generals among its Dialogue Partners. With a \$29 million annual budget, Energy Foundation China acts as a catalyst for capacity building and sharing of best practices, supporting initiatives in low-carbon development, transportation, renewable energy, electric utilities, buildings,

industry, environmental management and sustainable cities. Program grantees advised China's State Council in drafting the stricter PM 2.5 particulate matter emissions standards, to be implemented first in major cities and nationwide by 2016. Prior to adoption of the standards in 2012, the government had refused to even monitor fine-particle emissions, which are associated with many serious pollution-related health effects.

Some other projects in which Energy Foundation China has been involved are

- a Beijing Sustainable Development Center-Tsinghua University program to promote clean vehicle fuels and technology for use during the 2008 Olympic Games in Beijing;
- an initiative by the Chinese Academy for Environmental Planning to develop enforcement regulations for a national cap and trade policy;
- a 12-year collaboration with China National Institute of Standards (CNIS) to develop and implement energy efficiency standards for appliances, lighting, water heaters, air conditioning and home electronics; and
- a detailed 2012 status report on building energy efficiency in China, prepared by the Global Buildings Performance Network in cooperation with Chinese government, university and professional experts.

According to Jiang Lin, the Energy Foundation's senior vice president for strategy and analysis, the net annual energy savings projected once the CNIS standards are fully implemented by manufacturers nationwide will exceed the 18,000 MW of power generated by the Three Gorges Dam in a year.

"Our primary goal is to help China transition to a more sustainable energy future," says Lin, who believes that the most significant challenge facing China today is mass urbanization. "Hundreds of millions of people are moving from rural areas to the cities. That means China has to build hundreds of new cities. How those cities are built will have a huge impact—in terms of congestion, of the carbon footprint—on how livable those cities are. We're trying to bring a new pattern of urban design and land use from the very beginning."

Reflecting this, Energy Foundation China and its environmental design partners have projects in

six Chinese cities, designing mixed-use, transit-oriented communities with dense street networks, bicycle lanes and pedestrian walkways, short commutes and mixed-use zoning, as an alternative to the previous Chinese model of single-use residential or commercial "super blocks." The Foundation has supported the design of a BRT (bus rapid transit) project for Jinan City. The project that is furthest along is in Kunming, the capital of Yunnan province in southwest China, where Berkeley-based **Calthorpe Associates** is developing the master plan.

Lin sees huge opportunity in China's commitment to sustainable energy, carbon reduction, conservation and environmental mitigation contained in the 12th Five-Year Plan. In clean energy alone, China has committed a total expenditure of \$473 billion over 2011–15. That suggests significant business opportunities for overseas vendors and for venture-funded energy technology start-ups on both sides of the Pacific.

A San Francisco-based public-private partnership formed in 2004, the **China-U.S. Energy Efficiency Alliance**, with funding and technical support from the U.S. Agency for International Development (USAID) and the non-profit National Resources Defense Council (NRDC), has negotiated a series of memoranda of understanding with Chinese government bodies. Among them are

- MOUs with Hebei Province and Chongqing Municipality to provide policy planning and technical and training support for utility demand-side management (DSM) programs, and with Shanghai and Sichuan Province for energy savings and emissions reduction programs;
- a framework agreement between the State of California and Jiangsu Province to share information and best practices and to collaborate in the areas of emissions reduction, renewable energy, energy efficiency and environmental protection; and
- a May 2013 MOU with the U.S. Department of Commerce to jointly market U.S. energy efficiency and smart building products and services and increase access to the Chinese market for related firms.

Alliance partners include California's three major utilities, Pacific Gas and Electric, Southern

California Edison and San Diego Gas & Electric, now a unit of Sempra Energy. The group also includes venture investors, Honeywell, and niche energy efficiency firms with active China strategies, including:

- Nexant, a global consulting firm headquartered in San Francisco that specializes in advising utility, energy, chemical and financial sector clients on energy management, cleantech, hedging, billing and other solutions. It has had a presence in Shanghai for several years and expanded into Beijing in 2012 through a partnership with local petrochemical industry consulting firm Chem1.
- EnerNOC, a smart-grid designer and developer specializing in utility demand response (DR) programs to manage power consumption by large commercial and residential customers during peak demand surges. Based in Boston, it has offices in San Francisco and Walnut Creek.
- Opower, a company launched in San Francisco in 2007 with Silicon Valley venture capital funding. It now has 250 employees and designs customer energy conservation incentive programs for 75 U.S. utilities, using behavior models and data analytics.

CLEANTECH

A Bright Future...Someday

On its surface, the public and commercial benefit of clean technology is obvious: reduced energy consumption, cleaner air and water, cost savings through efficiency, and the slowing or arrest of climate change and its impacts. Over time, the transition to clean technology and processes is widely accepted as a certainty.

The path forward has not been easy. Following a period of expansion, market capitalization of and venture investment in cleantech companies worldwide fell sharply in 2012, as the industry remains hostage to a range of external factors: primary among these are fossil fuel prices on world markets; government regulation, research funding and subsidies; and global climate change policy. Since 2008, cleantech companies in California have been hit by a convergence of

- global recession;
- cuts to U.S. cleantech R&D spending following the high-profile failures of firms accepting

- federal stimulus money, such as Solyndra Corp., Fisker Automotive and A123 Battery;
- oil prices stabilizing in the \$90–100 per barrel range, and an expanded supply of domestic natural gas which has driven down conventional energy costs relative to renewables; and
- inability to reach a global climate change consensus that would capture the full competitive cost of fossil fuel consumption through emissions standards, cap-and-trade programs or carbon taxes.

China and California find themselves at the intersection of these trends, both shaping and reacting to the global cleantech market. China is driven by growing energy and environmental concerns at home, and by government policies designed to support Chinese emergence as a global player in the renewable energy sector.

California, for its part, leads all other U.S. states in advancing energy and climate policies and encouraging renewables development; is the recipient of the lion's share of U.S. cleantech investment; is the nation's largest market for clean energy technologies; and is the largest U.S. producer of those technologies. Most of the state's cleantech companies and related investment are concentrated in the Bay Area. This suggests potential synergies. How California, the Bay Area and China engage on these issues will have a significant impact on both national and global trends.

Comparing investment, according to Bloomberg New Energy Finance (BNEF), the U.S. claimed the leading position in cleantech investment in 2011, totaling \$48.1 billion versus China's \$45.5 billion. In 2012, China's investment grew 20 percent to \$68 billion, while U.S. spending fell 37 percent to \$35 billion. The U.S. (primarily California) enjoys a large lead in venture investment, but China benefits from much larger government investment.

Many of these issues and opportunities are reflected in the solar power sector. Reflecting the growing importance of the California market, China's major producers of solar panels—**SunTech Power**, **Trina Solar** and **Yingli Green Energy**—established North American headquarters in the Bay Area. Also operating in the region are smaller producers such as Silevo, a Fremont-based solar manufacturer with Chinese-American

management and venture funding from the Chinese affiliates of U.S. venture firms Madrone Capital and Mayfield Fund. Silevo recently opened its first production line in China, but eventually plans to manufacture in the U.S.

China's low-cost advantage in producing solar and wind generation equipment has helped make both large-scale generation projects and small-scale residential installation cost competitive. It has also, however, led to trade frictions with domestic manufacturers, installers, and companies with sophisticated solar panel and wind turbine technology. At the heart of the debate is the allegation that Chinese producers unfairly benefit from government subsidies and are dumping panels (i.e., selling at below cost) in the United States.

Domestic stakeholders have been divided on such complaints, with manufacturers feeling intense competitive pressure (Chinese competition was a factor in the high-profile demise of Bay Area solar company Solyndra). Installers and consumers, however, who have benefitted from falling prices, see increased costs from higher tariffs on Chinese imports negatively impacting what has been a fast-growing market. Tariff opponents and advocates of clean power cite the stimulative effect of falling prices on solar deployments and the substantial employment generated by the domestic installment industry.

In October 2012, the U.S. Department of Commerce sided with domestic solar panel manufacturers on a 2011 complaint brought by an Oregon-based subsidiary of German panel maker Solar World Group. The complaint alleged that Chinese manufacturers, with government support, were dumping panels below cost on the U.S. market in order to lock in market share in a nascent growth industry. Commerce imposed antidumping penalties of 18–32 percent on 61 major Chinese companies who participated in the U.S. International Trade Commission investigation (companies declining to participate saw 250 percent penalties imposed), and countervailing duties of 14–16 percent on companies determined to be receiving anticompetitive government subsidies.

In addition to being the major source of solar panels installed in the U.S., China is also the main supplier of solar panels in major European markets including Germany, Italy, France, Spain, the U.K.

and Greece. Since 2011, many European solar manufacturers have, like their counterparts in the U.S., either failed or scaled back production, due to a combination of weakening demand and Chinese imports whose prices have fallen 75 percent since 2009. In June 2013, the European Union announced provisional tariffs on imported Chinese panels, but in August reached a compromise under which it would waive antidumping tariffs for Chinese manufacturers who agreed to a schedule of minimum prices and volume limits. The agreement was confirmed in December 2013 with participating Chinese exporters being exempted from antidumping levies ranging from 27 to 64 percent. Chinese solar companies, faced with overproduction and falling prices, are themselves under financial pressure, with Suntech Power, the world's largest solar panel manufacturer declaring bankruptcy in March 2013 and being absorbed by two competitors in a rescue arranged by Jiangsu Province, where all three firms are based. Other companies are also facing large debt burdens.

Parallel developments are affecting wind generation. In December 2012, Commerce upheld a similar complaint from five domestic wind turbine manufacturers—among them General Electric Corp. and Siemens AG—against Chinese and Vietnamese firms and imposed 46–71 percent antidumping penalties plus 21–35 percent countervailing duties. A federal grand jury in Wisconsin indicted employees of Sinovel, China's largest wind turbine manufacturer, for conspiring to steal electricity flow control software from Massachusetts-based American Superconductor Corp. (AMSC) in 2011. Following the theft, Sinovel refused delivery of a \$700 million order from AMSC, resulting in a loss of 500 jobs at the firm.

Solar Flare

Trina Solar was launched in 1997 in Changzhou, Jiangsu Province by CEO Jifan Gao, who had been a solar panel installer in China in the early 1990s. With its U.S. headquarters in the Bay Area, the company entered the California market in 2009, responding to the California Solar Initiative (CSI), a rebate program for home and building owners who install solar heating and electrical systems on rooftops to displace power they would ordinarily draw from utility grids. CSI rebates are in addition

to federal tax credits amounting to 30 percent of system acquisition and installation costs. As of June 2013, California boasted more than 153,000 solar projects generating nearly 1,600 megawatts (MW) of electric power statewide.

With market growth, the global market share of China's five largest module producers—Trina, Suntech Power, Yingli Green Energy, Jinko Solar and Canadian Solar—grew. Production also grew rapidly, producing a worldwide glut that drove solar panel prices down by 75 percent between 2009 and early 2013.

The effects of overproduction in China have been aggravated by a falloff in demand from Europe, which until recently accounted for nearly 60 percent of global demand. This occurred as recession, tight credit and government austerity have reduced subsidies and taken large projects off the drawing boards. As demand from Europe has slowed, China has increasingly focused on the U.S. market and California in particular, where policies to support cleantech deployment and address climate change are most advanced. China's government is also seeking to stimulate domestic demand, targeting 10,000 MW of new installed base in 2013.

Trina president for the Americas Mark Mendenhall remains hopeful about California, which has more installed solar capacity than the next five states combined. "Trina came to the U.S. expecting that California would become one of the leading areas of solar deployment in the U.S., and it's true," he says, but another reason was access to capital markets—from banks like Wells Fargo and Bank of America—as well as from venture capital, solar developers, green funds and other sources.

California's consistent policies to encourage deployment of renewable energy—from the CSI to 2006 legislation (AB 32) setting a target of reducing California's total greenhouse gas emissions to 1990 levels by 2020 and mandating a minimum percentage of utility electric power generation from renewable sources—have provided an incentive to project developers and suppliers to invest in the California market. In 2010, voters upheld AB 32 against a repeal challenge, Proposition 23, confirming the state's commitment to these policies.

At the end of 2012, Trina's installed base in the U.S. totaled approximately 3 GW, half of it in California. Among its major projects are a 32-acre, 5 MW project with nearly 30,000 panels in Porterville for Southern California Edison (SCE), completed in 2011; a 1.25 MW rooftop panel project at Treasury Winery Estates near San Luis Obispo, completed in 2010; and a 45 MW supply agreement signed with SCE in 2010, involving third-party installation of solar panels on commercial rooftops in Southern California.

Trina is a supplier to third-party developers and installers like Solar City, SunRun, Sungevity and SunEdison (formerly chip manufacturer MEMC Electronic Materials) that have projects nationwide, including in California. It also draws on Silicon Valley suppliers like National Semiconductor, Applied Materials and QBotix of Menlo Park for integrated circuits, materials and software tools that help optimize panel performance. It also relies on high-grade polysilicon from the U.S. in the manufacture of PV cells for its modules.

Despite 18 percent antidumping duties and 16 percent countervailing duties which Trina begins paying in 2013, Mendenhall—who left SunEdison to take over Trina's U.S. operations in 2012—says the company can still compete in the U.S. market through modular construction that offers installers innovation, cost savings and convenience in a ready-to-install package.

Small Solutions, Big Benefits in China

With funding tight and domestic markets growing but constrained, California firms—including small and medium-sized businesses with new energy efficiency technologies and services—have turned their attention to overseas markets, including China. For its part in recent years, China has begun to invest in U.S. energy technology firms, even as the sector has cooled for domestic investors.

Bridgelux, a Livermore industrial LED lighting technology developer, saw opportunity in the China market where the government has used local government procurement and high tariffs on imports to encourage broad deployment of LED. In 2012, Kaistar Lighting (Xiamen) Co. invested \$25 million in Bridgelux to accelerate R&D and production of LED chip and packaging technology.

The combination of Bridgelux technology and Kaistar's manufacturing cost advantage is expected to expand the LED market in China and help both companies compete against global brands like GE and Philips.

MiaSole, a Santa Clara maker of copper indium gallium selenide (CIGS) thin-film solar cells, raised \$550 million in venture funding over 2006–12 from firms such as Kleiner Perkins, Bessemer Ventures and VantagePoint. In 2012, MiaSole became a casualty of the solar panel glut and falling prices; it was acquired for \$120 million by Hanergy Holdings Group, a Chinese renewable energy developer. Hanergy has pledged to maintain MiaSole's U.S. workforce of 100, pump new investment into the company and increase its sales in China.

Some firms have made inroads by bringing technology to the table that brings added efficiency and value to lower-cost Chinese production. Petaluma-based **Enphase Energy**, launched in 2006, makes microinverters that attach to individual solar panels in an array, convert direct current solar power to AC current that supplies electricity grids, and automatically monitor and optimize power output for each panel. Enphase has an office in Shanghai and its microinverters are embedded in panels made by Upsolar and Hanwha SolarOne.

Advanced battery developer and manufacturer **Envia Systems**, based in Newark, is on track to bring to market in 2015 an electric car battery with three times the efficiency of a Chevrolet Volt battery while lowering the vehicle price by an estimated \$5,000. A recipient of federal stimulus as well as venture funding, Envia's strategic advantage lies in patented nanocomposite battery cell technology that increases storage capacity, battery life and safety. The company holds 20 patents for its technology and counts among its partners the U.S. Department of Energy, the Defense Advanced Research Projects Agency and General Motors. Its Newark headquarters includes a materials innovation lab and a pilot production facility for fabrication of battery materials; cell prototyping and manufacturing are done in Jiaxing, China.

Finding that optimum mix of technology at the right price point is not always simple, especially

for smaller firms and start-ups. A case in point is **MakeSens**, a Silicon Valley producer of energy-saving position, directional and current sensors, most notably used to identify potential failures and re-distribute lithium-ion battery power in electric vehicles and smart grids. MakeSens principal Dr. Xian (Sean) Yan says lithium-ion battery and electric vehicle technology have enormous potential, but the economics are daunting. The unique characteristics of China's market and California's policies, however, offer an opening.

"California is really way ahead in electric vehicles and energy storage," Yan explains. "California policies and incentives are one reason we have Tesla, for example." But the jump from a laptop with six cells to a Tesla sports car or S-model sedan with 6,800 cells entails huge operating complexity and cost. "The bottom line with battery storage is price versus performance; if you can balance the two, then the market really takes off."

More than 20 million motorbikes and scooters are sold each year in China, nearly all powered until now by inefficient lead-acid batteries. In some respects, 2012 saw a "perfect storm" in the sector: sales still struggling since 2008 from the global downturn were further hit by government air quality restrictions on motorcycle use in large cities; 70 percent of China's 2,000 conventional battery factories have been closed since 2011 due to lead poisoning concerns; and multi-industry competition among autos, motorcycles and electric vehicles (including e-bicycles and e-scooters) has increased, as electric vehicle manufacturers have expanded urban and rural sales networks. Lithium-ion batteries are three times as efficient in terms of storage capacity and battery life, but are also three times the cost. Made more efficient and reliable through sensor technology and produced at the scale of China's market for motorbikes—as well as small fleet utility vehicles or urban two-passenger smart cars—this represents a sweet spot for his company and for the broader industry.

Yan, originally from Shanghai, travels to China frequently to meet with potential battery partners and vehicle customers, and he has headed CASPA delegations at conferences organized in cooperation with its PRC counterpart, SEMI China. Local governments in Tier 2 and Tier 3

cities are eager to attract new technologies that ultimately help build research clusters in already established industry sectors such as automotive.

A more immediate challenge for companies such as MakeSens is capital. Yan notes that venture capital support for both cleantech and for early-stage financing has ebbed in recent years. For now, the company is getting by on angel investor support as the hunt for Chinese partners continues.

ZAP, a Santa Rosa supplier of electric utility trucks and vans, motorcycles, scooters and ATVs using the company's advanced drive train and battery technology, entered the China market in 2009 through a joint venture with Hangzhou electric metering firm Holley Group and with financing from Chinese VC investor Better World International. The venture, ZAP Hangzhou, was established to combine ZAP and Holley technology in building fleet vehicles for the China market.

In January 2010 ZAP, with financing support from Chinese cross-border VC firm Cathaya Capital LLC, undertook a \$36 million, 51 percent acquisition of Zhejiang Jonway Automobile Co., Ltd., a maker of electric cars, motorcycles and scooters. The acquisition was completed in early 2011, and the company was renamed ZAP Jonway. Its first product was the E-380, a lithium-ion battery-powered version of Jonway's A380 three-door and five-door small SUVs featuring ZAP's electric drive train. A lower-priced lead-acid battery model is also available and a hybrid version is under development. The acquisition substantially improved ZAP's access to the China market: the new vehicle is sold through Jonway's nationwide dealer network and is eligible for government incentives offered to electric car buyers.

In late 2010, ZAP signed an agreement with the city of Shanghai to supply battery swap, charging and maintenance facilities in the Yangpu District. ZAP also agreed to develop a pilot Electric Vehicle Eco-City program, deploying its vehicles in Yangpu's transit shuttle, taxi and government vehicle fleets. In 2012, ZAP Jonway received \$12.7 million in dealership financing from China Everbright Bank and won China National Grid approval for its E380-S battery-swap model vehicle to be used in Hangzhou taxis and leased commercial vehicles as part of a fast-swap pilot program.

BANKING/FINANCE

Slow Money

China's banking market has more than \$18 trillion in total assets, \$13 trillion in deposits and \$9.3 trillion in loans. A 2011 report by PwC estimates that China will overtake the U.S. as the world's largest banking market by 2023. Foreign banks, however, are not sharing in the prosperity.

Overseas banks in China have invested more than \$60 billion in domestic banks, branch networks, technology, branding and training. As of mid-2012, Bloomberg estimated those 181 banks from 45 countries earned back a combined \$10 billion, held 1.6 percent of deposits and made 1.7 percent of loans from only 387 of the country's 67,000 bank branches. Three foreign banks—HSBC, Standard Chartered and Citi—account for more than 230 of those branches.

Barriers to market entry are considerable and have changed little in more than a decade. Foreign banks must have at least \$10 billion in assets and maintain a representative office for two years before they can incorporate and obtain a banking license. They are limited in the number and location of branches they may open each year and must operate for three years—two of those years showing a profit—before they can offer a full range of local currency banking services on par with domestic competitors. Reviews and approvals at each step can add months or years to the process.

Foreign bank loan portfolio value may not exceed 75 percent of capitalization; with deposits constrained by branch limits, so are lending capacity and market share unless banks recapitalize internally. Regulatory barriers have delayed approvals to issue RMB credit and debit cards, distribute mutual funds, set up trust funds and serve as custodians of investment accounts. Until banks can offer full local currency services, they are effectively denied access to state-owned enterprises, wealthy private banking clients and other key customer segments.

What is left for the banks has largely been a mix of offshore and approved onshore dollar-denominated loans and deposits, Chinese offshore corporate and private banking, and business advisory services.

Do You Know Where Your Money Is?

It should be noted that there is logic to the regulations beyond simply protecting domestic banks from competition. Slower GDP growth, lending excesses over successive property and commodity bubbles, and state-directed lending to SOEs and local governments have left major Chinese banks exposed.

Local government debt alone, much of it held by Chinese banks, is believed to total \$1.7 trillion. Total non-performing bank loans are estimated at \$73 billion. Much of the bad debt is in local government financing vehicles (LGFVs), instruments first introduced by China Development Bank, which lends for public infrastructure development.

Local governments have little autonomy to raise taxes to finance public works. LGFVs create an incentive to seize land, collateralize it, then borrow against it to fund large projects. Many projects—housing, office towers, stadiums—increase land values but may not generate sufficient revenue to repay debt. This creates pressure to seize even more land to pay the interest and borrow against that to build more, in a vicious cycle.

Banks, under government instructions to roll over this debt, have rushed to raise fresh capital through offshore debt and share listings and through securitization of troubled loans into high-yield “wealth management products” (WMPs) sold through unregulated pools.

China’s shadow financial system is significant—as much as \$4.8 trillion at the end of 2012, according to an April 2013 San Francisco Federal Reserve report, equivalent to 57 percent of GDP and 31 percent of total bank assets. Shadow finance may include mortgages from trust companies or brokerages, small business loans from SOEs, and WMPs offered by trust companies, insurers, private equity firms or brokerages as short-term investments with higher interest rates than banks can pay. Much of this business is ultimately financed with money initially borrowed from the banks.

The shadow banking system has grown 34 percent annually, adding leverage and risk to the formal system. In June 2013, the People’s Bank of China tightened the money supply, withholding RMB 2 billion (\$325 million) from the market in a signal to banks that it would no longer support

lending at unsustainable levels; short term inter-bank rates rose 200 basis points in a week.

In such an environment, government caution about further market opening is not surprising. While foreign banks have limited their exposure from ownership positions, they are also reassessing their strategies and carving out geographic or service niches for the long term, either alone or through tie-ins with Chinese banks.

Bay Area Banking Flows

San Francisco-based **Wells Fargo Bank** has two branches, in Shanghai and Beijing, and offers remittance services through an affiliation with Agricultural Bank of China. In 2010, Wells bought out HSBC’s remaining interest in their joint Wells Fargo HSBC Trade Bank venture, which had operated since 1995. The subsidiary facilitates trade transactions at either end with letter of credit, bankers’ acceptance, receivables financing, documentary collection, foreign exchange and other services.

Bank of America’s Asia-Pacific operations activities, with 27,000 employees, are headquartered in Hong Kong. Even with growth slowing, the bank sees opportunities in China, particularly in serving mid-market U.S. companies with operations in China. Activity by Chinese companies that are expanding internationally is also increasing. The bank has offices in Beijing, Shanghai and Guangzhou serving corporate clients, but no retail branches.

Silicon Valley Bank (SVB), headquartered in Santa Clara, holds a unique position in China due to its technology specialization and strong venture/private equity client base. SVB became active in China in 1999, organizing visiting delegations, hosting seminars and arranging introductions in both directions. It opened Shanghai and Beijing subsidiary offices in 2005 and 2010, respectively, and received its license in 2011, enabling it to handle onshore dollar-based transactions.

SVB has a stake in a Hangzhou loan guaranty corporation and manages two local renminbi funds for the Yangpu District in Shanghai. In 2012, it formed a joint venture bank—SPD Silicon Valley Bank—with Shanghai Pudong Development Bank, the first joint venture bank to obtain a license in 15 years.

"We need to work in China in renminbi; that's the holy grail for foreign banks," says SVB chairman Ken Wilcox, noting that 95 percent of tech industry business in China is done in renminbi. "For China, it's all about the banks' ability to finance innovation. There are as many as 2,000 VCs in China today. Government plays a role in all of them, but much of the investment is misallocated." Not enough attention is paid to business model innovation and sound management, Wilcox says, and that has worked to SVB's advantage.

In addition to providing specialized financing and trade-related services for the cleantech, life sciences and venture/private equity sectors, SVB also has developed a specialization in the wine industry, representing more than 300 West Coast wineries in California, Oregon and Washington.

Bank of Tokyo-Mitsubishi UFJ (BTMU) has been active in China since 1980. It has 16 branches in Tier 1 and Tier 2 cities and a China workforce of 2,400. The scale and scope of its activities has helped its U.S. subsidiary, **Union Bank**, land China-related business on both sides of the Pacific.

In 2009, Union Bank created a Global Business Coordination Unit to leverage its California presence and BTMU's China network. In addition to traditional trade finance and foreign exchange services, the new unit works with BTMU China to offer to cross-border businesses in-country credit, cash management, and investment solutions, as well as international RMB-denominated trade settlement and currency hedging instruments both onshore and offshore via the Hong Kong CNH market.

Union Bank senior vice president and global business manager Bob Garrett sees enormous opportunities in both directions. "Anyone who makes things or provides services in California either has a China strategy or is thinking about one; they're looking to make an acquisition, open a sales office, or access manufacturing partners or source materials," he says. "People went to China originally as an export platform, but much of the foreign direct investment we see today is aimed at selling into the China market itself."

Garrett observes that many businesses with the resources and track record to succeed in China are already there. However, small California

firms with specialized products and services being promoted by the current Five-Year Plan—in healthcare, telecom, IT, cleantech and environmental mitigation—will stand to benefit. For Chinese companies and investors looking to expand into new overseas markets, Chinese banks do not yet have the global reach, expertise or range of services to assist much of that business, he says.

Garrett adds that investment capital flows from China represent "a huge opportunity for California. It's going to come as Chinese firms take their businesses global, and they'll be looking for the biggest markets, where the culture is the same or close to theirs. It's California's to win."

Hong Kong and Taiwan banks have a long history in the Bay Area, and now PRC banks are making an initial approach. **Industrial and Commercial Bank of China (ICBC)** has five Bay Area retail branches—in San Francisco, Oakland and South San Francisco—through its 80 percent interest in Bank of East Asia, a Hong Kong-owned bank chartered in the U.S. The ICBC application was approved in May 2012 after lengthy U.S. Federal Reserve and Federal Deposit Insurance Corp. reviews, since it entails retail banking and thus federally insured deposits.

The **Bank of Communications**, after a three-year wait, has been approved to open a second wholesale branch outside New York, in downtown San Francisco. The bank offers business-to-business services aimed primarily at Chinese and Chinese-American clients in the Bay Area.

Credit Cards: A Charged Issue

Despite staggering growth in the past decade, credit card penetration in China remains relatively low. McKinsey Global Institute estimated that the number of credit cards issued in China grew from 11 million in 2004 to 124 million in 2008, and People's Bank of China data for 2011 placed the number at 268 million; 42 percent of urban residents told a 2011 survey they had at least one credit card.

But those numbers can be deceptive in terms of actual revenue. With a near 50 percent savings rate, a tendency to pay off outstanding balances within the month, and household debt already high from big-ticket home mortgage, medical and education expenses, discretionary spending on

credit cards in China has been limited. That, in turn, has also kept merchant fees low. Major discretionary card purchases are often made overseas: credit card purchases made abroad by Chinese tourists have grown sharply; U.S. purchases have increased more than 30 percent annually for most of the past decade.

Card issuers such as Visa, MasterCard and American Express normally earn payment processing fees, but in China all card issuers must use a single domestic payment processor, China Union-Pay (CUP) for yuan-denominated transactions. CUP was founded in 2002 by 85 Chinese banks under the auspices of China's State Council and the People's Bank of China. All merchants and ATM machines in China are required to accept CUP credit and debit cards; CUP is the world's largest issuer of credit and debit cards, with 2.9 billion cards in circulation (Visa is number two with 2.3 billion), and the third largest in terms of transaction value.

Responding to a U.S. complaint, the WTO ruled in July 2012 that China must end CUP's effective monopoly on payment processing, but it determined that foreign credit/debit card issuers can operate in China through co-branded partnerships with Chinese banks, and it upheld China's right to regulate cross-border clearance of payments into China. To date, China has neither challenged the ruling nor outlined specific steps or a time frame for reform.

Visa, headquartered in Foster City, became the first international card brand accepted in China when Bank of China's Guangdong branch began providing cash service in 1979 to Visa cardholder customers with Hong Kong's Bank of East Asia. The first Visa card in China was issued by Bank of China in 1987.

The firm set up representative offices in Beijing and Shanghai in 1993 and 1996, respectively. Guangdong Development Bank issued the first RMB-denominated Visa card in China in 1995; ICBC issued the first dual-currency card in 1996. Visa was a technical consultant to China's Golden Card Project, the precursor to China UnionPay. CUP became a Visa principal member in 2002 and the two have been collaborators and competitors since.

Working with 23 domestic and international financial institutions in China, Visa develops

branded cards; works with client banks to expand its acceptance network through installation of point-of-sale terminals and ATMs; develops credit, debit and prepaid options for consumers, as well as corporate card products; promotes security in the payment card industry and fights bankcard fraud; and partners with government and trade groups on China tourism promotion. It has played a leading role in the transition from magnetic stripe to embedded-chip 'EMV' cards, and in 2008 it launched the first Visa 'contactless' card product in China—the Peony-Parkson Pay-Wave card, a tie-in with Beijing Parkson Shopping Center and ICBC.

Visa is hoping these long-term investments will be rewarded over time in a more open credit card issuance and payment clearance market, particularly as the anticipated easing of currency controls goes forward.

Hong Kong—The Financial Intermediary

China is pursuing incremental financial reform—on its own timetable. It has a stated interest in internationalizing its currency and opening its markets. As an interim step, it is taking full advantage of Hong Kong's status as a special administrative region of the country since the end of British colonial rule in 1997, using it as a laboratory for financial modernization.

Under the "one-country-two-systems" arrangement guaranteed through 2047, Hong Kong's common law system, predictable regulatory framework and simple tax structure (16.5 percent profits tax; salaries tax capped at 15 percent; no sales, dividend/interest or capital gains taxes) have supported its continuing role as a major global financial center and China gateway, with

- over 200 licensed banks and deposit-taking companies, plus some 61 overseas bank representative offices from 35 countries and a daily interbank turnover of HKD 212.4 billion (as of the end of August 2013);
- one of the world's major insurance centers, with 154 authorized insurance companies of which 71 (46 percent) are from 20 overseas countries or mainland China;
- an offshore RMB center handling cross-border trade settlement of some RMB 2,600 billion in 2012; in the first eight months of

2013, RMB trade settlement handled through banks in Hong Kong amounted to RMB 2,285 billion, representing a year-on-year increase of 35 percent;

- Asia's second largest stock market, with more than 1,570 listed companies (including close to 750 mainland enterprises) with a combined market capitalization of \$2.8 trillion as of August 2013;
- Asia's second largest ETF market in turnover, with USD 85 billion traded in the first eight months of 2013, 61 percent in mainland shares;
- a liquid debt market of USD 261 billion in outstanding debt securities (at the end of 2012) with an average UAD 2.4 billion traded daily, plus over 1,840 authorized unit trusts and mutual funds;
- an active market for initial public offerings (IPOs), with USD 33 billion raised in 2011 (although 2012 IPOs were off by two-thirds, raising USD 12 billion); and
- a leading international fund management hub, with USD 1.1 trillion in assets under management in 2012.

Investment options are scarce in China, because of the tendency to create asset bubbles and a relative inability to assess and manage risk. Pent-up demand for liquidity and higher yield is putting pressure on China to liberalize its financial markets.

In this context, Hong Kong has provided the mainland with a window into markets for ETFs, index funds, options, futures and derivatives and offers foreigners a platform to play the China market through H shares (mainland-incorporated firms listing in Hong Kong) and P-chip shares (Chinese companies incorporated offshore and listed in China). These shares permit VC and private equity investors to buy stakes in PRC companies, structure IPOs or merge firms, and then exit and repatriate profits.

Similarly, Hong Kong was the test location beginning in 2007 for issuance of "dim sum bonds," yuan-denominated bonds sold by the Chinese government, banks and companies to offshore investors. From its first year when RMB 10 billion in bonds were issued, the total outstanding reached RMB 292 billion by September 2013.

Hong Kong also benefitted from the gradual introduction of cross-border trade settlement in

RMB, first allowed for five provinces in 2009, expanded to 20 in 2010, and permitted nationwide in 2011. Settlement volume by Hong Kong banks in the first eight months of 2013 reached RMB 2,285 billion. That, in turn, has contributed to a total of RMB 857 billion in accumulated offshore deposits and certificates of deposit in banks in Hong Kong as of August 2013—big business for foreign banks registered in Hong Kong.

But how long will this situation last? China is internationalizing its currency, but the process is gradual and closely managed. This is benefitting Hong Kong, but competition is coming.

Partners Across the Border?

The next phase of the experiment may take place at Qianhai Bay, a 15-square-kilometer planned development in Shenzhen. Qianhai is to be established as a finance, information and logistics hub offering a low 15 percent corporate tax and concessionary personal income taxes to attract talent—a profile similar to Hong Kong, but with an important added feature.

China's National Development Reform Council (NDRC) has invited large mainland and foreign financial institutions and fund managers to locate within Qianhai, permitting them to raise renminbi offshore—in Hong Kong—to invest on the mainland. Companies registered in Qianhai will be able to issue bonds and obtain loans via Hong Kong.

Qianhai is the government's third attempt at a special zone enabling currency internationalization, following programs launched and later discontinued in Wenzhou and Tianjin. At its heart are eased restrictions on offshore investment by institutions and wealthy individuals as Qualified Domestic Institutional Investors (QDIIs) and Qualified Foreign Institutional Investors (QFIs). The first of the new and revised rules were issued in early 2013. The challenge for regulators is to set thresholds that attract large financial institutions, but also to set limits that effectively manage risk.

Shanghai also sees its role as a global finance hub expanding in tandem with easing of currency controls. Settlement of trade transactions in Shanghai dates back to 1842, and the original Shanghai Stock Exchange opened in 1891. The Exchange closed following the 1949 revolution

and was re-established in 1990. In 2012, the National Development and Reform Commission (NDRC) released a long-term development plan for Shanghai that includes development of an expanded Shanghai Financial Center. By 2015, China plans to launch an international board on the Shanghai Stock Exchange to allow overseas company listings and trading in foreign stocks, derivatives, bonds and gold. The 2013 launch of a 28-square-kilometer free trade zone in greater Shanghai will, among other things, facilitate cross-border settlement of yuan transactions and expand the currency's use in trade, finance and insurance.

In October 2013, the government took a further step toward internationalizing the yuan by announcing during a visit by Vice Premier Ma Kai that London will become the first major trading hub for Chinese currency outside Asia.

All of this will necessitate conformity with international standards and practices in law, taxation, and supervision. A 2011 Brookings Institution report suggested that Shanghai's success will depend on a broader offer of financial products; wider global use of the renminbi; an expanded "soft" infrastructure of related services; and a liberalized commercial law framework for structuring and adjudicating transactions. In a 2012 PwC survey, foreign banks stressed two overarching prerequisites: meaningful currency and interest rate liberalization.

MOBILE/INTERNET

Everything Is Interconnected

It is much more difficult today than in the past to make distinctions among tech market segments—computing, networks, mobile and wireline broadband, data storage and analytics, social media, entertainment—as the lines between them become more and more blurred. All are increasingly part of a single set of tools that work in various combinations to serve particular markets. The trends shaping the tech sector today include the following:

- The cost of computing—both on the hardware side and the software side—has fallen sharply, even as devices become smaller and more powerful, and as computing finds new applications in cars, appliances, smart buildings, manufacturing, power generation and agriculture.

- Computing has moved from the desktop to mobile devices and the cloud, and as banking, retail, entertainment, travel and government services become available online, on demand, on a 24/7 basis via multiple channels, brick-and-mortar businesses have seen wide-scale disruption.
- Big data, social media and mobile payments are creating rich personal and brand-driven business ecosystems that keep users connected in a real-time feedback loop of marketing data.

In China, as in most emerging economies, mobile technology has leapfrogged an inefficient national wireline telephone monopoly. China's online markets are growing exponentially: data storage and management firm Network Appliance estimates annual turnover in China's data storage and management market at \$2 billion, among the world's largest. Alibaba expects transactions hosted by its main online shopping sites, Taobao and Tmall, to reach \$473 billion in the next five years. According to the Boston Consulting Group, online retail sales in China are projected to triple to more than \$360 billion by 2015, overtaking the U.S. as the world's largest online market.

It Starts with a Phone Call

China's state-owned telecom providers are at the heart of the country's Internet architecture. In 1999, the monopoly wireline phone company, China Telecom, was broken up, its assets in 10 northern provinces given to China Netcom (now China Unicom), formed in 1994 as a wireless pager and mobile provider. China Mobile, launched in 1997, emerged as a nationwide wireless provider after the China Telecom breakup.

As demand for more sophisticated mobile services has grown, China Mobile has often struggled to innovate. Introduction of the 3G smartphone in Tier 1 cities was initially handed off to China Telecom and China Unicom in 2009. China Mobile remains the baseline national provider of 2G rural services and has steadily expanded its 3G phone and data offerings. It is the world's largest mobile provider, with 745 million subscribers; in Q1 2013, it had 114 million 3G customers, up from 60 million a year earlier.

China Telecom and China Unicom operate on conventional CDMA standards prevalent in the U.S. China Mobile has gradually migrated from the European GSM mobile standard, to a new, distinctly Chinese version TD-SCDMA, that focuses on data capacity rather than voice call clarity. This is significant for handset and chipset makers seeking access to China Mobile's customer base.

Apple's early decision to adopt the GSM standard for the iPhone, with an eye toward the high-end European market, delayed the phone's release in China, but the firm did obtain a license to offer the iPhone on China Mobile's network, with rollout in late 2013. By providing access to its more than 700 million subscribers, the partnership with China Mobile, which involves the lower-cost iPhone 5, may improve Apple's market share (5 percent), which has been declining relative to competitors such as Samsung (18 percent), Lenovo (12 percent), Huawei (9 percent) and fast-growing Xiaomi (5 percent). Apple's high cost—\$815 for an iPhone 5 compared to an average smartphone cost of \$200—has been a factor that the lower-cost model offered through China Mobile may also help to address. Apple's current customers are concentrated in affluent cities such as Beijing and Shanghai, while the fastest market growth is now in smaller and inland cities where China Mobile enjoys a strong position. Consumer trade-ups in those cities, from older feature phones to smartphones, offer an opportunity for Apple—if it can hit the right price points.

In the meantime, **Google's** Android operating system dominates in China, with just over 70 percent of smartphone market share as of July 2013, up nearly 9 percent from a year earlier. Prices for 3G smartphones are falling sharply, to as little as \$99, and Android powers most of the low-cost phones made by Chinese producers like Huawei, ZTE, Lenovo and Xiaomi.

As of April 2013, China's Ministry of Industry and Information Technology (MIIT) reported 1.16 billion mobile phone users nationwide, up 13 percent year-on-year. In the same time, 3G subscribers grew by 84 percent to 293.1 million and are projected to reach 375–400 million by year end 2013—still at best a 40 percent market

penetration. Most Chinese are still on 2G feature phones without Internet capability.

Industry analyst Canals estimates that 30 percent of the 840 million mobile phones sold worldwide in 2013—some 240 million—will be sold in China. Research firm IDC estimates that China accounted for 26.5 percent of global smartphone sales in 2012, passing the U.S. as the world's largest smartphone market.

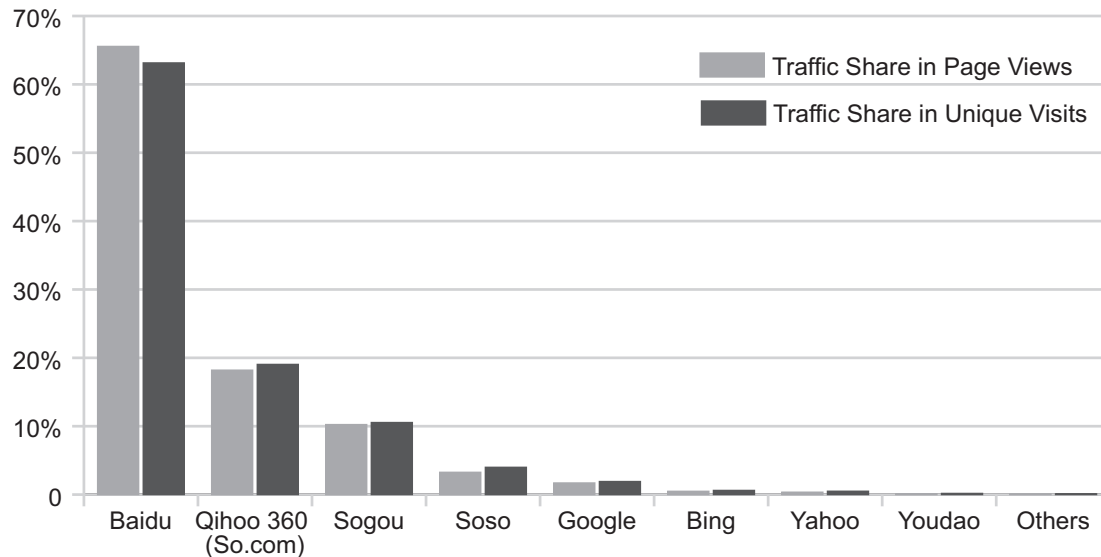
The total number of people online in China—via wireline or mobile—is about 560 million, a 42 percent penetration. Most access the Internet on phones, while more expensive personal computers are used in cafes and workplaces.

Much of China's original Internet infrastructure was developed by major Silicon Valley companies like Cisco Systems, Sun Microsystems and Oracle. Equipment and software were installed within government agencies, SOEs and universities at concessionary prices in the 1980s and 1990s, in the hope of building early ecosystems of users that would generate repeat contract business over time.

Many of China's premier Internet companies also have roots in Silicon Valley. **Baidu**, the leading Chinese search portal, was founded in 1999 by Robin Li, who previously headed search engine development at Infoseek in Sunnyvale, and Eric Xu, a UC Berkeley graduate in biochemistry with extensive Valley connections. Web portals **Sina Corp.** and **Sohu.com** received early venture funding from Valley investors, as did Internet portal **Tencent**, online payment provider **YeePay**, social media site **51.com**, applications developer **NetEase**, online travel service **Ctrip**, and game designers **Shanda Interactive** and **The9**.

Global web portal **Yahoo!** and search firm **Google** got off to successful starts in China, but stalled over freedom of speech and censorship issues. Yahoo! complied with Chinese law in 2005 and provided the government with IP address information on dissidents which led to their arrests and imprisonment; Google agreed to filter politically sensitive key search terms from its system in 2006. Both incidents proved damaging. In 2013, Yahoo! Mail was closed down in China, after falling to a 2 percent market share.

China's Online Search Traffic Market Share, September 2013



Source: Marbridge Consulting, Beijing

Yahoo! had been instrumental in the launch of business-to-business (B2B) search engine **Alibaba.com**, and in the face of political and market challenges eventually traded its China operations and \$1 billion for a 40 percent stake in Alibaba, which has since bought back half of that position. The transaction netted Yahoo! \$7.6 billion; its remaining stake in Alibaba continues to account for a significant share of Yahoo's capital value. Alibaba is rapidly expanding its reach beyond B2B, to include consumer transactions and finance: its Tmall claims 70,000 online storefronts, and in 2012 its 11.11 Shopping Festival processed \$2.5 billion in transactions in 24 hours, more than Black Friday and Cyber Monday combined.

A 2009 cyber attack on Gmail accounts of Chinese human rights activists in 2009, presumably at government direction, led Google to publicly announce that it would no longer censor its search results. In March 2010, the company announced that it would shut down its Google.cn site and offer unfiltered China search via its Hong Kong site Google.hk, while keeping its mainland R&D center and sales presence. In December 2011, Google broke ground on a 2.7-acre, \$100 million data center at the Tseung Kwan O Industrial Estate in Hong Kong. It has since entered a

partnership to provide filtered search for mainland portal Qihoo 360.

LinkedIn has been operating in China for a decade, with more than 4 million members. It will offer a new Chinese language site in 2014 and plans to comply with government requirements that may limit some content. **Facebook** and **Twitter** have not agreed to government censorship and are not available in China.

Hong Kong is aggressively marketing itself as a location for secure data center operations to serve the mainland market; **Apple** has been scouting locations for its first offshore data center in Hong Kong, targeted to open in 2015. Bay Area suppliers such as San Jose-based data storage media manufacturer **Microdia** and **Arkologic Ltd.**, a Fremont supplier of high-capacity solid-state drive storage solutions for the chip design, biotech and cloud computing sectors, base their Asia operations in Hong Kong.

The digital economy connects China and the Bay Area not only through telecom and Internet, but through emerging sectors such as gaming. San Francisco Game developer Zinga, for example, employs 250 game developers in its Beijing office.

Game Strategy

Online gaming is rapidly going global, and game developers and animators speak a common technical language. No surprise, then, that interactive animation development lends itself well to cross-border collaboration—not just for games but for apps, feature-length films, and beyond.

San Francisco digital art and animation studio **Concept Art House (CAH)** has been in China since its inception in 2007, with a studio in Shanghai's Yangpu District. It began with three founders and two employees and as of early 2013 had a staff numbering 140–200 in San Francisco and 120 in Shanghai.

Founders included concept artist James Zhang, who provided digital art solutions for Star Wars Galaxies published by LucasArts and Lair for PlayStation; Matthew Le Merle, a Booz-Allen consultant and gaming enthusiast who joined as an investor; and Xuan Li, who led CAH's China expansion by building capacity and winning contracts with Shanda and Tencent, including work on Worlds of Warcraft, a favorite online game in China with 7 million users. Other clients have included NBC, Disney, AOL and Sina.

CAH chose Yangpu for its proximity to universities and the cluster of digital artists that had begun to form in what had been an industrial area. "We got a brand new facility, with infrastructure just being built out, near the largest concentration of students studying digital arts in the world."

Le Merle says that the Bay Area-China linkage makes good business sense on several levels: demand for higher-quality entertainment is growing among China's rising middle class; costs of making traditional live action films (or buying older titles from catalogues) and physically distributing them to larger audiences in emerging markets are up sharply; Bay Area companies are at the cutting edge of digital technology, but lack enough skilled workers locally to serve global markets; Chinese studios have upped their game significantly in terms of quality; and the time difference enables CAH to work on client projects 24/7.

"China has a reputation as a place to get rapid turnaround of product," Le Merle says, "but it has also proven to be an active market in its own right." The Shanghai studio has recently taken on more autonomy, he adds, doing its own business development and account management. The volume of available skilled talent is key. "We pay normal wages and work normal hours, we're fully compliant with all regulations and standards," he stresses, "and we still have a cost advantage."

Using this business model, CAH sees new market opportunities going forward, beginning with digital trading cards or graphic novels. But the big market could be online education, particularly as libraries become digitized and schools offer courses beyond their physical, local boundaries. "I see a lot of value in examining how we use technology to educate a much larger population," Le Merle says. "Why doesn't it make sense for 100 million Chinese to get an education without necessarily having proximity to professors or classrooms?"



Major Firms Find Their Niche

Legacy Silicon Valley tech firms, active in China since the 1980s, have seen their early investments in infrastructure, R&D centers and university programs pay off. But as the China market matures and domestic competitors expand their low-cost, off-the-shelf solutions and services, margins are being squeezed, and success is a function of scale and finding new niche business.

Oracle Corp. entered China in 1989 with a clear strategy—to partner with government, business and academia to embed their technology in as much of China's initial computing and network architecture as possible, laying the foundation for long-term business growth.

"Going back twenty years," says Oracle senior director of business development Brad Tewksbury, "you'd go in, find a partner, then to get anywhere in winning government contracts you needed to show skin in the game by building R&D centers. For software companies you'd invest in centers of excellence focusing on key verticals—finance in Shanghai, government in Beijing, manufacturing in Shenzhen. Moving forward over the years, you'd need to do training through the universities and through the R&D labs for customized projects."

Oracle currently serves its top 500 enterprise accounts in China—mainly SOEs, government agencies and large institutions—through a dedicated, direct sales force. A multi-channel focus is selling database, middleware and application solutions in key public-private verticals such as healthcare, pension benefits and infrastructure. One important channel is Chinese software outsourcing partner Neusoft: Oracle often places staff in its six software centers, providing training in particular verticals, and it teams with Neusoft to bid on projects. "They can just bid on a solution and go to market with Oracle as an ISV partner," Tewksbury says, "and on some huge-scale government contracts we can go in as a quasi-Chinese company."

In Tier 2 and Tier 3 cities, Oracle is now selling database, middleware and application solutions in retailing, government services, banking and telecom. Once a solution is installed and proves successful, Tewksbury says, bidding the next job and the one after become easy, especially with a

known brand and the right connections. In all, Oracle has 16 branch offices, 4 R&D centers, 3 solutions centers, 1 customer support center, 2 consulting centers and some 1,500 partners, 25,000 customers and over 4,500 employees in China.

Oracle's clients include the following:

- Ping An Bank uses Oracle's FLEXCUBE core banking solution to cross-sell products and assess related risk.
- China Mobile, China Telecom and China Unicom use Oracle's Exadata Database engineered system for a variety of data management solutions, including both online transaction processing (OLTP) and data warehousing.
- Metallurgical Corp. of China in Chongqing uses Oracle software to create a Database as a Service (DaaS) model to run its business of constructing steel plants around the globe.

Oracle was an early partner in 2005 with Chinese developer Shui On Land at SOL's knowledge and innovation community in Shanghai's Yangpu district. An Oracle Advanced Technology Solution Centre has been testing software products for the China market in areas such as distance learning, broadband content, e-commerce and radio frequency identification (RFID) technology. A Dalian global support center opened in 2007, and is expected to become a full-service outsourcing center for the region.

Tewksbury believes Oracle is well-positioned in China to compete in the big data space, given its leadership in data management and analytics solutions. At the low end of the market, large accounts—and especially the government—are resistant to cloud/software-as-a-service providers like Salesforce.com because data resides outside China's borders; at the other end, China's tech sector has recently been getting stronger in hardware but less so in database software and has no real indigenous database companies to compete with Oracle for large accounts with complex data management needs.

Intel Corp.'s Intel China Research Center (ICRC), established in 1998 in Beijing, is made up of two labs for research in communications and microprocessor technology and an Advanced Platform Development Center to develop component

technologies and system architectures for Intel's future chipsets and platform products. In Shanghai, the company has a wafer manufacturing plant; an R&D center that focuses on Flash silicon design, chip package development, and digital home system development; and a software development center. Intel opened a \$2.5 billion semiconductor manufacturing plant in Dalian in 2010 and has a testing and assembly site in Chengdu. Its combined investment in China totals roughly \$4.7 billion.

Intel has more recently partnered with Chinese laptop and smartphone manufacturer Lenovo on a new rugged Classmate-Plus laptop for students and the power-efficient, high-end K900 smartphone, both powered by versions of Intel's Atom processor.

Cisco Systems has had a China presence since 1994. It was instrumental in developing China's Internet infrastructure and in offering network connectivity and big data solutions to help government and business clients achieve scale and improve productivity across large enterprises. Beyond that, it has partnered with universities and provincial governments to provide new education and training opportunities as well as pilot programs that expand delivery of public services.

Rebuilding after the 2008 earthquake in Sichuan Province provided a laboratory for redesigning Sichuan's healthcare and education systems and transforming its workforce, using information and communications technology. Under a three-year, \$50 billion public/private partnership, Cisco:

- developed 94 online schools with 1,140 technology-enabled classrooms benefitting 135,000 students and 8,000 teachers, along with a 26-site TelePresence professional development network that has helped 112,000 teachers enhance their skills;
- built 66 healthcare organizations, 6 regional data healthcare centers, 2 operational centers and an emergency response center in the establishment of smart hospitals, mobile clinics, telehealth services in remote or inaccessible areas and a regional healthcare cloud; today, the system supports 7,000 doctors and practitioners, 15,000 inpatients and 280,000 outpatients, and processes 60 million rural cooperative medical insurance

records and 400,000 electronic medical records, on a monthly basis;

- expanded its nationwide Cisco Networking Academy (CNA) to 51 schools in Sichuan and all of the province's vocational colleges, providing information and communications technology (ICT) training for 7,400 students and teachers over 2008–11.

The nationwide CNA program, launched in 1998, offers a blended program of classroom and cloud-based curricula for training in the design, building, securing and maintenance of computer networks. It has provided university, vocational and continuing education training to more than 207,000 students through 2012.

The Cisco China Research and Development Center (CRDC), established in 2005 in Shanghai's Caohejing Economic Development Zone, is the firm's third largest R&D center with 3,300 employees and branch offices in Hangzhou, Suzhou, Hefei, Beijing and Shenzhen, representing a cumulative \$100 million investment.

CRDC has launched a joint lab for green technology with Tsinghua University, the University of Electronic Science and Technology of China (UESTC), and Chongqing University of Posts and Telecommunications (CUPT), to develop network platform-based architectures and systems that improve energy conservation, emissions reduction and sustainable growth. The Center also has various joint research projects with Tongji University, Zhejiang University, the University of Science and Technology of China (USTC), Shanghai Jiaotong University, Fudan University, and Beijing Jiaotong University.

More broadly, CRDC's R&D supports service providers, large enterprises, small and medium businesses, and consumers domestically and worldwide, covering a range of networking technologies, including next-generation networks, video, mobile internet, data center virtualization, collaboration and cloud computing, and borderless networks.

A Tough U.S. Sell for Chinese Suppliers

Global competition from China in telecom has developed more quickly than expected. **Huawei**, the world's second largest producer of telecommunications equipment, had \$2.7 billion in global

revenues in 2002, 10 percent from sales outside China. Its 2012 global revenues totaled \$35 billion, 70 percent of that from overseas. In recent years Huawei has emerged as a major competitor for equipment suppliers like Cisco, both in China and overseas.

Building on its base in telecommunications infrastructure equipment, Huawei is also seeking to become a leading global brand for smartphones and mobile devices, rivaling dominant players Samsung and Apple and other producers such as Nokia, Lenovo, LG and HTC. To compete at higher levels globally, like its principal Chinese competitor, ZTE, it is investing more than 10 percent of its annual revenues in R&D.

In the U.S., Huawei and ZTE have made inroads selling basic, high-quality, low-cost network systems to small business customers and small regional telephone companies. An important specialty has been high-speed regional broadband and municipal Wi-Fi in underserved rural areas, as customer demand shifts from wireline to wireless and from voice calls to Internet usage, and as major incumbent phone providers have been reluctant to take on build-out and service costs in a highly regulated market segment.

Huawei not only fills an infrastructure gap for rural providers, it is also one of only three global competitors—none of them in the U.S.—capable of building out a 4G-LTE network entirely with its own equipment, operating system and software. U.S. mobile carrier customers include Clearwire, Hibernia, and Leap Wireless. AT&T and Sprint offer Huawei handsets at retail outlets.

Both Huawei and ZTE have encountered pushback in the U.S., U.K., Canada, Australia and India over questions about their technology and pricing structures: whether government ownership and subsidies give them an unfair price advantage; the extent to which they owe their rapid innovation to illegal technology transfer; and whether their network infrastructure contains Chinese government-mandated “back door” vulnerabilities that enable remote access to monitor data or disable systems. Huawei, which is an employee-owned company, points out that such concerns have never been substantiated and that the company and its gear are globally deployed and work with major

nationwide carriers, including in the U.K., Canada, Australia and India.

With Huawei expanding in the U.S., the issue is significant. At the end of 2012, it posted \$1.3 billion in revenues and had 1,750 employees in the U.S. Its California workforce numbered about 700, engaged primarily in R&D and marketing—with more than 620 in Santa Clara and more than 100 in San Diego—according to Dean Sirovica, vice president for business development with Huawei R&D USA.

Huawei opened its U.S. headquarters in Plano, Texas in 2001 to be close to key telecom firms such as Nortel Networks, AT&T and Texas Instruments. “After a few years, they realized that the telecom market was colliding with the Internet communications markets, and that the line between delivering telecom and Internet was becoming very fuzzy,” Sirovica says. Over time, Huawei’s flagship R&D center in Santa Clara—one of four in the U.S., has become an increasingly important part of the firm’s growth strategy.

“As the world continues to globalize, any company needs to source technology wherever it’s being developed,” Sirovica explains. Huawei’s focus in Silicon Valley is on new growth markets—consumer mobile handsets and enterprise cloud storage and IT. Key verticals include education, healthcare and electric power. Much of the R&D work involves technology licensing. “If you look at the way business is evolving in Silicon Valley, everybody is evolving toward collaborative innovation,” he adds. “The days of the white coats at Bell Labs are gone; they’re looking to start-ups. Huawei is no different. Our desire is to be a regular member of the ecosystem and do business in a regular way.”

That has not been simple. A 2003 joint venture between Huawei and network infrastructure firm **3Com** combined licensed 3Com technology and Huawei’s manufacturing and marketing resources in Asian markets. But a subsequent 2008 Huawei-Bain Capital bid to acquire network infrastructure firm 3Com was blocked by the U.S. government, due to 3Com unit Tipping Point’s cyber security work for the U.S. military. 3Com was absorbed in 2010 by Hewlett-Packard.

A similar 2007 joint venture with Mountain View Internet security firm **Symantec** ended in 2012

when Symantec sold its 49 percent stake back to Huawei. A 2011 bid for the technology assets of bankrupt **3Leaf Systems**, a Santa Clara virtualization company with processing technology to link servers for low-cost supercomputing, was withdrawn after a negative review from the Committee on Foreign Investment in the U.S. (CFIUS), which regulates security-sensitive foreign investment.

Security issues create a conundrum for Huawei and for U.S. regulators. Independent analysts have identified specific security vulnerabilities in Huawei equipment, but have not alleged that they were intentional. A 2012 White House Security Council report cleared Huawei of spying allegations, but an October 2012 House Permanent Select Committee on Intelligence report focused on the difficulties in fully identifying hardware and software backdoors in a network and criticized what it felt were inadequate responses from Huawei and ZTE about their business structures and government ties. The report recommended a ban on federal purchases of Chinese telecom equipment and urged state and local governments and U.S. companies not to do business with Chinese suppliers. A classified annex of the report is said to identify specific network security breaches but is thinly documented. In light of the fact that no evidence of actual wrongdoing was presented, it is difficult for companies like Huawei to address such charges.

China has criticized these allegations as unfounded and insists that they reflect a political agenda and are motivated by protectionism. In late October 2012, two weeks after the report was released, China Unicom removed core Cisco cluster routers from its China169 backbone network serving Wuxi in Jiangsu Province, claiming security issues—a move largely seen as retaliation. Cisco supplies core routers to both China Unicom's China169 network and China Telecom's 163-Network, which together handle 80 percent of China Internet traffic.

Congress subsequently enacted a federal ban on Chinese telecom equipment purchases as part of the March 2013 budget continuing resolution signed by the president. Language in the provision is vague, referencing both subsidized pricing and security concerns. At about the same time, Japan's Softbank bid to acquire Sprint-Nextel, and the two

firms have assured Washington lawmakers that Sprint would not integrate Chinese equipment into its network and would replace the Huawei equipment used by Sprint partner Clearwire.

Governments in Canada and Australia also exclude Chinese equipment suppliers from their procurement programs; New Zealand has explicitly opted not to do so. The U.K. and India require inspection and certification of Chinese telecom equipment imports. The EU threatened an anti-dumping investigation into pricing and possible illegal subsidies to Huawei and ZTE involving some \$1 billion annually in network equipment sales throughout the EU. In August 2013 the investigation was put on hold pending China Mobile's awarding of the contract for its 4G network build-out; that same month, European vendors Ericsson, Alcatel-Lucent S.A, and Nokia Siemens Networks were together awarded nearly a third of the \$3.2 billion in contracts.

Huawei's Americas revenue grew by only 4.3 percent in 2012; U.S. revenues, while not made public by the company, were reportedly less than \$2 billion. With sales slowing, a senior Huawei executive told an April 2013 analyst call that the company no longer sees the U.S. market as a strategic priority, although it will continue to sell handsets and service its existing U.S. customer base.

China Calling

By contrast, **China Telecom** and **China Unicom** maintain comparatively low-profile sales and technical support offices in San Jose, and **China Mobile** opened a Milpitas R&D center in 2009—its first overseas. China Telecom and China Unicom offer cross-border business voice and data services between the U.S. and China. China Unicom has a stronger Bay Area presence and also offers tailored cloud data and mobile payment solutions.

Ben Chen, president of West Region operations for China Unicom Americas, says his company has invested more than \$30 million in hardware and infrastructure for its enterprise service, which offers up to 200 gigabyte capacity. This provides Chinese businesses in the U.S. with a level of comfort about assured capacity, tailored services and security. It also makes it easier for a U.S. firm to set up an office or facility in China.

Chen also looks for telecom and Internet innovations that potentially benefit the China wireline and mobile markets. China Unicom has the largest 3G subscriber base of the Chinese carriers and was Apple's first iPhone partner in China. Its WoStore, launched in 2010, sells mainly apps for Android phones and fills an important niche since Apple sells its own apps, Google has scaled back its China presence, and private app stores are notorious for pirated code that steals user information.

So far, China Unicom has taken a risk-averse approach in Silicon Valley, licensing technology but avoiding acquisitions. Among the areas of innovation it is watching closely, says Chen, are

payment, data centers and the holy grail for tapping emerging markets—a low-power, full-featured smartphone delivered for under \$100.

China's leading Internet search engine, **Baidu**, has announced plans to open the Institute of Deep Learning (IDL)—its first wholly-owned research center—in Cupertino. In announcing the new initiative at Baidu's January 2013 annual meeting in China, CEO Robin Li said the IDL will focus on research in the machine learning field, in which computers use data analytics to simulate the way a human brain absorbs information and applies context. A well-known example of machine learning is Apple's Siri voice recognition feature.

The Foxconn Connection

If any one company can be said to embody U.S.-China trade during the past decade, it is arguably Foxconn Technology Group, the original design manufacturing (ODM) unit of Taiwan electronics contract manufacturer Hon Hai Precision Industry Co. Foxconn designs and manufactures products to customer specifications, and the finished product is sold under the customer's brand. The ODM retains rights and related patents to design contributions it has made to the product.

The company has manufactured the Apple iPod, iPhone and iPad; the Amazon Kindle; Sony's PlayStation; Nintendo's Wii U; and, as early as 2001, motherboards for Intel. In 2013, it announced plans to make the Google Glass wearable computer at a facility in Santa Clara and has licensed technology to Google relating to head-mounted displays.

Foxconn is the world's largest electronics manufacturer, with a workforce of 1.2 million—900,000 of them at 13 factories in nine Chinese cities. The largest and most well-known such facility is Foxconn City in Shenzhen, with some 230,000 employees; another 120,000 work in Zhengzhou Technology Park. Most Foxconn workers live in company dormitories; the company's Chengdu complex has 70,000 dormitory residents.

At least 40 percent of Foxconn's \$132 billion in annual revenues is estimated to come from Apple, and Apple has become closely associated with headlines about working conditions and wages at Foxconn facilities—from worker suicides and wage protests in Shenzhen to a factory explosion and worker riots in Chengdu.

Foxconn's growth and the challenges it faces reflect the evolution underway in Chinese manufacturing and trade: mass urbanization as rural Chinese flock to cities for work; pricing and margin squeezes due to global competition; and manufacturing moving further inland to cities like Chengdu and Chongqing as land becomes scarce and production costs rise nearer the coast.



This growth has come at a price. Apple has worked with Foxconn to resolve workforce issues that have compromised its branding, Foxconn workers have received pay raises, and overall safety and living conditions have improved. But as Foxconn has added capacity, the worker training, safety measures and amenities needed to support it have not always kept pace. The company's employee turnover rate has been 10–20 percent, in the mid-range for China, particularly as overall wages have risen and workers routinely quit for higher-paying jobs with promotion opportunities.

Foxconn is vulnerable, however, to Apple's business flow, including slowing growth in U.S., European and Japanese markets, and a slow rollout of Apple products in China due to price point and network limitations, as well as competition from Android and Samsung. Apple CEO Tim Cook announced in December 2012 that the company will invest \$100 million to manufacture Mac computers—possibly the Mac Pro or Mac Mini—in Texas. It is not yet clear whether Foxconn, which has a Texas production facility, will do the manufacturing.

Foxconn reported a 20 percent drop in earnings in Q1 2013, in large part due to slowing Apple and Nokia demand, although Q2 earnings rose modestly. The company is expanding and diversifying its U.S. activities with Google, and has branched into new products of its own—60-inch flat-screen televisions sold under the VIZIO brand in the U.S. and by RadioShack in China (which may eventually play a part in Apple's television strategy), as well as a wearable watch computer that syncs to an iPhone or iPad, and a reported line of low-cost tablets that run on an open-source Mozilla Firefox operating system. Apple, meanwhile, is sending more of its lower-end business to contract manufacturer Pegatron, a Taiwanese spinoff from computer-maker ASUS that employs 70,000 workers at plants in Shanghai and Suzhou.

Cashing In on Chips

Global suppliers are closely monitoring China Mobile's continued rollout of 3G service in rural China, its issuance of 4G TDD-LTE licenses, and the overall success of its TD-SCDMA standard both within and outside China. The standard is a test case for indigenous innovation, following the Five-Year Plan. China Mobile's scale provides a critical mass customer base that puts domestic suppliers on a more level competitive playing field in the world's largest market. Finally, it is expected to drive innovation in low-cost, low-power handsets, Internet television and advanced broadband deployment in the Middle East, Africa and Asia.

Marvell Technology Group Ltd. sees dramatic new opportunities in China Mobile's scheduled 4G TDD-LTE rollout because the nascent Chinese

standard has no dominant chipset supplier, as Qualcomm and Samsung are in 2G and 3G and in the 4G FDD-LTE standard prevalent in the United States. China Mobile's subscriber base, the rapid growth seen in smartphone sales, and the Android operating system's leadership position in China suggest a potential market larger than that of Verizon and AT&T combined.

Marvell was co-founded by Dr. Sehat Sutardja and his wife, Weili Dai, immigrants from Indonesia and China, respectively, in 1995. Both are UC Berkeley alumni and are the principal donors for Sutardja Dai Hall, the home to CITRIS (the Center for Information Technology Research in the Interest of Society) and a nanofabrication laboratory on the Berkeley campus. They have also supported the MIT Media Lab's One Laptop per Child project; the Smart Electronics Initiative cross-industry

collaboration to cut energy consumption in consumer electronics; and the U.S.-China Green Energy Council, a public-private partnership in California and China.

Marvell employs nearly 2,000 people in China, with Shanghai being the largest R&D site. Many China-based engineers are focused on the mobile sector in silicon design, digital signal processing, protocol stacks and Android software. In addition, Marvell has mobile R&D design centers in the U.S. and Israel. Marvell has provided 3G chipsets for Samsung, Motorola, Huawei, ZTE and other Android handset makers. It also designs chipsets for

television set-top boxes, LED-screen TV processors and computer hard disk drives.

The “sweet spot” for Marvell lies in a systems-on-chip (SOC) solution for TDD-LTE that includes full applications and integration processing. Down the road, as China’s government builds out fiber optic cable to the home to reach China’s 175 million cable television subscribers, Marvell sees a valuable growth market for chipsets supporting 10 gigabits per second transmission network infrastructure, eventually ramping up to 100 gigabits—the standard for instant delivery of feature-length HD programs.

The Taiwan Tech Community Plans its Future

Taiwan faces its own challenges as it attempts to reposition itself as an innovator in a fast-evolving technology landscape. The task is made more difficult in the shadow of the mainland’s rapid rise.

The scale and speed of the PRC’s economic growth and technological advance has, to an extent, crowded out Taiwan’s efforts to diversify its innovation and promote its own global brands. More than anything, commoditization of hardware and migration of value-added away from production, have disrupted an OEM culture and infrastructure dominated by Taiwan’s leading global chip foundries, Taiwan Semiconductor Manufacturing Corp. (TSMC) and United Microtechnology Corp. (UMC), as well as low-cost manufacturers like Acer, ASUSTek, Quanta and MiTAC.

Government is an active partner: Taiwan’s tech sector grew out of a 1979 Ministry of Economic Affairs initiative to redeploy foreign exchange reserves toward moving the island’s economy up the value chain from basic manufacturing to semiconductors, computers and peripherals. The Industrial Technology Research Institute (ITRI) administers the program, oversees Taiwan’s Hsinchu Science and Technology Park, selected the early students to go abroad, and provided seed funding for professional organizations such as Monte Jade and CASPA in the 1980s.

Today ITRI maintains a worldwide office network—including a Bay Area office in San Jose—that engages in early-stage incubation, R&D collaboration, contracted research, technology licensing, recruiting and training. Worldwide, ITRI employs 5,800 people, administers some 18,000 patents and generates half of the Taiwan government’s R&D budget. It works in close coordination with Taiwan’s trade promotion arm, TAITRA, and with the science and technology division of the Taiwan consulate, the Taipei Economic and Cultural Office (TECO), both with offices in Santa Clara. They cooperate closely to facilitate trade and technology exchanges, and to encourage Taiwanese graduates and entrepreneurs to return home and help expand and diversify Taiwan’s skills and knowledge base.



Major Taiwanese tech firms with presences in Silicon Valley include semiconductor foundries **TSMC** and **UMC**; **ASUS**, which has a service center and also collaborates with Google on the Nexus 7 tablet; **Acer**, which has its U.S. headquarters and an R&D lab in San Jose and in 2011 acquired Mountain View cloud software firm iGware, leading to the launch of its CloudMobile Android phone in 2012; GPS, server, workstation and cloud services firm **MiTAC** International, which has a factory and assembly configuration center in Fremont and division offices in Fremont and Santa Clara; motherboard and PC peripherals maker **GIGABYTE**; and monitor/display maker **BenQ**.

A number of major Silicon Valley tech firms also have presences in Taiwan. **Hewlett-Packard** opened a global R&D center, the Computing Hub, in 2010 and a service center in 2012. **Cisco** has operated a networking lab since 1997 in collaboration with the Institute for Information Industry and four major Taiwan OEMs, including Acer and Tatung, and has been a leading provider of networking equipment and services to Chunghwa Telecom. **Oracle**'s database, middleware and applications programs are taught through its Oracle Academy program at 26 Taiwan universities. **Applied Materials** opened a flat-panel display/thin-film solar equipment manufacturing center in Tainan in 2008, and has applied to build a \$5 billion flat-panel LED R&D facility in Southern Taiwan Science Park.

In the Bay Area, **CHT Global** is the U.S. telecom solutions arm of Taiwan's premier phone and Internet provider Chunghwa Telecom. CHT, based in San Jose, provides wholesale business voice, data, conferencing, hosting and cloud/data center services over its secure private network, as well as international residential phone service via its Net2Asia calling card. CHT's primary market is business customers with extensive cross-border Asia-U.S. activities and a need for high-capacity, secure broadband connections. It has reciprocal relationships with national carriers in more than 100 worldwide locations, among them China's three main operators. CHT expects to launch mobile service in late 2013.

Taiwanese cell phone designer and manufacturer **HTC Corp.** has its **HTC America** U.S. headquarters in Seattle, but expanded to San Francisco in 2008 with the acquisition of industrial design firm **One & Co**, designer of the HTC One Android and Windows phones. HTC recently introduced the co-branded **Facebook** HTC First phone, which boots up to a specially designed Facebook Home user interface.

HTC America advanced technology manager Gary Yao is tasked with scouting for innovations in hardware, user interface and rich audio-visual features. Yao says he talks regularly with venture investors and their portfolio companies. Discussions with universities and laboratories, he says, are often likely to lead to technology acquisitions or IP licensing deals. Intellectual property protection, whether in patents or licensing, remains a minefield, Yao admits. He is currently hunting for new companies and technologies working in low-power design, enhanced multimedia features and device contextual intelligence.

Meanwhile, semiconductor engineers—many from Taiwan—are increasingly concerned that the industry and its related knowledge base in Silicon Valley are gradually hollowing out. On the surface, little appears to have changed over two decades for the Taiwanese engineering community in Silicon Valley. The flow of students has been steady, but with relatively flat growth; their focus is still largely chip design and hardware for computing and networking, with some growth in mobile Internet. Attendance at annual conferences and after-work meetings is still strong, but numbers have remained fairly static.

Engineer Joseph Lin, an advisor to and former president of CASPA, has worked in Silicon Valley since the mid-1980s. He says that the industry continues to attract highly-skilled engineering students and workers because of the cutting edge work done there. But as chipsets and integrated circuits become faster and smaller and provide more storage and security, prices are falling. That has translated into mergers, consolidation, layoffs and clean rooms either closing or staying without moving into more advanced technology modes.

Lin worries that Silicon Valley is losing talent and historical knowledge, and that loss will contribute to the long-term erosion of its manufacturing base. "Silicon has always been the DNA of this place," he says. "It's why they named it Silicon Valley when it was first built on orchards. Now a lot of that is going away."

LAW

The Wild West Settles Down

Foreign law firms were not officially permitted into China until 1992, but as early as 1979, firms such as Coudert Bros., Baker & McKenzie and Graham & James took advantage of a loophole in Chinese law allowing in trade-related consultants. They established legal "consultancies" in their home countries or in Hong Kong and then opened informal China subsidiary offices.

China had not yet reinstituted a formal legal system; criminal and civil cases were decided by the government and the Communist Party. In the absence of commercial contract law, precedent determined a loose legal framework for joint ventures until a dispute arose or the government intervened. At first, arbitration was permitted only within China. Over time, Hong Kong and Sweden were allowed as arbitration venues. Today the arbitration venue is left to negotiation by the contracting parties.

The favored arbitration venue specified in commercial contracts is the China International Economic and Trade Arbitration Commission

(CIETAC), a panel of international lawyers established in China in 1989. Intellectual property (IP) cases are the exception and are typically heard in court. IP cases can be highly technical and if the arbitration panel gets it wrong, there is no appeal process, as in civil court. Also, the absence of juries and punitive damages in Chinese courts moderates potential awards, and courts have the power to grant immediate injunctive relief to plaintiffs.

Foreign attorneys officially practice the laws of their home countries only. They may not represent clients in Chinese courts or render opinions on Chinese law, nor are they permitted to take the Chinese bar exam. Where representation of a foreign or Chinese client touches on issues of Chinese law, the work must be done by a Chinese law firm. This wall preserves the opacity of Chinese law and is designed to protect and ensure a role for Chinese firms in the growth area of international commercial law. The wall has two sides: Chinese lawyers may not join foreign law firms without first surrendering their Chinese law licenses.

Representatives of foreign law firms in China must be attorneys in good standing with at least three years' practice experience in their home

countries. Senior representatives must spend at least 180 days of the year in China, bringing them under Chinese tax jurisdiction.

Law firms initially acted as advisors to home country clients on trade and customs issues, contract preparation, intellectual property protection and formation of joint ventures. Since China's admission to the WTO, the market for investment-related legal services has expanded to include cross-border regulatory and tax compliance; establishment of wholly foreign-owned enterprises (WFOEs) and R&D centers; M&A transactions and related due diligence; cross-border technology licensing; real estate transactions; and public share listings.

U.S. law firms active in China were not hurt seriously by the global downturn in and of itself, as China experienced a counter-cyclical upturn thanks to stimulus, and U.S. client firms turned to China to offset slack demand in the U.S. Where they saw business was in due diligence and advisory work involving cross-border start-up investment and IPOs, as venture capital and public equity retreated and as the Chinese government clamped down on an overheated property development market.

The already weak market fundamentals were exacerbated by the rise of Chinese "reverse IPOs," mergers of private Chinese firms into dormant publicly-listed U.S. companies in order to expedite listings with minimal financial disclosure (see "A Two-Way Street" in the Investment section of this chapter). Some 20 Chinese firms came under attack from hedge funds and other short sellers over accounting and valuation issues.

Business is gradually returning, but in different areas. Among the recent trends for overseas law firms in China are

- intensified focus on attracting large, relatively safe Chinese banks and state-owned firms as clients;
- increased presence in Beijing, to build and maintain government contacts, and in Hong Kong, to concentrate on offshore financing and investing;
- meeting the needs of growing renminbi funds and other domestic Chinese investment vehicles;
- leveraging cross-border expertise to serve Chinese banks, construction companies and

SOEs exploring overseas real estate, brown field and M&A opportunities in the U.S.

Thomas Shoesmith, a partner at **Pillsbury Winthrop Shaw Pittman** in Palo Alto, heads the firm's China practice. He previously ran Pillsbury's Shanghai office, which he joined in 2008 when Pillsbury absorbed Thelen Reid Brown Raysman & Steiner's China practice. Despite early signals that China would open its legal service market further to foreign firms, Shoesmith says little has changed. But as the business environment becomes increasingly sophisticated, he adds, that has not been a serious problem. Divisions of labor with Chinese law firms are as rigid as ever, but years of working together on cross-border cases have taken both sides beyond the initial learning curve to build closer bonds. And in areas such as intellectual property, foreign firms and their counsel have a clearer sense of where the technical and legal risks begin and end.

Pillsbury, which has an office in Shanghai, expects to open a Beijing office later in 2013 in order to focus on state-owned enterprises and financial institutions. Shoesmith sees likely China-related business prospects in the Bay Area coming in three key areas: large public-private development and infrastructure projects like high-speed rail; sports/retail complexes or mixed-use housing and commercial projects; and ongoing investment in tech and selective outbound M&A to China.

U.S. law firms are also active in taking Chinese companies public in the U.S. Value-added telephony (mobile apps), which is growing rapidly, is another area where limitation of foreign activity is creating the need for work-arounds advised by U.S. lawyers.

"Things are kind of settling down; it's not a fire sale anymore," Shoesmith says, "We're seeing the rise of China as a market, not just a place to build things cheaply." What looks like tightening, Shoesmith suggests, is mainly greater caution on the part of the Chinese government and foreign investors.

Beijing is gradually allowing more wholly foreign-owned investment versus joint ventures, but it wants more rigorous reporting; and foreign investors are adapting to a market that lacks transparency and favors domestic competitors,

taking smaller stakes in companies with investments structured to mitigate risk and exit easily.

Shoesmith has represented Chinese computer maker Lenovo in its international joint venture with Massachusetts-based cloud computing/big data firm EMC Corp.; has represented San Jose IT solutions provider Ingram Micro on several international acquisitions; and has participated in the public listings of more than 15 China-based companies.

A sampling of other Bay Area law firms active in China includes the following.

Davis Polk & Wardwell, based in New York, serves Silicon Valley through an office in Menlo Park and maintains a China presence in Hong Kong and Beijing. Its Hong Kong office was upgraded in 2010 to become a Hong Kong law practice, bringing together legal expertise in Hong Kong, the U.K. and the U.S. to serve global financial clients.

The firm advised Baidu in its purchase of Shanghai-based PPS Net TV's online video business in 2013 and in an earlier 2012 acquisition of a majority stake in video platform Qiyi. It helped prepare New China Life Insurance Co.'s public listings on the Shanghai and Hong Kong exchanges; Charles River Laboratories International's proposed \$1.6 billion takeover of Wuxi Pharmatech in 2010; Dalian Wanda's acquisition of AMC Theaters; and the management buyout of Shanda Interactive by a family-owned offshore company led by Shanda chairman and CEO Tianchao Chen.

Orrick, Herrington & Sutcliffe's history in the Bay Area, and specifically San Francisco, dates back to 1863. The firm expanded into China in 2005 through its acquisition of the China practice of Coudert Brothers. Coudert had been the first foreign law firm to open offices in Hong Kong in 1972, the first in Beijing in 1979, the first to be licensed in China in 1992, and among the first to practice in Shanghai.

In 2006, Orrick lawyers served as U.S. counsel to Sinopec Beijing Yanhua Petrochemical Company Ltd. in its \$500 million privatization by China Petroleum & Chemical Corp., a transaction that created a new path for PRC companies to privatize overseas listed companies. The firm also defended Baidu in an antitrust action brought in China by rival search firm Tangshan

Renren Information Services in 2009—a challenging case because China's Anti-Monopoly Law on the books at that time had no implementing rules.

Orrick was lead counsel for aluminum producer China Hongqiao's \$943 million IPO in 2011, and attorneys from Orrick's San Francisco, Hong Kong and Shanghai offices represented VancelInfo Technologies in its 2012 merger with rival HiSoft Technology International.

Wilson Sonsini Goodrich & Rosati (WSGR) has its roots in Silicon Valley, providing cross-border legal support to firms in debt placement, public listing, M&A, trade and financial regulatory compliance, technology licensing and IP protection. Its initial China presence was in Shanghai beginning in 2007, but it has more recently opened offices in Hong Kong in 2010 and Beijing in 2012.

WSGR represented Chinese chip foundry Semiconductor Manufacturing International Corp. (SMIC) in a five-year patent infringement trade secrets case brought by Taiwan Semiconductor Manufacturing Corp. (TSMC) in California. It also advised on SMIC's 2004 IPO, and on the Bank of China's 2006 IPO. In 2012 WSGR represented Boyu Capital in the complex, multi-party 2012 financing for Alibaba's buyback of a portion of Yahoo's early stake in the company, and it represented Chinese Internet service provider Tencent in a licensing deal with Activision Blizzard to launch the "Call of Duty Online" game in China.

Cooley LLP, founded nearly a century ago in San Francisco, developed early specializations in emerging Bay Area industries such as venture capital, information technology and life sciences. The firm opened its first PRC office in Shanghai in 2011 but has been active in greater China since 1989. It advised on the formation of the first institutional venture capital fund investing in China, and has since handled cross-border M&A transactions for U.S. clients and securities and corporate matters for Chinese companies. In 2012, its global investing fund formation group closed three Shanghai funds representing a combined \$1 billion.

Cooley has advised clients on market entry; distribution and licensing agreements; U.S. export control compliance; and antitrust and IP

protection, most notably representing San Jose analog chip designer Monolithic Power Systems and three Taiwanese firms in a patent suit brought against O₂Micro, a Taiwanese maker of battery and power management systems.

Los Angeles law firm **O'Melveny & Myers (OMM)** traces its roots back to 1885. OMM opened offices in San Francisco in 1988 and in Silicon Valley in 2001. Its China presence launched in Hong Kong in 1994, followed by offices in Shanghai (1996) and Beijing (2003). It was one of the first U.S. law firms registered to practice Hong Kong law, and its greater China practice today deploys a team of more than 110 professionals.

OMM represented Chinese Internet marketing technology firm Allyes in a 2006 acquisition by China advertising company Focus Media and advised security software provider Symantec Corp. on antitrust compliance in its 2007 joint venture agreement with Huawei Technologies to manufacture and sell telecom network equipment with integrated security software. The firm also represented Mountain View-based Complete Genomics in the firm's 2012 acquisition by Chinese gene sequencing and bioinformatics group BGI-Shenzhen. (For more detail, see the Life Sciences/Healthcare section below.)

LIFE SCIENCES/HEALTHCARE

Healthy Prospects

Bay Area research laboratories and medical facilities are engaged in cutting-edge science with major implications for healthcare worldwide. China is a huge urban and rural market building a state-of-the-art healthcare infrastructure from scratch amid challenges of aging, wealth inequality, chronic diseases, environmental illnesses and pandemics. The synergies are most clearly seen in China's ongoing healthcare reform effort; in its ambitions as a global provider of pharmaceuticals, medical devices and treatment; and in financial and policy trends influencing R&D and delivery of care in the U.S.

1.3 Billion Patients, 95 Percent Coverage

Powerful demographic forces are at work, including urbanization, the rise of affluence, and the effects of an aging population. Some results

of these forces are occurring naturally, while some are consciously directed by government policies. Mass migration from the countryside to cities over the past decade is already approaching a quarter of a billion people. By 2025, China is expected to have 220 cities with populations exceeding 1 million; by 2030, China's urban population will pass 1 billion. Metro areas will likely merge into megacities with as many as 20 million residents, where chronic ailments and disease prevention will pose growing problems. China's middle class is expected to more than double by 2020, to 700 million people; a growing number of wealthier Chinese will have higher expectations and the ability and willingness to spend more for healthcare. More than 185 million Chinese are over the age of 60 today—13.4 percent of the population. The most common illnesses in this cohort are chronic: circulatory, vision, neurological, endocrine, nutritional and metabolic, all requiring long-term treatment and making up 23–40 percent of the prescription and 40–50 percent of the over-the-counter market. Government spending commitments for a social safety net in healthcare and pensions will add to demand.

Until the late 1970s, China's healthcare system was entirely government funded and government run. Economic reforms launched with the country's opening in 1979 moved the system in the opposite direction, toward a free-market model under which government support was withdrawn and healthcare providers were expected to operate as profit centers. The focus of care shifted to higher-priced tests and treatments, patients unable to pay were denied care, and service quality declined, sparking civil unrest.

China eventually dialed back the experiment and has since been searching for a hybrid distinctly Chinese model. In 2009, the government committed RMB 850 billion (\$124 billion) to a three-year healthcare overhaul focusing on the following:

- Comprehensive insurance coverage for 90+ percent of the population, through expansion of programs for urban employees, non-working urban residents and the rural population; before 2007, only urban workers and retirees had access to defined-contribution insurance plans through their employers.

- Upgrading the pharmaceutical supply chain from production to procurement and distribution, in particular for drugs classified as essential and/or eligible for government reimbursement.
- Expansion of the National Essential Drug List (NEDL) and the National Reimbursement Drug Lists (NRDLs) from a combined 300 drugs to 520, adding children's vaccines, cardiovascular and chronic disease drugs, and anti-cancer medications, allowing more direct purchasing and capping prices.
- Strengthening public health service disease prevention and control programs, giving added emphasis to prevention and vaccine programs in central and western China.
- Adding more than 300 county hospitals, 1,000 town-level health centers and 13,000 village-level clinics to the country's grassroots healthcare infrastructure, to increase coverage and competition.
- Modernizing nationwide public healthcare and hospital infrastructure, standards and practices, including funds for medical devices and IT systems.

The 12th Five-Year Plan picked up in 2011 where those reforms left off, focusing on the development and restructuring of indigenous industry. It sets goals for consolidating a fragmented pharmaceutical industry through M&A and vertical integration to create at least 5 drug manufacturers with RMB 50 billion or more in annual revenues and 100 with revenues of RMB 10 billion or more. It also encourages companies to set up overseas R&D centers and manufacturing facilities.

A similar strategy applies to pharmaceutical distribution (3 national distributors with RMB 100 billion or more in revenue; 20 regional distributors with RMB 20 billion or more), and encourages consolidation of small retail pharmacies into regional and national chains.

Finally, the Plan commits government support to build an indigenous medical device industry that serves the domestic healthcare market: 8–10 manufacturers with sales above RMB 5 billion; funding and other support for 10–15 medical device groups, 40–50 technology companies plus manufacturing and demonstration bases for device innovation; and an R&D/import

substitution program aimed at replacing mid- and high-end imported devices.

Overlaying the above strategies is an increasingly strict and sophisticated regulatory regime to force quality and safety improvements, alongside price caps on essential drugs, limits on wholesale markups, crackdowns on fake drugs and limits on advertising of non-prescription remedies.

A 2013 KPMG report on healthcare and life sciences in China points to three key trends as Chinese companies scale up to compete globally and as domestic and foreign companies turn their attention to a growing Chinese market:

1. Overproduction of cheap basic products is giving way to more efficient manufacture of higher-quality products to satisfy a growing and more demanding middle class; R&D spending is up, as are vertical pipeline acquisitions and foreign licensing arrangements.
2. Companies are extending their sales and marketing into Tier 2 and Tier 3 cities as well as the countryside, offering more affordable products tailored to niche markets.
3. As the drive for quality has thinned margins, firms are aggressively squeezing costs out of their sourcing, manufacturing and supply chains through acquisitions, partnerships and re-engineering.

From the Outside Looking In

In the meantime, forces are converging that make the China market especially attractive for global healthcare providers and life sciences technology firms.

In 2012, global pharmaceutical companies saw patents expire on more than 40 brand-name drugs earning a combined \$35 billion annually. For those companies, China represents an attractive market for off-patent drugs in partnership with local distributors, to help offset price declines with volume sales. In some cases, domestic Chinese manufacturers see opportunities to produce their own generic versions, or to license in the better-known brands.

In the U.S., lower risk tolerance for long clinical trials and regulatory uncertainty have dampened investment flows into earlier-stage life sciences ventures. China is an exception, however,

due to the government's push to accelerate healthcare reform.

The result is that the market potential for branded, quality imports is high at the low end of the market—basic hospital supplies, lab testing equipment, basic over-the-counter and prescription medications. At the high end are licensing opportunities for specialty and orphan drugs as well as facilities and treatments tailored to the affluent, private Chinese healthcare market. For the longer term, Chinese firms are investing overseas, looking to manufacture low-cost generic drugs and acquire innovative products, technology and know-how to move up the value chain back home.

"Life sciences investment has been way down since the recession, in part because the exits are very difficult," explains Gail Maderis, president and CEO of BayBio, a regional association of more than 800 life sciences companies of all sizes. She notes that only 14 life sciences IPOs were launched in 2012, seven of those involving California companies. "As financing has become more difficult, especially in the early stages, we've seen a clear business model emerge, where executives have the knowledge but don't have the labs, so they work through contract research facilities. The other trend is that they have to partner early to gain financial support because of the diminishing availability of VC and public R&D investment."

That suggests synergies between small and mid-sized Bay Area life sciences ventures and Chinese investors, and Maderis acknowledges that many of her member companies have explored collaborations with Chinese companies in the past three years to cover clinical trial research costs in exchange for rights in China.

The realities in searching for the right China partner, however, can be complex. In general, Chinese companies prefer investing at the clinical stage of co-development, compared to the pre-clinical stage, which many consider too early. Particular opportunities may exist in partnering between U.S. and Chinese companies to enroll Chinese patients in clinical trials for conditions endemic to China or Asia. This may be enabled by a recent shift by the FDA allowing earlier enrollment of Chinese drug candidates in clinical

trials. Chinese generic drug companies are showing particular interest in partnerships or co-development of products with innovative U.S. companies.

Dr. Jimmy Zhang, greater China lead for licensing, acquisitions and external research at **Merck & Co.**, as well as the current chairman of trade association **BayHelix**, shuttles back and forth between China and the Bay Area regularly. Prior to joining Merck, he was senior vice president at **Synergenics LLC**, a professional services and investment company founded by biotech pioneer Dr. Bill Rutter of UCSF. While at Synergenics he brought two early-stage Bay Area companies—one in diagnostics, the other a maker of monoclonal antibodies—to Shenzhen and Hangzhou, respectively.

Dr. Zhang agrees about the natural synergies between biotech start-ups seeking funding in the absence of government research funding or IPO activity in the sector, and Chinese firms—both state-owned and private—under government pressure to produce original drugs and medical devices for the Chinese market in a relatively short time frame. The Chinese government is also going out of its way to encourage nimbler private firms to enter the market and scale up, while municipalities are competing to attract talent and investment for new research clusters.

Yet despite considerable interest in developing cross-border cooperation, real activity has been slow to build. "Expectations on the U.S. and China sides are still far apart," Dr. Zhang suggests. "The U.S. side wants the cash right now; China wants a long-term relationship and is not willing to pay up front; they want a more gradual development arrangement." One solution has been a co-development model for products and treatments, where each side covers its own costs and both share the clinical trials data.

Dr. Zhang sees longer-term prospects for foreign firms on the pharmaceuticals side of health-care, since 80–90 percent of innovation currently takes place outside of China; others place the number higher—at 95 percent. The medical device sector has lower barriers to market entry and lends itself more readily to copying by Chinese companies that are able to bring products to market more cheaply and quickly. "There has

been a saying in the China healthcare market," he says. "Look at what GE, Phillips and Siemens are doing and follow them."

The good news is that as China's market grows and its drugs, distribution and devices sectors consolidate, there will be a growing need for overseas innovation, while sales and distribution networks will become more robust and efficient. If there is bad news, it is that, over time, M&A attention will focus increasingly on later-stage companies, as execution and time to market become as critical as innovation itself.

Pharmaceuticals: Finding the Right Fit

According to a 2012 report by McKinsey & Company, China is now the world's third-largest pharmaceutical market, with healthcare spending expected to triple to \$1 trillion by 2020. But negotiating that market presents challenges. Government pressure is growing, for example, for foreign companies to discount some of their most expensive drugs. This recently happened with Novartis, which reached a negotiated agreement with the government of Jiangsu province to contribute three doses of its leukemia drug Gleevec for each one sold, lowering the cost of an annual regimen from as much as \$100,000 per year to \$12,000. While this cuts into profits, negotiated discounts of this kind may prove preferable to compulsory licensing or the denial of patent protection. In the summer of 2013, Chinese regulators revoked the patent protecting **Gilead Science's** HIV and hepatitis B drug Viread, in a move designed to pressure drug makers to offer lower prices.

Distribution is also a growing but complex field. **Cardinal Health**, a Fortune 500 distributor of healthcare products such as non-capital medical and laboratory supplies, entered the China market in 2010 and now has several billion dollars in turnover annually. Cardinal Health China president Eric Zwiler notes that China has a well-developed bio-medical manufacturing industry that includes both pharmaceutical raw materials and end products and that buys extensively from overseas companies.

Overall, the dynamics of China's healthcare market are strong, with growth based on expenditures by the government's health insurance plan

(two-thirds) and private spending (one third). Market growth, now 15–20 percent per year, should accelerate to 25–30 percent over the next ten years. Approximately 80 percent of health-care is provided through government hospitals, the growth of which is limited only by government funding. As incomes grow, more Chinese will be able to afford better care, and private services will grow, but this process will take time and will focus on the high-end—those who can afford to pay. U.S. hospitals, health groups and investors are looking at the market.

The pharmaceutical market—focused on hospitals and retail pharmacies, with city and provincial governments holding competitive tenders—is moving upscale, and in the future will look increasingly like other international markets; in other words, multinationals will be able to rely less on older, generic products. The medical devices and supplies market is also growing quickly. Foreign companies face strong competition, however, from Chinese companies that produce cheaply and are working hard to move up the value-added scale. As part of that trend, both pharmaceutical and devices companies in China are increasing their focus on overseas investment, with the goal of developing more competitive products for the domestic market.

Predictably, the process is complex. Apart from basic language and cultural barriers, due diligence is problematic: even large Chinese life sciences and healthcare firms do not have long track records in advanced medicine and lack familiarity with global practices, quality standards and regulatory processes. Smaller firms here, with little experience on the ground in China, rely heavily on consultants and advisors to screen likely partners in what can be an opaque market environment.

One overarching concern is intellectual property protection, which may be at risk when dealing with Chinese life sciences companies. Industrial espionage—through data room breeches or IP theft—is a significant issue for larger U.S. biopharma companies. This concern lies behind Merck's decision to scale back its planned \$1 billion R&D center in Beijing and explains the much smaller scale of other new U.S. R&D centers. It is important, therefore, that U.S. companies protect

themselves in the due diligence phase of any deal. Caution is also advisable when accepting Chinese funding, which may or may not require transferring or sharing access to IP.

One example of a successful collaboration is the five-year marketing agreement signed in September 2012 between Emeryville maker of anti-infective skin and wound care products **NovaBay Pharmaceuticals, Inc.** and **Naqu Area Pioneer Pharma Co. Ltd.** of Shanghai. Pioneer is paying \$500,000 up front to market NovaBay's NeutroPhase, a solution of disinfectant hypochlorous acid and saline. It has won FDA approval for some, but not all, proposed uses. Pioneer Pharma (Singapore) Pte. Ltd. has committed an equity investment of as much as \$5.5 million over 2012–13, and will provide contract research support to develop antibodies for use with non-healing wounds. "Antibody development can be done at 20 percent of the cost in China," says Maderis. "That means you get five shots at the goal instead of one, in effect five times the work. That's driving companies of all sizes to consider China."

One such firm is **FibroGen, Inc.**, a San Francisco biotech company specializing in tissue growth and repair as well as production of recombinant human collagens and gelatins. In 2010, FibroGen received approval from China's State Food and Drug Administration (SFDA) to perform Phase 1 and Phase 2 clinical trials for an affordable oral treatment for anemia associated with chronic kidney disease (CKD).

The benefits are mutual: one byproduct of China's urbanization has been a rise in CKD, as changes in diet and exercise have increased diabetes and hypertension, which are risk factors for the disease. Some 125 million Chinese suffer from CKD, and 300,000 patients die from it annually. The disease is often accompanied by anemia, adding to a patient's debilitation. Nearly all terminal patients are anemic, as are an estimated 6–8 million patients not yet on dialysis. While insurance reform has made dialysis more accessible and affordable, only 10 percent of patients are now treated for anemia, due to cost and the fact that current injectable vaccines must be clinically administered.

FibroGen has successfully completed Phase 1 trials and dosing in two Phase 2 studies, with

Phase 3 trials in China beginning in 2013. Similar trials are underway in the U.S., Europe, Japan and Russia. Other kinds of partnerships and investments are also significant connections.

Foster City pharmaceutical company **SciClone** expanded sales in China of its hepatitis and cancer drug Zadaxin, as well as other drugs, by acquiring Chinese drug distributor **NovaMed**. While the company has subsequently faced legal and regulatory challenges, sales have grown from approximately \$85 million in 2010 to over \$135 million in 2013. The company currently employs 700 people in China, 15 at its Foster City headquarters and 10 in Hong Kong.

Mindray Medical International Ltd. of Shenzhen in June 2013 announced an agreement to acquire Mountain View ultrasound imaging technology firm **ZONARE Medical Systems, Inc.** for \$105 million. ZONARE offers high-end imaging and sales and marketing channels in the U.S., Canada, Scandinavia and Germany. Mindray contributes efficient engineering and manufacturing platforms capable of bringing down costs and expanding ZONARE's global reach.

Tianjin-based Andon Health Co.'s **iHealth** unit, which manufactures digital personal healthcare products, has established an R&D lab in Mountain View. The company produces a home blood pressure testing system that measures blood pressure through an arm cuff that transmits the results to an iPhone, iPad or iPod Touch through an app. Future products include a similar device to measure blood glucose levels.

In March 2013, **BGI-Shenzhen**, a group of research institutes and commercial gene sequencing application firms in the medical, environmental and agriculture sectors, finalized acquisition of **Complete Genomics**, a Mountain View company known for its "sequencing-as-a-service" mapping/sampling technology used in disease prevention, diagnosis and treatment. Prior to the acquisition, BGI had to do its own sequencing on equipment purchased from competitors in the space. Complete Genomics offered sequencing for as little as \$5,000 per genome for volume orders to build a market presence, but struggled financially at those rates, eventually laying off employees and hiring an advisor to explore strategic alternatives.

The \$117.6 million offer price from BGI represented an 18 percent premium over the Complete Genomics share price when the offer was accepted in September 2012. The acquisition was cleared by the U.S. Committee on Foreign Investment in the U.S. (CFIUS) and the Federal Trade Commission (FTC) following a complaint from San Diego-based Illumina, a market leader in sequencing machines and BGI's former supplier. Complete Genomics will continue to operate in Mountain View as a separate company.

In December 2012, **Biorichland LLC**, a publicly traded Chinese holding company that owns China's largest contract research organization and pre-clinical laboratory, **JOINN Laboratories**, paid \$50 million to acquire the 53-acre East Bay Berlex research facility site most recently owned by **Bayer Healthcare Pharmaceuticals**. Berlex, until 2006 a unit of Schering AG, had expanded the Richmond site to include 355,000 square feet of lab, manufacturing and administrative space and had hired 300 employees to work on cancer and immune-based disease drugs. Bayer bought Schering in 2006, moved its research activities to Mission Bay in San Francisco and by 2010 had phased out the Richmond operation.

JOINN was formed in 1995 in Beijing to perform drug screening, safety evaluations, animal-based clinical trials, efficacy studies and registration for clients in China, Europe and Japan. It has facilities in Beijing and Suzhou, as well as an office in Maryland, adjacent to FDA headquarters, that provides clients with technical consulting on FDA compliance. Plans for the Richmond property, to be called the JOINN Innovation Park, include a bioresearch center, contract research facilities and a biotech incubator, with a combined estimated workforce of up to 500.

Hanhai-Zibo Life Science Park opened in June 2013 in Burlingame (see the Investment section of this chapter), with combined funding and technical support from Hanhai Investments and China's Zibo New & High-Tech Park industrial development zone. Six life sciences companies from that zone have a presence in the Burlingame facility, including **Xinhua Pharmaceutical**, **SHINVA Medical**, **Jinjing Group**, **Jincheng Pharmaceutical and Chemical**, **Jinyang Pharmaceutical**, and **Fushan Group**. The park hopes to attract Bay Area life

sciences start-ups with offers of funding support, shared lab space and China connections, possibly to do collaborative work.

Firms have expressed interest in incubators, but some are wary. Early stage funding help and affordable shared facilities are needed; life sciences incubators are proliferating, offering the best start-ups a range of choices. Bay Area entrepreneurs are tempted by the idea of collaboration with China, but they remain concerned about intellectual property protection. "It's still a relatively new area for our companies; we're feeling our way as we go," says Maderis. "The opportunities with China are huge, but businesses are being cautious. They need a comfort level; what they want to see more than anything is greater transparency up front."

QB3 has pioneered life sciences incubation in the region through multiple locations of its highly successful "Garage." In recent years, QB3 has been courted by both Chinese tech parks and universities to help establish incubators, but there have been few results so far. The challenge is that early-stage incubation of the kind supported by QB3 is too small for most tech parks, and Chinese universities are adept at catch-up innovation but are not at the same level as UCSF in generating cutting edge, disruptive innovation. QB3 director Regis Kelly also notes that while Chinese partners are anxious to draw on QB3's expertise, reciprocity has been limited. Though the Chinese have yet to respond, he points to joint research as a way forward and is continuing to explore opportunities: "I'm an optimist, and keep going back."

INVESTMENT

A Two-Way Street

Cross-border investment funds encountered a radically changed environment coming out of the global recession, as cash remained on the sidelines, central bank easing kept interest rates and yields low, and investor skepticism of Chinese shares deterred new IPOs and, with them, venture and private equity exits.

In China, slower growth and an overhang of public and bank debt and tighter government curbs on speculative real estate deals, bank lending and public listings have combined to

narrow investment options. China attracted \$111.7 billion in new foreign-invested enterprises (FIEs) in 2012, down 3.7 percent from a record \$116 billion in 2011, according to China's Ministry of Commerce. The number of FIEs declined by more than 10 percent.

Domestic Chinese RMB venture and private equity investment has been growing. In 2011, Chinese domestic VC investment totaled \$7.8 billion, according to Asian Venture Capital Journal, for the first time passing foreign VC fund investment, which amounted to \$7.4 billion. And while private equity deals doubled in value over 2009–11, foreign fund investment fell by 45 percent.

U.S. listings of Chinese companies are only now beginning to recover from a rash of "reverse IPO" listings in 2009–10, which were associated with accounting irregularities. Reverse IPOs, or reverse mergers, circumvent the formal IPO listing process by taking over an inactive U.S.-listed company and merging the shell with a private Chinese company so that the private entity assumes control and can raise funds in equity markets with less transparency up front. Over 2007–11, more than 150 Chinese companies with a combined market capitalization of \$12.8 billion entered U.S. financial markets through reverse IPOs, versus 50 companies using traditional IPOs. In 2011, nearly 20 reverse IPO firms saw their shares plummet amid allegations from hedge funds and other short sellers that they had falsely inflated valuations.

Skepticism was not limited to U.S. shares. In October 2012, the China Securities Regulatory Commission (CSRC) imposed a freeze on initial public offerings on the ChiNex, a NASDAQ-style exchange set up for small-cap and mid-cap tech growth companies. The freeze was imposed to address market volatility and concerns that many listed firms were weaker than initially assessed. A planned July 2013 lifting of the moratorium was delayed as implementing rules are written; more than 80 companies have IPO applications pending.

A market recovery is suggested by three successful Chinese IPOs in the tech space: online retailer Vipshop Holdings, Ltd. and social media network YY Inc. in 2012 and LightInTheBox Holding Co., another online retailer, in 2013. Still, LightInTheBox has been the only Chinese IPO in

the U.S. thus far in 2013, down from three in 2012, 11 in 2011 and 38 in 2010, according to Bloomberg data.

In China, foreign investors have adopted a defensive posture, focusing on offshore investments that allow earnings repatriation and that, through structures such as variable interest entities (VIEs), allow greater investor control through a minority interest—although government reserves the right to intervene.

Unable to fully compete in the domestic Chinese RMB market, many investors are reconsidering strategic benefits offered by "greater China"—financial services in Hong Kong, and tech manufacturing and IP protection in Taiwan—that leverage the mainland market.

PRC investment flows, guided by the Five-Year Plan, reflect broad, long-term trends in Chinese society—an aging population requiring more advanced healthcare; urban migration and its environmental impacts; emerging middle-class consumer needs and expectations; the rise of mobile Internet; and the need for cleaner, reliable supplies of energy, food and water.

Chinese FDI in the U.S.: A Complicated Environment

Meanwhile, Chinese investment in the U.S. has grown steadily, setting new records every year since 2009 and increasing from \$5.8 billion in 2010 to \$6.7 billion in 2012 and \$4.7 billion in just the first half of 2013, according to business consultancy Rhodium Group. While deal volume has tapered, total deal value is up. Private Chinese enterprises (as opposed to state-owned enterprises) account for a growing share of foreign direct investment (FDI).

Well-known deals include Wanda Group's \$700 million purchase of Kansas City movie theater chain AMC Entertainment Holdings; Wangxiang America Corp.'s \$257 million buyout of battery maker A123 Systems; BGI-Shenzhen's \$118 million takeover of Mountain View-based Complete Genomics (see the Life Sciences/Healthcare section of this chapter); and the \$4.7 billion Shuanghui International Holdings purchase of Smithfield Foods.

A number of deals have also fallen through due to strategic concerns, prompting greater caution and due diligence among Chinese

investors: state-owned oil producer CNOOC's proposed \$18.5 billion dollar acquisition of Unocal Corp. in 2005; Superior Aviation Beijing Co.'s 2012 bid to buy Hawker Beechcraft's civilian aircraft assets for \$1.8 billion; and the proposed development by construction company Sany of a solar wind farm in Oregon at a site near a classified U.S. Navy installation.

Over the long term, global expansion will be critical for large Chinese companies seeking a stronger global profile. Only a few Chinese companies so far have broken through to achieve recognition as global brands, among them Lenovo, Haier and Huawei. The most prominent example may be Lenovo, which purchased IBM's personal computer business in 2005. Lenovo created dual headquarters, in Beijing and Morrisville, North Carolina, where the IBM unit was located, and made English the company's official language. Since then, ThinkPad sales have doubled, while profit margins have been maintained at a healthy 5 percent.

For most Chinese firms, FDI in the U.S. is aimed at achieving scale, vertical integration and technical expertise. For the U.S. partner, acquisition typically brings a fresh injection of capital, and improved access to Chinese markets.

The successful acquisitions of Complete Genomics and A123 Systems reflect a pivot in Chinese strategy toward deals valued at less than \$500 million; joint ventures, partnerships and equity stakes rather than outright acquisitions; a focus on privately held versus publicly traded firms; and avoidance of companies and technologies where there are potential security-related issues.

Investment into China: The New Normal

FDI into China is generally thought to have reached a plateau, given slower GDP growth, currency controls, rising production costs, intellectual property and transparency issues, and political risks. "The good news is that due diligence has gotten easier if for no other reason than experience," says **Deloitte & Touche LLP** partner Chris Cooper, who serves as Americas leader of Deloitte's Chinese Services Group. "We've got lots of people on the ground with the knowledge and the tools to bridge the gaps that exist between the U.S. and China, including types

of advisors we never had before—the returnees, the sea turtles."

At the same time, Cooper says, recent years have brought increased uncertainty. "There are things we think about a lot because our clients do, because of the risks involved—the transition of power, pervasive corruption, the China-Japan conflict, the flattening of the Chinese economy and how it affects business." To those he adds higher land and wage costs, high turnover and labor unrest, IP concerns, tightening liquidity resulting from the shadow banking system, and difficulties shifting from an export to a consumption economy.

To attract fresh capital, China raised investment limits under its Qualified Foreign Institutional Investor (QFII) program, developed in 2002 to allow licensed foreign investors to buy and sell yuan-denominated A shares on the Shanghai and Shenzhen exchanges. QFII sets size, governance and other requirements for investors, as well as investment limits. The limit on total QFII investment was raised from \$30 billion to \$80 billion in April 2012, and again to \$150 billion in mid-2013. The quota for RQFII investment in mainland shares using renminbi held offshore was raised in April 2012 from \$20 billion to \$44 billion, and in 2013 QFIIs holding renminbi in Singapore, Taiwan and London were permitted to reinvest those funds directly into China, rather than via Hong Kong.

QFII has so far attracted just \$43 billion and the RQFII program has attracted RMB 105 billion (\$17 billion). Foreign investors account for 1.6 percent of total China market capitalization. At the same time, a large share of RMB investment growth is in structured wealth management products (WMPs), high-yield securities made up of troubled loans moved off bank balance sheets. "Our strong sense is that there's an awful lot of stress right now in the way wealth is concentrated in China," Cooper says. "It's also obvious from the economic data that wealth has been exiting China at an accelerating rate."

Experienced investors and fund managers in China, foreign and domestic, continue to see potential in well-managed small and mid-sized companies with the capability to scale up and become national or global brands; in a more sophisticated

retail sector to serve a growing and aspirational middle class; and in technological advances in growth sectors such as healthcare, energy, environmental mitigation, agriculture and an expanded and improved supply chain/logistics infrastructure.

San Francisco-based private equity firm **TPG Capital** has invested more than \$6 billion in Asia since 1994. It has exited some 30 of 50 investments to date, earning 2.5 times the value of the initial investments. TPG was an investor in Lenovo's acquisition of IBM's PC manufacturing business in 2005. Its Newbridge Capital unit acquired an 18 percent controlling interest in Shenzhen Development Bank as part of a government-approved turnaround effort. Newbridge exited in 2009, selling its stake to Ping An Bank for Ping An shares valued at \$2.44 billion.

TPG Capital senior partner Tim Dattels sees bargains in China even as the environment becomes more challenging. There are fewer buyout opportunities, mainly state-owned enterprises and family or entrepreneur-owned businesses; offshore banks are unwilling to lend against onshore assets; Chinese banks are already overextended through government-directed, non-performing loans and high-risk private banking products; and there were only 24 Chinese IPOs in the first half of 2012, half the number for the first half 2011, even before the ChiNex exchange stopped accepting new listings.

Dattels points to China's 4.3 million small and mid-sized businesses that account for 60 percent of GDP and 75 percent of jobs and have trouble getting financed. "There's a lot of capital in China but it's misallocated," Dattels says. "With so many entrepreneurs and capital so restricted, it creates opportunities for private equity."

In 2012, TPG acquired HCP Holdings, a Taiwan packaging company for the cosmetics, skin care and fragrance industries that had moved its manufacturing to Suzhou. The \$500 million purchase price made HCP the largest leveraged buyout to date in China. The plan is to scale up the firm's operations to compete globally. TPG also teamed with Singapore sovereign wealth fund GIC, investing \$120 million in a turnaround of Beijing-based sneaker and sportswear maker Li Ning. It has recently put up for sale UniTrust Financing and Leasing, a Shanghai equipment lessor that it acquired in 2008 for \$275 million, with

an asking price of \$800 million. Other investments include China Grand Auto, the world's largest car dealership, and shoe retailer Daphne.

Lee Ting has viewed China through both the venture and private equity lenses, as a managing director, general partner and advisory director at **WR Hambrecht + Co** since 2003, and more recently as an advisor to Singapore-based private equity firm Novo Tellus Capital Partners. He is also an independent director with Lenovo Corp.

Hambrecht's funds have been fully invested for several years and focus on technology, including companies such as Lenovo and PayPal. He says the old model of looking for disruptive technologies that can be applied in key Chinese industry verticals at huge scale to emulate advances in the U.S. is much more difficult today. The China market is less dependent on foreigners and returnees to provide management and technical expertise or access to venture capital; often, local entrepreneurs can provide solutions more closely attuned to consumer tastes and industry needs, and they have connections to proliferating domestic VC funds.

"Being a local company does provide a certain advantage over a foreign competitor, even if the foreign company is larger and more established," Ting explains. The difference begins with language and cultural differences in the way people use and interact with technology, he adds, but it doesn't end there. "Local Chinese companies move much faster than multinationals. Local capabilities from a technology standpoint have also improved a lot." They also have the RMB capability and government connections to execute large onshore SOE deals.

In the healthcare space, Ting sees opportunity in Chinese contract research organizations (CROs) doing clinical trials, and in compounding laboratories that can partner with global pharma and innovate for the China market. "The government is making a huge push," he says. They know they can't continue to depend on western-style drugs: they're too expensive. With more original research, their own scientists can start to uncover new compounds and find medicines more tailored to Asian populations." He cites as an example the fact that western cancer research focuses heavily on breast and prostate

cancer while stomach cancer has much higher rates in Asia but is neglected.

In general, Ting says, the investment landscape remains lucrative but more complicated: IPOs are off the table until a later stage when a company has proven it is a real business and has scale, recurring customers, cash flow and profitability; M&A remains a challenge either because of government restrictions or difficulties agreeing on valuation, especially with firms not already publicly traded; and slower economic growth suggests smaller returns over a longer period of time.

Hanson Li, head of investment banking and private equity firm **Hina Group's** San Francisco office, concedes that the investment field is crowded. "The biggest change in the last five years is the available capital that has entered the market from both outside and within China," he says. "On the corporate side, companies are more sophisticated; enough people call and you realize you can pretty much take your pick from the outside capital."

In pure technology, Li sees growing investor interest in biotech, particularly given the small number of Chinese companies in software and the increasing commoditization in semiconductors. Other investment targets are in healthcare, retail, energy, agriculture and real estate, as well as services like hospitality, insurance and logistics tied to a booming online retail sector.

Recent Hina investments focus on "copy-me" companies in China that in many cases replicate Silicon Valley firms that bring scale and disruptive technology to key service sectors. A Groupon copycat is part of the company's current portfolio, as is a cleantech firm that helps utilities optimize energy usage for enterprise and retail customers, and a niche high-end travel agency offering services to affluent customers that indigenous agencies—often spinoffs from SOEs—can't match.

In 2011, Hina opened its own RMB fund, out of necessity. "In the domestic exit market of 2007–11, it was possible for a small company to go public in China," Li recalls. "If you looked at the amounts U.S. dollars funds were raising, it was staggering. At the same time, China was encouraging the development of a structured RMB market that offered speedy deployment of capital with fewer restrictions." With the government

encouraging the development of a stronger Chinese private equity sector, and restrictions on the ability to do IPOs in China with USD funds, the incentive to create an RMB fund was there.

Among the major Bay Area venture investments in Chinese companies are the following.

Kleiner Perkins Caulfield & Byers has funded some 60 Chinese companies, most notably Baidu and Alibaba.com. Target sectors range from cleantech (environmental products firm Universtar; solar and wind power inverter maker Sungrow; water treatment technology company Scinor Water) to advertising (mobile ad firms Madhouse and Limei; advertising data mining company Miaozen Systems) to life sciences (testing laboratory services firm Kindstar Global; orthopedic implant and instrument maker KangHui; biology CRO GenScript) to business and consumer services (China Auto Rental; B2B travel service Intohotel).

Since 2003, **New Enterprise Associates** has invested some \$400 million in more than 20 China companies focused in three fields: IT, healthcare and energy technology. It has funded mainland chip foundry Semiconductor Manufacturing International Corp. (SMIC); digital wireless chip designer Spreadtrum; healthcare provider HYGEIA Medical Services Group; e-commerce platform Redbaby, China's largest multi-channel direct consumer products marketer; and China's leading green lighting company, Shenghui Lighting.

San Francisco-based **IDG Ventures** has made VC and private equity investments in China through its IDG Capital Partners affiliate since 1992. IDG Capital Partners, with \$2.5 billion under management, invests in the \$1 million to \$100 million range, at all stages of the company life cycle. It has successfully exited 60 investments through M&A and IPOs in the U.S., Hong Kong and China A-shares markets. Portfolio firms include real estate portal SouFun, online travel service Ctrip, game developers G-bits and NetDragon, chain retailer WuMart, online retailers VANCL and Dangdang, medical device maker Andon Health, orthopedic implant developer KangHui and advanced battery nanotech company CNano Technology.

Sequoia Capital manages eight dollar-denominated China funds with a combined value of \$2.5 billion, plus the equivalent of another

\$640 million in RMB funds. Sequoia focuses on high-growth companies at all stages, with a portfolio that includes school test preparer and admissions consultants Beijing Wanxue Education Technology; car rental firm Reocar; social networking site 51.com; micropayment solutions firm 19pay.com; LED lighting/solar cell producer Changelight; medical sterilization/purification device maker Laoken; municipal waste treatment firm CSO Environmental Protection; and hematological/cardiovascular drugs maker Nuokang. Most recently, Sequoia, GGV Capital, NLVC and Steamboat Ventures have invested \$50 million in Chinese mobile entertainment startup Chukong.

Draper Fisher Jurvetson's China portfolio includes a range of investments beginning with early positions in Baidu online payment platform YeePay, and advertiser Focus Media. Other portfolio firms include Jing-Jin Electric, a maker of high-performance motors and drive trains for hybrid and plug-in electric cars; online shoe retailer OkBuy; and sports and entertainment portal UUSee.

California: U.S. Trade Dollars Return Home

It was only a matter of time before some of China's \$3.4 trillion in foreign exchange reserves—largely export earnings—began to migrate out of U.S. treasury securities and bonds and into outbound foreign direct investment (FDI). The strategy began with the 2007 creation of China's sovereign wealth fund, the China Investment Corp., and continues with the May 2013 opening of a State Administration of Foreign Exchange (SAFE) office in New York.

SAFE oversees China's foreign exchange reserves, and the new office is charged with accelerating China's diversification from U.S. government securities to alternative U.S. assets such as property and infrastructure.

"The U.S. has always been very underinvested," says Hanson Li of Hina Group. "It's a difficult place to deal with relative to other places in the world, but about four years ago we started to see interest from Chinese companies in business-oriented assets overseas. That interest has really picked up in the last 12–18 months, as Chinese conglomerates, and even mid-sized companies, are looking to scale up."

Outbound foreign FDI from China is a relatively new phenomenon. In 2005, Chinese buyers—almost exclusively state-owned firms—made \$12 billion in non-financial investments outside the country; in 2012, the total passed \$77 billion. Overseas investment has grown for a variety of reasons: China's need for energy, minerals and agricultural commodities; government strategies to build national champions that can compete globally; and firms extending their reach to gain technical and business expertise and an edge on competitors back in China.

As noted above, Chinese FDI in the U.S. has been rising steadily, setting new records every year since 2009. The scale of transactions has also increased in that time, from small tech acquisitions and equity stakes to large-scale M&A. Accordingly, total deal volume has moderated as the total value of deals has continued to rise. As the mix has shifted to larger, more complex transactions, the share accounted for by private Chinese firms has grown to 80 percent of transactions by number and 50 percent by value in 2012.

California accounts for the largest number of Chinese investment transactions of any U.S. state; New York, however, accounts for a larger share of Chinese investment by value. This may reflect the fact that capital-intensive investments in manufacturing or resources tend to flow to less expensive jurisdictions, while California attracts more investment in smaller, innovative companies. New York's numbers are also high due to Lenovo's acquisition of IBM's laptop business, a particularly large transaction. The principal drivers of Chinese investment in California—apart from real estate—are market access and the development of strategic assets, defined as brands, technology and knowledge, that can enable Chinese companies to penetrate markets and advance up the value chain.

Rhodium Group reports cumulative Chinese FDI in California for 2000–11 of 156 deals valued at more than \$1.3 billion, of which \$463 million, or 35 percent, was in the Bay Area. Another 20 deals worth \$800 million were done in 2012 and the first half of 2013. Investments in California were spread across a range of sectors—software and IT; consumer electronics; semiconductors; leisure and entertainment; food; transportation; pharmaceuticals; healthcare; and aerospace—

with a focus on value-added services, either upstream (R&D) or downstream (supply chain, branding, after-sales service) from the core manufacturing processes in which Chinese investors are already strong. Large greenfield investments were located primarily in the Los Angeles and San Jose areas; M&A was spread throughout Southern California and the Bay Area. Key deals were done in the Internet, electronics and solar energy sectors.

Internet

- Shanda Games acquired San Francisco-based flash gaming ad network/payment platform Mochi Media for \$80 million in 2010.
- Online gaming operator Perfect World Co. Ltd. acquired Los Gatos game developer Cryptic Studios from Atari in 2011 for \$50 million.
- In 2010, e-commerce portal Alibaba.com bought majority stakes in Auctiva (Chico) and Vendio Services (San Mateo), two developers of software tools to help customers list and sell on eBay.

Electronics

- Microprocessor manufacturer **MEMSIC Semiconductor** purchased the non-military inert sensor and wireless sensor business lines of Milpitas-based **Crossbow Technology** for \$18 million in 2010.
- **China WLCSP**, a wafer-level chip packaging and testing supplier for the mobile and RFID markets, opened an R&D center in Sunnyvale in 2011.

Solar Energy

- **Yingli Green Energy's** Yingli Solar unit opened a solar R&D lab in South San Francisco in 2011.
- **LDK Solar** acquired a 70 percent stake in Sunnyvale vertically-integrated solar developer **Solar Power, Inc.** in 2011, a deal that included LDK's assumption of control over operations of a manufacturing facility in Shenzhen.
- **GCL Solar**, a solar project developer, which opened an office in San Francisco in 2009, currently has 300 megawatts of solar projects under construction.

Most recently, Chinese web companies are expanding their footprint. In 2013, social networking and gaming company Tencent Holdings, with \$5 billion in cash reserves, led a \$150 million

investment in ecommerce company Fab.com, and Alibaba Group Holdings led a \$206 million investment in ShopRunner.com, which provides services similar to Amazon. Alibaba established a U.S. investment group based in San Francisco in 2013. Tencent's offices in Palo Alto actively scout for investment prospects, wielding a \$760 million fund for emerging companies that was created in 2011. The company subsequently invested in venture firms such as Andreessen Horowitz and SV Angel, giving it early access to emerging start-ups. In 2012, it acquired majority ownership in game maker Riot Games for \$231 million and a minority stake in Epic Games for \$330 million. Both Alibaba and Tencent's formidable market caps are enabling their respective moves to go global, with the help of Silicon Valley start-ups.

Beyond Tencent and Alibaba, a growing range and number of Chinese firms have opened offices, R&D centers and/or sales and support presences in the Bay Area. Among these are China's three major telecom providers China Unicom, China Telecom and China Mobile; equipment makers Huawei Technologies, ZTE Corp. and Spreadtrum; search engine Baidu; web portals Sina and Sohu; solar module firms Trina Solar, Jinko Solar and Yingli Green Energy; Bank of Communications, Nanyang Commercial Bank and Industrial and Commercial Bank of China; computer maker Lenovo; airlines Air China and China Eastern, plus Taiwan's China Airlines and Hong Kong's Cathay Pacific; container shipping lines COSCO and China Shipping; Andon Health Co.'s iHealth unit; and the Jun He law firm.

More than 80 Chinese companies belong to the **Chinese Enterprise Association**, a Bay Area trade association that mainly helps Chinese firms locating here navigate the business, regulatory and cultural environment (see section on Professional Networks).

West Summit Capital, with offices in Beijing, Hong Kong and Palo Alto, is a cross-border investment firm with 13 portfolio companies and approximately \$300 million under management. Its focus is on growth-stage companies with \$10 million or more in annual trailing revenue, more than 20 percent revenue growth, and a proven business model, mainly in China or the U.S., in the technology, new media or cleantech sectors.

A major investor at West Summit's inception was sovereign wealth fund China Investment Corp. (CIC), which was the sole investor in its first fund and an anchor investor in its second. But West Summit managing director David Lam says investments are not strategically (government) directed. "We invest in Chinese companies to help them connect with the rest of the world," he explains, "and we invest in companies outside of China, mostly in the Bay Area, serving as a strategic partner to connect them to business expansion in China. All of our efforts go into building great companies that derive returns."

Lam, who previously was managing director at VC firm W.I. Harper and vice-president at global private equity firm The Carlyle Group, says West Summit seeks out established companies poised for growth, typically in the enterprise space rather than the consumer side, with technology already embedded in a viable product. Enterprise software is perhaps the weakest area of China's tech sector and is also an attractive market for innovators because programs and applications cannot be replicated quickly.

An example of the possible synergies is Danish online 3D game platform, **Unity Technologies**, in which Summit invested. It moved the company headquarters from Copenhagen to San Francisco to build a larger developer community, then opened a studio in Shanghai and partnered with Qihoo to add its anti-virus software and support to the platform. Asia revenues have more than doubled since 2011.

That said, Chinese investors remain heavily hardware-focused because it is what they know. "China consumes more than half the chips used in the world, so a lot of investment is still around that ecosystem," Lam says. Four West Summit portfolio companies are in the semiconductor space; another three are in cloud computing and storage.

Other West Summit Bay Area investments include **Accent**, a Palo Alto system-on-chip designer and manufacturer for the smart grid sector; Mountain View cloud computing/software-as-a-service platform **Mirantis**; San Jose multi-core processor developer for cloud computing **Tilera**; Santa Clara cloud storage software developer **Nexenta Systems**; Mountain View social media data analytics firm **NetBase**; and Redwood

City multi-screen digital advertising solutions provider **Yume**.

Location, Location, Location

Real estate is becoming an increasingly important draw for Chinese investors, throughout the U.S. but particularly in the Bay Area. For Chinese investors, the U.S. real estate market has few barriers to entry. In China, slowing economic growth is prompting companies and investors to accelerate their globalization plans, both to access new markets and technology and to diversify risk. Recent U.S. acquisitions have ranged from high profile properties in Manhattan to distressed commercial buildings and hotels that are in default or need turnaround capital. The San Francisco Bay region is a natural destination, but investors face a learning curve regarding entitlement, disclosure and other complexities in U.S. law.

Hong Kong investors have long been active in commercial real estate in San Francisco. For example, the Great Eagle Group, a major global investor in commercial, retail, and residential properties through San Ramon-based **Pacific Eagle Holdings**, owns the 353 Sacramento Street tower in San Francisco's financial district and recently acquired 123 Mission Street, a 29-story building currently occupied by Salesforce.com and McKesson Corp.

Recent transactions highlight the Bay Area's attractiveness for development, most notably in housing, office parks and tech incubators, hotels and infrastructure. An early acquisition was Chinese investment firm Upsky Enterprises' purchase in 2011 of the 309-room 10-story **Crowne Plaza Hotel** near San Francisco International Airport. Yorbar Investments, a Chinese investment group specializing in boutique hotels, has announced plans for its first hotel in the United States at 1409 Sutter Street in San Francisco, investing \$3.5 million in design and build-out. Chinese investors have also acquired office buildings in San Francisco and Milpitas and the largely-vacant Silicon Valley office park that was at once the headquarters of Borland Software.

One of China's largest publicly-listed developers, China Vanke, is teaming with New York construction firm **Tishman Speyer** to build two high-rise residential towers of 37 and 42 stories

in downtown San Francisco at a site adjacent to the new Transbay Terminal. The 655-unit project is expected to cost \$625 million, including \$175 million from China Vanke and \$75 million from Tishman Speyer.

And in a \$1.5 billion investment partnership deal announced during Governor Jerry Brown's April 2013 China trip, Chinese property developer **Zarsion Holdings Group Co., Ltd.** has become a co-developer in the Brooklyn Basin project (formerly known as Oak-to-Ninth), a 65-acre former industrial property on the Oakland waterfront where local developers **Signature Development Group** and **Reynolds and Brown** plan to build a new neighborhood of 3,100 residential units and 200,000 square feet of retail space, with a 200-slip boat marina and 30 acres of parks and open space. Zarsion has committed an initial \$28 million for infrastructure and environmental cleanup for the first phase of the development, with more to follow as the project proceeds.

Developers concluded the \$18 million purchase of the land in June 2013 from the Port of Oakland and the State Lands Commission, and project build-out will take an estimated 15 years, beginning in 2014. Signature was introduced to Zarsion through a UC Berkeley connection: Oakland Mayor Jean Quan and Bay Area attorney Bruce Quan (no relation), now a professor at Peking University and a Zarsion partner, were classmates. Zarsion was looking to diversify to other markets with different business cycles and toured the U.S. looking for projects. When Brooklyn Basin was selected, local attorneys and accountants were hired to advise on the transaction. Funding is now going into demolition, remediation and site improvement, with further infusions to follow. Zarsion now has a permanent three-person office in the region and is looking to grow its U.S. portfolio. For many years the Oak-to-Ninth project had languished due to the lack of investors; Brooklyn Basin is expected to bring new residents and energy to the Oakland waterfront and contribute to the revitalization of the city's downtown.

Not every deal works. A similar proposal, involving a \$1.7 billion five-year loan by China Development Bank for two large development projects at San Francisco's Hunters Point Shipyard

and Treasure Island—involving 12,500 housing units, office and retail uses and open space—did not go forward in 2013 despite a memorandum of understanding signed in 2012 between the bank and developer Lennar Corp. This experience points to the complexity of navigating China's investment environment, where political support, finding the right partner, and aligning interests can be essential.

Second Home

Residential investment by private individuals is also increasing. Over 2007–12, National Association of Realtors data reported by Rhodium Group shows that Chinese buyers increased their share of total U.S. home purchases from 5 percent to 11 percent, ranking second among foreign buyers behind only Canadians, and potentially contributing as much as \$1 billion in 2012 capital inflows to California. Real estate services firm Jones Lang LaSalle sees residential property investment by high net worth Chinese (those with 10 million yuan, or \$1.6 million in assets) particularly growing. As reported by China Daily, the most popular offshore destinations are the United States, Canada, Australia and the U.K. Considerations for these investors include asset diversification (security), establishing an overseas anchor for the family, and the potential for appreciation—down payments can run as high as 30–50 percent in major Chinese cities, compared to the U.S. where 20–25 percent is the norm and interest rates are low.

Start-up Stimulus

Cross-border start-up incubators and accelerators have emerged as another potential growth area for Chinese investment. Some have tacit or direct government support and are intended to provide seed funding and technical support to Chinese-born entrepreneurs in the U.S. and to U.S. start-ups looking to engage in China.

Incubators typically house applicant start-ups, offering low-cost office and/or lab space in exchange for equity or as a straight rental arrangement. The length of time a company may stay in the incubator is flexible, up to a maximum cap. Most facilities offer add-on support services such as business mentorship and training, networking events, and introductions to investors.



Brooklyn Basin

Source: Signature Development Group

Accelerators accept for a fixed period small teams from applicant companies that are usually beyond the start-up stage. Like incubators, they offer business mentorship and training immersion programs that may or may not involve shared workspace; founder applicants are typically provided with seed funding and a convertible note in exchange for equity upon successful completion. The model began in 2005 with **Y Combinator**, a Mountain View accelerator launched in 1998.

In all, the Bay Area is home to more than 60 incubators and accelerators of various kinds, primarily serving tech and life sciences start-ups. Chinese participation in this space is relatively new, often with unique characteristics—beginning as a commercial real estate investment, possibly with strategic tie-ins to Chinese science and technology parks or a China-focused source of capital. Consistently, the goal is to facilitate cross-border linkages of entrepreneurs and companies and access to technology and innovation.

The first of these accelerators was **InnoSpring**, a 13,500-square-foot facility opened in Santa Clara in April 2012. Partners in the venture include Tsinghua University Science Park (TusPark), property developer Shui On Group, China-focused VC firm Northern Light Venture Capital and Silicon Valley Bank. InnoSpring offers six-month

“pre-seed” and “post-seed” programs that include a mix of services and support with funding, mentoring, workshops, in-house accounting and paralegal advice, and venture/angel investor contacts, plus physical office space and related services. Post-seed companies can also connect with and obtain workspace at satellite offices of larger firms in related fields.

InnoSpring has also established a seed fund as part of its program through which start-ups receive, upon acceptance, \$25,000 plus an additional \$250,000 upon completion. In return, the accelerator takes a 1 percent to 5 percent equity stake in the company. Seed fund partners include Kleiner Perkins Caulfield & Byers, Northern Light, GSR Ventures, China Broadband Capital and TEEC Angel Fund. As of May 2013, InnoSpring’s seed fund has invested \$2 million in 12 firms accepted from among 300 applicants.

Portfolio companies have included low-noise/low-power integrated circuit maker **Accusilicon**; mobile-to-mobile file-sharing technology firm **Dew Mobile**; mobile security app developer **TrustGo**, a Silicon Valley start-up with a Chinese founder; **Empower Micro Systems**, a designer of power inverters for energy storage and electric vehicles; **Lex Machina**, a data analytics firm that uses big data to search and analyzes intellectual

property litigation for law firms, businesses and public interest groups; and **OncoHealth**, a maker of protein marker diagnostics to screen for and diagnose cervical cancer.

The 80,000-square-foot **Hanhai Z-Park**, opened in San Jose in June 2012, manifests China's growing focus on innovation-led economic growth and on attracting overseas talent. The facility is a joint venture of Beijing Hanhai Zhiye Investment Management Group, a developer of office parks and incubators in China, and Zhongguancun Science Park, China's largest such park with some 23,000 companies. Vice President Joe Biden and China's then vice president Xi Jinping were in the audience at the February 2012 signing ceremony when Hanhai chairman Wang Hanguang purchased the property.

The park currently has 70 members, primarily IT and cleantech companies, 20 of which are in residence and receive a higher level of support. Resident members are assigned managers, who help them design a China strategy and facilitate contacts with potential Chinese partners. Three-fourths of tenant start-ups are U.S. businesses with plans to enter the China market, some with Chinese-born founders; Chinese tenants include universities or economic development zones in China and entrepreneurs with cross-border expansion plans.

Hanhai Z-Park is a hybrid model, an incubator that primarily offers office and R&D space plus incubator services. It has no structured accelerator program but brings to the table a \$5 million angel investment fund and plans to invest \$100,000–300,000 each in selected tenant companies. Through its relationship with Zhongguancun and other parks, Hanhai Z-Park aims to help start-ups scale and enter the China market. In the fall of 2013, the Park hosted its first Zhongguancun-Silicon Valley Innovation and Entrepreneurship Competition where twelve start-up finalists, winnowed through several rounds of pitches and screenings, competed for prizes of \$20,000–50,000, a tour of Z-Park in Beijing, and mentorship by venture capitalists and experienced Chinese and American entrepreneurs. Another player is the Zhongguancun Development Group, an equity investment arm of the Science Park and the City of Beijing that focuses on high-tech, high-growth

start-ups. With RMB 10.2 billion in registered capital, the fund works through Hanhai Z-Park to identify companies in the Bay Area and elsewhere for possible funding.

Tenants include cloud computing/file sharing company **Synaptop**; project management/productivity app developer **Moxtra**; cloud-based text message health management service **Health-Crowd**; online dermatologist health exchange **DermLink**; **NanoSatisfi**, a firm that leases crowdsourced time on satellites for running space-based research and other projects; commercial building smart energy management company **EZ Green**; and distributed wind power generation company **ArborWind**. Larger Chinese firms, among them Baidu, Tencent and retailer Suning, have also taken space in the park, either to do sales and marketing or to access local engineering R&D talent.

In June 2013, a second Hanhai-affiliated incubator, the **Hanhai-Zibo Life Science Park**, opened in Burlingame to focus on biotech, cleantech, microdevices and new materials. The \$24 million, 113,000-square-foot facility is a joint venture between Hanhai and the Zibo New and High-Tech Industrial Park, a biotech and new materials facility in Shandong Province which is a majority stakeholder. The business model is similar to Hanhai Z-Park's with paid members. Hanhai-Zibo's six tenants at the time of opening relocated from the Zibo Park.

Twenty-five U.S. companies have also been introduced to potential partners and funders in Shandong Province, where assistance may be provided in finding engineers and grants may be available from local research parks. At the start, nearly all the members (95 percent) were local, but the ratio is shifting as more Chinese companies (up from 5 to 20 percent of members currently) are seeking help coming to the Bay Area. According to Sue Xu, Operations Director of zPark Venture, increasing competition in China is pushing Chinese companies to come to the Bay Area, to gain a competitive advantage and a 6–12 month lead time in product development on companies at home. Like Bay Area companies going to China, these companies receive professional advice and introductions to potential employees and local service partners.

Hanhai is also a limited partner in QB3@953, a biotech incubator located in San Francisco's Mission Bay district.

Start-up activity is also supported by **Accelerator zPark Venture**, a venture fund that supports companies housed in incubators. In its first year (2013), the fund invested between \$5,000 and \$350,000 in 25 companies, 95 percent of which are start-ups based in the U.S., with 80 percent in Silicon Valley.

HAXLR8R and **Highway1**, both in San Francisco, are hardware accelerators for start-ups involved in advanced manufacturing. Both provide seed funding; training in design, engineering, sourcing and supply chain; and mentoring and contacts to take innovative hardware products and technologies from idea to production.

HAXLR8R offers hardware start-ups with up to four people \$25,000 in seed funding; training in sourcing, manufacturing and supply chain at a 111-day boot camp in Shenzhen, China's manufacturing center; and an additional \$25,000 note upon successful completion of the program and presentation at a demonstration day in San Francisco. Portfolio start-ups include **Melon**, an EEG connected headband device that helps enhance cognitive function; **Nomiku**, designer of an affordable precision temperature cooker that enables *sous vide* cooking in airtight plastic bags; and **Spark**, developer of a cloud-based open-source kit that adds Wi-Fi to any electronic product.

Highway1 was launched in early 2013 by an Irish electronics contract manufacturer and

fulfillment company, PCH International. PCH has been in China since 2000, with operations in Shenzhen's Futian Free Trade Zone. Its U.S. headquarters in San Francisco is a 30,000-square-foot industrial space that houses a development and engineering lab, a rapid prototyping facility, a sustainable packaging facility, collaborative workspaces for Highway1 and PCH clients, and an events space.

Highway1 accepts up to 10 companies at a time for its four-month program and offers \$20,000 in seed funding plus office and manufacturing space, in exchange for 3–6 percent equity down the road. Part of the program involves travel to Shenzhen to tour PCH's Chinese contract manufacturing facilities that may eventually make successful graduates' products. PCH already has a separate accelerator that has graduated companies such as **Lark**, maker of a sleep monitoring device, and **MetaWatch Strata**, developer of a digital watch that can sync to a smartphone, using Bluetooth, to retrieve emails and text messages.

More incubators, with investment, are on the way. **CFLD**, a major developer of new towns and technology parks with 19 sites in China, will open a technology incubator in Mountain View in 2014, focusing on hardware and medical devices. Its strategy is to develop companies in the Bay Area that might one day expand to China, creating employment in the new towns. An associated venture fund, **CFLD Capital**, will provide investment support.



8. CONNECTORS

Building New Bridges

As has been noted throughout this report, the Bay Area and greater China have benefited from cross-border trade, investment and technology exchanges based on an infrastructure of talent, capital and innovation.

A changing landscape has now produced a new set of “connectors,” oriented toward promoting cross-broader business exchanges and sustaining a cross-border talent and innovation infrastructure: public-private trade and investment partnerships at the regional, state and city levels; privately developed incubators and accelerators; EB-5 regional centers linking immigrant investors with local development projects and green cards; and sector-specific trade associations arranging targeted cross-border contacts and events.

A New Kind of Overseas Office

California has not had a dedicated overseas trade and investment promotion program since 2003. A robust program launched in 1983 within the office of Governor George Deukmejian included services such as export finance in cooperation with community banks; low-cost, California-themed trade show participation; and a network of overseas offices in more than a half dozen locations. Over time, that network grew to 10 international trade and investment offices, supported by domestic teams in Long Beach and Sacramento. By the mid-1990s, these activities and an office for foreign investment promotion were centralized in the California Trade and Commerce Agency, until budget cuts forced its closure. When that occurred, California essentially had no overseas representation.

Other sector-specific trade promotion programs were housed within the California Energy Commission and the California Department of

Food and Agriculture. Another network of trade promotion centers had developed, linked to community colleges and designed to serve small, new-to-export firms. These programs to some degree continue but have also suffered from budget cuts.

A new public-private model for state trade and investment promotion surfaced in early 2013 when Governor Jerry Brown, on a trip to China, announced the opening of the **California-China Office of Trade and Investment**, the state’s first overseas office in a decade. The office in Shanghai was a creative response to budgetary necessity: the state had no funds to operate foreign offices. In September 2012, California lawmakers had approved legislation to allow the joint, public-private establishment and operation of overseas offices. This legislation paved the way for the California-China Office of Trade and Investment to open as a public-private partnership between the Governor’s Office, the Governor’s Office of Business and Economic Development (GoBiz), and the Bay Area Council. The Council’s Shanghai office, which had been in successful operation for three years, provided an efficient base for launching the new program.

The California-China Office of Trade and Investment serves exporters throughout California, helping them gain access to the Chinese market, and serves as a portal for Chinese investors seeking opportunities in California. While that investment could go in many directions, the state sees infrastructure projects, agriculture, online commerce, and high tech as particular opportunities.

As China faces major energy and environmental challenges, climate and energy will also be an important focus. California has developed effective environmental policies over many decades, leads the U.S. in developing climate policy, and is the nation’s leading center for cleantech

development. Both share an interest in improving energy efficiency and addressing climate change. This led to a September 2103 MOU signed by California governor Jerry Brown and National Development and Reform Commission (NDRC) vice chairman Xie Zhenhua, to cooperate on climate change, clean energy and low carbon development—the first agreement of its kind between a subnational government and the central Chinese government. This followed a separate agreement, signed with Guangzhou Province during the governor's trip to China in the Spring of 2013, to cooperate on carbon markets.

The California-China Office of Trade and Investment is committed to raising \$1 million in private sector funds to operate the office and support staff in California that will provide cross-border advisory services to California businesses and Chinese investors. Founding advisory board members include Bank of America, Driscoll's, FedEx, Hanson Bridgett, HSBC, Invest LA Regional Center, JM Eagle, MEBO International, Royal Business Bank, Signature Development Group, Shui On Land Limited, Silicon Valley Bank, Sun World International, Visa, and Wells Fargo. Critics in the past have questioned the effectiveness of overseas offices in producing significant new business, but Diane Long, executive director of the Office, says that the Office has been structured according to the best practices of other states, has developed realistic performance metrics, and will make improvements as needed.

The Office's first undertaking was Governor Brown's April 2013 trade mission to China. During that trip, over \$1.8 billion dollars in deals were announced, including the investment by Zarsion in Oakland's Brooklyn Basin. The governor also signed several sweeping agreements with Chinese leaders to expand trade relations, further knowledge and technology exchange, and build a trans-Pacific approach against climate change. A major success came in November 2013, when it was announced that **Suning Commerce Group**, the largest retail enterprise in China with more than 1,600 chain stores in over 600 cities in mainland China, Hong Kong, and Japan, will open an R&D Center in the Bay Area, its first research institute outside China. With 20

employees and \$5 million invested to date, Suning plans to increase its investment and to grow its employee base to 200 in the next two years. Its initial focus will be on advanced technologies, online commerce and Internet-based retail.

Other organizations have moved to formalize ties at the regional and city levels. The **Bay Area Council**, a business-sponsored, public policy advocacy organization for the nine-county Bay Area, had launched a series of China initiatives beginning with the first edition of this *Ties That Bind* report in 2006, followed by venture capital and cleantech conferences in Shanghai in 2007–08 and the opening of an office in Shanghai's Yangpu District in 2010 to help Bay Area firms access the China market. Since then, the Council has introduced 15 companies to China; 90 percent are American, and 70 percent of those are from the Bay Area. A steady flow of Bay Area Council delegations have visited China, and Chinese delegations from Shanghai and other cities have visited the Bay Area, meeting with companies and participating in events such as the Council's first U.S.-China Smart Cities Symposium, held in San Jose in 2012.

In 2012, the Bay Area Council opened a second China office in Hangzhou, a major technology center south of Shanghai, and a third office will open in Nanjing in 2014. Additional offices in south, north and central China are being considered.

"We're in a good position because we're a non-profit—for businesses entering the China market and trying to figure out where to go first, trust is important," explains Council chief of staff John Grubb. The Council's office is located in the 207-acre Knowledge and Innovation Community, an urban live-work neighborhood developed by Shui On Land to foster technological innovation and entrepreneurship similar to that of Silicon Valley. The Yangpu District is also home to 14 universities and colleges.

Individual Bay Area cities are also marshaling their China business, academic and cultural resources to build distinct public-private networks. **ChinaSF** was established in 2008, in part to organize an upcoming China business delegation led by then San Francisco mayor Gavin Newsom. Since then, it has leveraged the official resources

of the Mayor's Office of Economic and Workforce Development with the business and investment expertise of the San Francisco Center for Economic Development (SFCED), a non-profit business promotion arm of the San Francisco Chamber of Commerce.

ChinaSF's sponsors include Deloitte; developer Lennar Urban; investment firms BlackRock, Morgan Stanley, Hina Group and Warburg Pincus; law firms Pillsbury, Morrison & Foerster, K&L Gates and Nixon Peabody; architects Gensler and HOK; commercial real estate firms CB Richard Ellis and Kidder Matthews; and Cisco Systems.

The group's bilingual staff works out of the Beijing and Shanghai offices of Hina Group and Nixon Peabody, respectively. Its work builds on San Francisco's longstanding relationship with China dating back to the administration of then mayor Dianne Feinstein and the establishment of the **San Francisco-Shanghai Sister City Committee**, which continues to lead mayoral delegations to China. San Francisco also boasts close ties to Taiwan and Hong Kong dating back decades.

"San Francisco is comfortable for Chinese investors; there's a large Chinese community here and they see a lot of opportunity in the Bay Area," says ChinaSF executive director Darlene Chiu Bryant. "And now we have a Chinese mayor who is seen as very friendly to Chinese investment, and that helps as well." For many Chinese firms, the city's geographic location and international focus are also an attraction. "A lot of companies have made their name in China and want to become global," she explains. "They can come to San Francisco, cross fewer time zones, and access 75 countries through our network of trade offices and consulates."

Since 2010, ChinaSF has been instrumental in bringing to San Francisco China's Bank of

Communications and solar firms Trina Solar, Yingli Green Energy, GCL Solar Energy and ReneSola, and in helping online game developer Shanda Holdings expand its Bay Area presence.

In June 2012, San Francisco entered into a memorandum of understanding (MOU) with China's National Energy Conservation Center—part of the National Development and Reform Commission—to undertake technical cooperation in promoting energy efficiency. Putting the MOU into action, an initial step has established a partnership with the city of Nanchang in Jiangxi Province for cross-border business and technical exchanges on two large development projects of comparable type and scale: San Francisco's 500-acre Hunters Point Shipyard project and Nanchang's 200-acre mixed use development, also to be built on former industrial land. A key provision encourages participation from Chinese and Bay Area financing, suppliers, vendors and subcontractors.

ChinaSF partnered with another San Francisco-based connector, the **China-U.S. Energy Efficiency Alliance**, to secure the MOU, and the two organizations are assembling a delegation of energy efficiency firms with proven business models and technologies to visit Beijing, Tianjin, Chongqing and Qingdao in 2014. The Alliance includes among its members California's major utilities, the state Public Utilities and Energy Commissions, Bay Area clean energy companies, Lawrence Berkeley National Laboratory and the Natural Resources Defense Council.

A second San Francisco MOU signed in 2013 with the China International Culture Association provides an official door for future cultural and artistic exchanges with organizations throughout China, a development that should significantly benefit the city's Asian Art Museum.

The Asian Art Museum: Come for the Art

San Francisco's Asian Art Museum houses a world-class collection of classic and modern Chinese art—the largest in the Western Hemisphere—and regularly hosts both large and small scale visiting exhibits. The museum is already a draw for Bay Area residents and visitors, and museum director Jay Xu would like more visitors from China to experience it. Xu says that a dual-track strategy is needed to fully leverage this valuable asset—one that combines community support and more concentrated, coordinated tourism promotion. "Our museum, like others, forms a very important pillar of the economy—cultural tourism," he says. "China should be one of the big growth areas."



The year-long Celebration of Shanghai series of exhibits and programs in 2010, tied to the World Expo in Shanghai at the time, provides a template. The Asian Art Museum provided a focal point for 30 programs hosted by 15 different China-related cultural organizations.

An early 2013 exhibit of terra cotta warriors from the burial complex of Emperor Qin Shihuang in Xi'An, Shaanxi Province featured a reception with Chinese-American organizations, reprising an earlier exhibit in 1994 that was the Museum's best-attended event.

Xu is optimistic about increasing Chinese tourist traffic at the museum. While most travelers from China currently come to the Bay Area on package tours, he's counting on the trend of more affluent travelers visiting on their own and looking for a richer cultural experience.

There is an added challenge of expanding museum exhibits beyond traditional art, that involves complex relationships with Chinese museums, galleries, collectors, artists and government agencies. While there are established procedures for curating cross-border exhibitions of classic works with national and provincial museums, similar arrangements for contemporary art are still uncharted territory in terms of logistics, liability, documentation and government involvement. All

must be handled on a case-by-case basis among multiple parties, adding to cost and risk.

Xu is hopeful that tourist and exhibition obstacles will recede over time, and that the Asian Art Museum can become a cultural hub connecting and promoting understanding between the Bay Area and China. The City of San Francisco's new cultural MOU with the Chinese government should help. "With the rise of Asia, the museum becomes all the more relevant," he says. "It connects art to life and offers a platform to help people be better informed about Asia—a hub where people from all walks of life connect."

The City of San Jose launched its own connector, **China Silicon Valley**, in June 2013. The group's mission is to attract inward Chinese investment by providing access to local government and business leaders and to supportive regulatory, tax, legal, and other services.

Board members include Hanhai Z-Park general manager Victor Wang; East-West Bank first vice president Stephanie Xu, a commercial real estate and EB-5 specialist; and Fred Greguras, a partner with Bay Area law firm K&L Gates, specializing in cross-border M&A. Business partners include the Chinese Entrepreneurs Association, Stanford University, global commercial real estate firm Colliers International, the Pillsbury law firm, the California Development EB-5 Regional Center, the Singer-Lewak tax practice, and the cities of San Jose, Sunnyvale, Cupertino and Campbell.

China Silicon Valley is particularly targeting large Chinese companies willing to locate manufacturing and R&D facilities that create jobs in areas with high commercial vacancy rates or, as in locations such as North San Jose, in areas with large tracts of available industrial land. Development of this kind can, in turn, attract additional investment from EB-5 and other sources. The group is talking to large potential Chinese partner firms that already have presences in Silicon Valley and has met with officials of Guangzhou's Yiexiu District in Guangdong Province to explore investment prospects. It plans to open offices in Shanghai and Beijing.

The EB-5 Advantage

In an earlier discussion of visas in this report (see "Visas: The School-to-Work Transition" in the Chinese Students at Bay Area Universities chapter),

the EB-5 visa program was referenced in the context of investors pursuing green cards with a dual strategy: as insurance in case they want to relocate abroad and as a way to enroll their children in U.S. schools or universities at resident tuition rates.

The federal EB-5 program, established in 1990, has emerged as a potentially valuable economic development tool for cash-strapped cities and counties in California and as a source of funding for both large and small-scale projects. This is particularly the case as California's redevelopment program and its network of 400 local redevelopment agencies with bond-issuing capacity was eliminated in 2012. Given this economic environment, Chinese investors and California cities and counties have found their interests aligned, and regional centers (RCs) are emerging as key points of intersection.

Under the EB-5 program, investors, their spouses and unmarried children under 21 become eligible to apply for a permanent resident visa (green card) if they make a \$1 million investment anywhere in the U.S. that results in the employment of at least 10 qualified individuals, or if they make a \$500,000 investment in rural or high-unemployment areas or through a government-approved EB-5 non-profit regional center that syndicates investments to fund larger development projects.

Regional center investments operate on a five-year time frame, coinciding with the EB-5 visa process. During that period, the investment must generate at least 10 full time jobs per investor within two years.

At that point, investors are eligible for conditional resident visas similar to those granted to spouses of green card holders. They may exit the

investment at any time after the job-creating conditions of the EB-5 are met, and after five years residing in the U.S. they are eligible for a permanent green card. Regional centers typically charge fees in the \$50,000 range to administer the project investments, reporting requirements and visa processing.

Investments have different characteristics and offer varying types and levels of return, so exits may come well before the five years or well after. Most investments made through regional centers are passive, but they must be structured and represented as “at risk” investments, not loans for which returns are guaranteed. Qualifying jobs created can be direct—hotel desk clerks, customer service representatives, manufacturing line workers, event planning and catering staff—or indirect in construction or services from vendors and suppliers, such as room furnishings or landscaping. Jobs do not have to be specifically identified and can be calculated using federally-approved statistical models.

A total of 10,000 EB-5 visa slots are allocated nationwide each year; up to 3,000 are made available for investment in targeted employment areas (TEAs), and up to 3,000 are available for investments through regional centers. U.S. Citizenship and Immigration Services (USCIS) figures show that since the EB-5 program’s inception, it has attracted \$6.2 billion in investment, created 49,000 jobs, and issued more than 13,000 permanent visas to investors. As of July 2013, USCIS reported 18 approved Bay Area regional centers, out of more than 80 registered in California.

The proliferation of RCs—from 11 in 2007 to more than 300 in 2013—and dubious operators can crowd the market and at times damage the reputation of an otherwise beneficial program. Applications to create new EB-5s surged several years ago as registration fees were about to be hiked, but less than 20 percent of those regional centers are currently active. Chinese investors, mostly individuals, may be sophisticated but often rely on friends for advice and need help understanding what is and isn’t a good project in the U.S. Some EB-5 developers see the program as easy money, so investors need to be cautious.

A case in point is the February 2013 Securities and Exchange Commission lawsuit against

29-year-old Anshoo Sethi, charging that his Chicago RC fraudulently raised \$145 million in investments and another \$11 million in administrative fees from 249 mostly Chinese investors for a dubious green hotel and convention center project next to O’Hare International Airport, on vacant land owned by Sethi’s family.

Such cases are rare but highlight weaknesses in the EB-5 program. Targeted Employment Areas, which permit lower investment in disadvantaged areas, are subject to manipulation. Regional centers are lightly regulated and monitored on the front end, and rules can be vague or contradictory regarding marketing representations, fee structures and project milestones. Detailed assessments take place when investors submit I-526 petitions for conditional visas as job requirements are met (up to two years into the process), or later when they file I-829 petitions for the government to remove conditions and grant a permanent visa.

USCIS can decertify an RC and/or deny an I-526 for not meeting investment requirements. Projects—and the green cards they are to generate—may therefore be disallowed after the investment funds have been spent. In a 2012 case, for example, 23 foreign investors sued USCIS for disallowing visas relating to a warehouse project in Riverside, California after the investments had already been made. USCIS ruled that the RC could not count jobs created by tenant businesses after the warehouse was completed. The USCIS California service center saw its backlog of I-526 cases double from fewer than 3,000 in May 2012 to more than 5,800 in April 2013, with the oldest cases dating back a year; pending I-829 petitions, by contrast, dropped sharply from 2,500 in late 2011 to around 700 in March 2012 and have held at those levels since.

As shown in the following tables, the annual percentages of I-526 and I-829 petitions approved over 2005–12 increased until 2012, in part due to the volume of petitions received and the resulting backlogs. The surge in volume is mainly attributable to Chinese applications. For the first time in the program’s history, EB-5 applications are approaching the total cap of 10,000 visas; of 7,600 applications in 2012, more than 6,100 were from China, and USCIS is now reportedly considering a country cap.

USCIS Service-Wide Receipts, Approvals, Denials (Fiscal Years, 2005–2012)

Form I-526, Immigrant Petition by Alien Entrepreneur				
Fiscal Year	Receipts	Approvals	Denials	Approval Percentage
2005	332	179	156	53%
2006	486	336	124	73%
2007	776	473	148	76%
2008	1,257	640	120	84%
2009	1,028	1,262	207	86%
2010	1,955	1,369	165	89%
2011	3,805	1,563	371	81%
2012	6,041	3,677	957	79%
Grand Total	15,680	9,499	2,248	81%

Source: USCIS; Association to Invest in the USA (IIUSA)

Form I-829, Petition by Entrepreneur to Remove Conditions				
Fiscal Year	Receipts	Approvals	Denials	Approval Percentage
2005	37	184	112	62%
2006	89	106	108	50%
2007	194	111	49	69%
2008	390	159	68	70%
2009	437	347	56	86%
2010	768	274	56	83%
2011	2,345	1,067	46	96%
2012	712	736	60	92%
Grand Total	4,972	2,984	555	84%

Source: USCIS; Association to Invest in the USA (IIUSA)

Two Local Examples

The **San Francisco Regional Center (SFRC)**, based in Oakland, structures its projects like private equity funds. Three projects—two **Call Socket** customer service call centers and **Comprehensive Care of Oakland**, a subacute care nursing facility affiliated with Kaiser Permanente—have launched, delivered their financing and obtained conditional or permanent green cards for 80 investors. When fully operational,

those projects and a planned third call center will generate over 2,000 jobs. SFRC CEO and Bay Area real estate investor Tom Henderson is planning more projects, including a restaurant, an LED lighting company, a company that produces and distributes hearing aids, and a third-party logistics company. The companies are located in buildings that Henderson has acquired, including Oakland's Tribune Tower and a 90,000-square-foot industrial building near the Port of Oakland.

He has also leased 30,000 square feet at 1355 Market Street in San Francisco, in the same building occupied by Twitter, to house an EB-5-funded incubator.

Henderson has a background not only in real estate but in import-export, primarily with Asia. Most of his investors—about 80 percent—are mainland Chinese, and the rest are from Hong Kong, Pakistan, Singapore and Vietnam. His investors are sophisticated, understand the EB-5 rules, and are adept at analyzing business proposals. “It’s the project that drives investors,” he says. “The Chinese from China are the smartest in the world; they’re capitalists in a communist country, they have to deal with competitors on the ground while protecting themselves from the government.”

He is skeptical of most regional centers and expects many will end up suspended by USCIS for inactivity. He is also wary of centers tied exclusively to real estate and to large projects requiring too many investors without a sound underlying value proposition in specific growth sectors. Pure real estate plays are complex, Henderson maintains, requiring an LLP, an environmental impact report and other supporting documentation translated into Chinese. “A lot of RCs go out with five pages, sometimes even just one page,” he says, noting that other RCs appear to have no clear business plan or sectoral expertise; they apply for the broadest geographic scope and industry mix possible and shop for projects.

Like Tom Henderson at the San Francisco Regional Center, Ginny Fang, CEO of the **San Francisco Bay Area Regional Center (SFBARC)**, has seen success. SFBARC was initially approved in 2009 and was reorganized under its current leadership in 2011 when Ginny Fang left her position as ChinaSF’s founding executive director to lead SFBARC’s efforts to direct EB-5 financing into job-creating enterprises in the San Francisco Bay Area. The principal focus of SFBARC’s EB-5 funds is the 495-acre Hunters Point Shipyard site in San Francisco, a former U.S. Navy shipyard being redeveloped by Lennar Corp.

Helping to finance development at the Hunters Point Shipyard, the first of two SFBARC funds, covering street, utility and sewer infrastructure, raised \$27 million from 54 investors. The second,

to help fund housing construction, raised \$50 million. SFBARC proceeded with a third fund for the Shipyard, with investors in all three funds coming from nine different countries.

Fang says an RC is a good route for prospective EB-5 investors because it manages both the investment and the visa details and is a regulated entity with reporting requirements. It also allows investment at the lower \$500,000 level (“At the \$1 million level it’s often difficult to find someone,” she says), and since Hunters Point is in a high unemployment area, investors are eligible for both the RC and the targeted employment area allocations, making them less likely to be closed out in a given year if either category reaches its limit.

Lennar’s Kofi Bonner agreed that EB-5 investors have been important to Hunters Point. When Lennar’s financing discussions with the China Development Bank (CDB) ended in early 2013, the project already had been courting EB-5 investors. The publicity around the CDB talks had raised the profile of both Lennar and Hunters Point in China.

For Hunters Point, Bonner describes a series of tranch deals with offerings made only for specific activities the investor funds will go toward. Through the second fund, 88 townhouses and condos were under construction by mid 2013 and construction was scheduled for another 159 residential units, bringing the total to 247 for 2013. Approximately 280 more are planned for 2014, with the infusion of an additional \$100 million in investment.

A key factor for investors is how the EB-5 and overall development timelines mesh: since large, complex construction projects like Hunters Point have prolonged construction time frames surpassing two years, construction jobs can be counted toward fulfilling the EB-5 mandate to meet the two-year initial job creation requirement for investors to get their conditional visas. “Large residential projects can qualify as EB-5 projects due to their lengthy employment of construction labor beyond two years,” Fang explains.

Given that, large real estate development projects—housing, hotels, shopping centers—are attractive because they are job generators at all stages. And if a big name architect, builder

or company is behind the project, that gives investors an added comfort level. “There are hundreds of regional centers registered, but if you’re out in China, there are probably only about ten names you hear about in terms of actual projects.” SFBARC is now considering potential projects throughout the State of California.

To maximize investment prospects, some RCs try to identify development sites and projects in rural locations or targeted unemployment areas (TEAs), defined by law as areas where unemployment is at least 50 percent higher than the national average. With nationwide unemployment in the 8–10 percent range over 2009–11, RCs tended to shop for projects in counties with pockets of 12–15 percent unemployment: Oakland, Richmond, Eastern Contra Costa County, the Central Valley, East Palo Alto and North San Jose. Some examples of other regional centers in the Bay Area include the following:

- **California Energy Investment Regional Center**, with offices in Cupertino, Fresno and Sacramento, focuses on solar farms selling electricity to utilities, advanced extraction fracking rigs, and reopening closed ethanol plants.
- **California Wineries and Vineyards Regional Center** in San Mateo invests in winery and vineyard properties in Napa and Sonoma County TEAs; it has recruiting and support services affiliates in the PRC, Hong Kong, Japan and Korea.

Regional centers from outside California are also stepping in. The Kor Group is renovating the vintage but run-down Renoir Hotel in San Francisco’s mid-Market area with \$40 million in Chinese investment from **EB5 Global**, a regional center based in Portland. In addition to accommodations, the boutique hotel will have several bars and restaurants to capitalize on its mid-Market location adjacent to expanding companies such as Twitter, Dolby, Square, and Yammer and to large housing developments under construction nearby.



Paths Forward

As the Economic Institute found in its 2006 study, the San Francisco Bay Area enjoys a depth and density of economic connections with China that is unique in the United States. This reflects more than 160 years of interaction that has produced demographic ties and a depth of cultural intelligence regarding China that is difficult to find elsewhere. It also reflects the fact that the Bay Area's economic strengths—in technology, urban design and environmental planning, life sciences, innovation, and entrepreneurship—mirror China's own needs and priorities. While the business and policy landscapes are complex, this presents the Bay Area with major opportunities for growth and leadership, as China continues to expand its presence on the global economic landscape.

Several specific areas of opportunity emerge from this analysis.

Higher Education

Because of the large number of colleges and universities in the region and the presence of world-renowned institutions such as Berkeley and Stanford, the Bay Area is a major destination for students from greater China. China consistently vies with India for the top position as an overseas source of students. This flow remains strong and is likely to grow. The Bay Area benefits from the direct spending of those students but more importantly from the energy and skills they ultimately bring to the economy. Even those who return to China bring benefits through the personal and business ties they develop with the region, enabling further trade and investment.

For public colleges and universities (UC and CSU), however, it would be unfortunate if Chinese and other foreign students (who pay full tuition) were to be seen as an adequate substitute for long-term investment by the state in its higher education system. Budget cuts to higher education can also undermine the long-term global competitiveness of the state and its economy. Continued investment in public higher education in California is essential.

As more U.S. and international universities and business schools open campuses and offer programs to connect students with the region's innovation and entrepreneurial system, the potential for a greater presence by Chinese universities is growing. Strong Bay Area alumni networks from leading Chinese universities offer a unique foundation to build on.

There are also outbound opportunities. The 100,000 Strong Initiative, launched by former secretary of state Hillary Clinton in 2010, aims to send 100,000 U.S. students to study in China by 2014. The 100,000 Strong Foundation, created in 2013, is tasked with carrying out the Initiative, and the Chinese government is offering scholarships for 20,000 U.S. students to study in China. As of early 2013, approximately 6,500 U.S. students had taken advantage of the program. Bay Area students studying in China can help to build both cultural intelligence and relationships that will support stronger economic ties.

Tourism

The growing flow of Chinese tourists venturing overseas, their increasing wealth, and the fact that more are traveling independently all suggest that tourism will remain a major area of opportunity for the region. The Bay Area's location on the West Coast, iconic attractions, easy access through SFO, and cultural receptiveness to Chinese travelers make it a natural destination.

Immigration

In the last two decades, students from China have chosen to remain in the Bay Area in large numbers, populating research laboratories, founding companies, and becoming venture capitalists. Current policy, however, makes it unnecessarily difficult for many of these graduates to stay and contribute to the economy. Immigration reform is needed to (1) remove country quotas for green cards (which are quickly exhausted for high-volume countries such as China), (2) make it easier for entrepreneurs from China and other countries

to stay in the U.S. to found companies, and (3) enable foreign graduates of U.S. universities with advanced degrees in STEM fields to secure green cards on an expedited basis.

Energy and Climate

Despite policy differences, China and the U.S. share a common interest in reducing the long-term consumption of fossil fuels, increasing the production of renewable energy, improving energy efficiency and addressing climate change. California leads the nation in its commitment to addressing these issues and in the progress it has made. This is particularly true in the Bay Area, where the state's cleantech industry is concentrated and where government, university, and industry initiatives offer a rich foundation for dialogue and cooperation.

Investment

As China begins to send ever larger volumes of investment capital around the world, California and the Bay Area are positioned to capture an outsized share. Because of its strength in smaller, entrepreneurial and technology-based companies, the region is more likely to attract investment from private Chinese companies than from larger state-owned enterprises. Areas of particular opportunity include real estate, healthcare, hospitality, and technology.

Supplementing direct investment by larger commercial entities, the EB-5 program is a promising vehicle to expand Chinese and other foreign investment, and it can play an important role in financing infrastructure, housing, and new businesses, particularly in the wake of the 2013 closing of California's redevelopment programs. Overseas investors, however, need more security and transparency. The EB-5 program for regional centers, which is currently only a pilot and is subject to annual extensions, should be made permanent. USCIS should also be given the resources required to expedite applications processing (which currently can take as long as 18 months), advance priority projects, and exercise better oversight and screening of questionable or ineffective regional centers.

Connectors

While China will remain a sometimes controversial topic in Washington, states, regions, and private companies tend to see China pragmatically. More than most, the Bay Area has shown an affinity and openness to China. Ever since the historic creation of the Shanghai-San Francisco Sister City Committee, the Bay Area has shown that it is prepared to reach out to develop new relationships and channels. New intermediary entities such as ChinaSF and the Bay Area Council's Shanghai and Hangzhou offices exemplify this trend and provide platforms for continued business growth. The State of California's new China office gives California an official presence in China for the first time in a decade. For organizations that play this role, investment attraction will be an increasingly important focus.

Conclusion

These opportunities do not mean that China will be an easy place to do business or that significant barriers don't exist. China's economy is slowing, labor costs are rising, and competition from Chinese firms is increasing, both in China and overseas. Cyber security, intellectual property protection, lack of transparency, and government policies that often force technology transfer or favor national companies will remain significant issues for both businesses and policymakers.

Bay Area companies, however, have demonstrated their capacity to succeed in China's often challenging environment, and local government has chosen to lead as well. With this experience, the region is in a strong position to interpret China to the U.S., and the U.S. to China, as it continues to build a positive, multifaceted relationship. As the Economic Institute found in its 2006 report, as China grows as a major force in the world economy, the San Francisco Bay Area continues to occupy the pole position among its potential U.S. partners. Because of the scale of this opportunity, it merits continued investment by both the public and private sectors.

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Sources

China's Economy

"An understated recovery." *The Economist*, December 15, 2012: 44.

Asian Development Bank. "Key Indicators for Asia and the Pacific 2012." Country: People's Republic of China. <http://www.adb.org/publications/key-indicators-asia-and-pacific-2012?ref=publications/series/key-indicators-for-asia-and-the-pacific>.

Back, Aaron. "China's Surpluses Start to Even Out." *The Wall Street Journal*, February 2, 2013.

"Chasing the Chinese dream." *The Economist*, May 4, 2013: 24.

China National Bureau of Statistics. *Statistical Communiqué of the People's Republic of China on the 2012 National Economic and Social Development*. February 22, 2013.

"China's Economy Achieved a Stabilization and Accelerated Development in the Year of 2012." China National Bureau of Statistics press release, January 18, 2013. http://www.stats.gov.cn/english/PressRelease/201301/t20130118_72247.html

"China's economy: Pedalling prosperity." *The Economist*, May 26, 2012.

Chovanec, Patrick. "China's Solyndra Economy." *The Wall Street Journal*, September 12, 2012.

Chu, Kathy and Laurie Burkitt. "Retail's New Pace in China." *The Wall Street Journal*, November 7, 2012: B6.

Davis, Bob and Silk, Richard. "Chinese Economy Shows Weakness." *The Wall Street Journal*, March 11, 2013: A8.

Davis, Bob and William Kazer. "Chinese Numbers Reopen Stimulus Debate." *The Wall Street Journal*, October 16, 2012: A14.

Delegation of the European Union in China. *China's Twelfth Five-Year Plan, 2011–15: The Full English Translation*. 2011.

"Despite China's Modernization, the Inequitable Hukou System Remains." *A&S Perspectives*, February 2010. <http://www.artsci.washington.edu/newsletter/Feb10/Hukou.asp>.

Frangos, Alex, Tom Orlik and Lingling Wei, "In Reversal, Cash Leaks Out of China." *The Wall Street Journal*, October 16, 2012: A1.

Fung, Esther, Tom Orlik and Richard Silk, "Home Prices Soar in Chinese Cities." *The Wall Street Journal*, September 3, 2013.

"HSBC Flash China Manufacturing PMI." HSBC/Markit monthly reports, September 2012–September 2013. <http://www.hsbc.com/news-and-insight/emerging-markets>.

Lazear, Edward. "Chinese 'Currency Manipulation' is Not the Problem." *The Wall Street Journal*, January 8, 2013: A17.

Lee, Il Houn, Murtaza Syed and Xueyan Liu. "Is China Overinvesting and Does It Matter?" Working paper, International Monetary Fund, Asia and Pacific Department, November 2012: 1-21.

Li Guangyu and Jonathan Woetzel. "What China's Five-Year Plan Means for Business." McKinsey & Company, July 2011.

"Migration in China: Invisible and heavy shackles." *The Economist*, May 6, 2012.

Orlik, Tom. "China Falls Short on Efforts to Rebalance." *The Wall Street Journal*, May 23, 2013.

Orlik, Tom and Bob Davis. "China Falters in Effort to Boost Domestic Consumption." *The Wall Street Journal*, July 16, 2013.

Orlik, Tom and Bob Davis. "China Moves to Temper Growth." *The Wall Street Journal*, March 5, 2013: A1.

Orszag, Peter. "China's New Leaders Face an Economic Turning Point." *Bloomberg*, November 13, 2012.

Qi Liyan. "Is Hukou Reform the Key to Reviving China's Economy?" China Real Time Report. *The Wall Street Journal*, August 19, 2013.

Roberts, Dexter. "China Moves on Reforming Hukou?" *Bloomberg Businessweek*, June 28, 2013.

Roberts, Dexter. "The Trouble with Chinese Frugality." *Bloomberg Businessweek*, July 15-21, 2013: 16.

"Rustbelt revival." *The Economist*, June 16, 2012: 51.

Sharma, Ruchir. "China Has its Own Debt Bomb." *The Wall Street Journal*, February 26, 2013: A15.

Shen Jingting, Chen Limin and Tuo Yunnan. "Homeward bound? Firms mull return." *China Daily Europe*, July 23, 2013: 13.

Steil, Benn and Dinah Walker. "Labor Data Show that China is a Bubble Waiting to Burst." Council on Foreign Relations, December 5, 2012. <http://blogs.cfr.org/geographics/2012/12/05/laborchina/>.

Chinese Students at Bay Area Universities

American Immigration Lawyers Association/American Immigration Council. Section by Section Summary of the Border Security, Economic Opportunity, and Immigration Modernization Act (S. 744). June 14, 2013.

Bell, Nathan E. "Findings from the 2012 CGS International Graduate Admissions Survey—Phase II: Final Applications and Initial Offers of Admissions," Council of Graduate Schools, August 2012.

Berkeley International Office, University of California Berkeley. "International Student Enrollment, 2006–11."

Farrugia, Christine, Rajika Bhandari, PhD. and Chow, Patricia. "Open Doors Report on International Education Exchange." Institute of International Education, 2012.

Fiscal Policy Institute. Immigrant Small Business Owners: A Significant and Growing Part of the Economy. June 2012.

Fitzgerald, Michael. "H-1B at Center of Immigration Reform Debate." *Information Week*, May 16, 2013.

Guidi, Ruxandra. "Chinese Students Flock to the US—and Efforts to Help Them Adapt are Ramping Up." *The World*, Public Radio International, May 29, 2013.

Immigration Policy Center, American Immigration Council. "Comprehensive Immigration Reform 2013." <http://www.immigrationpolicy.org/comprehensive-immigration-reform-2013>.

Johnson, Ian. "Wary of Future, Professionals Leave China in Record Numbers." *The New York Times*, November 1, 2012: A1.

Khimm, Suzy. "How Long is the Immigration Line? As Long as 24 Years." *The Washington Post*, January 31, 2013.

King, John. "Two buildings give campus new flair around its edges," *San Francisco Chronicle*, January 23, 2012: A1.

Leuty, Ron. "Bay Area colleges see spike in Asian giving," *San Francisco Business Times*, February 15-21, 2013: 6.

Perlez, Jane and Helen Gao. "Seeking Edge in Academics, Chinese Spend Summer in U.S." *The New York Times*, August 30, 2013: A4.

"Plight of the sea turtles." *The Economist*, July 6, 2013: 41.

Rauber, Chris. "Stanford breaks ground on \$90 M Li Ka-Shing Center." *San Francisco Business Times*, May 9–15, 2008: 18.

Ruiz, Neil G., Jill H. Wilson and Shyamali Choudhury. "The Search for Skills: Demand for H-1B Immigrant Workers in U.S. Metropolitan Areas." Metropolitan Policy Program, Brookings Institution, July 2012.

San Francisco State University Office of International Programs. "SFSU Chinese Student Enrollment, 2006–12."

Sengupta, Somini. "Bill Allowing More Foreign Workers Stirs a Tech Debate." *The New York Times*, June 28, 2013: B1.

Tan Yingzi. "Chinese flock to US for further education." *China Daily*, November 17, 2010.

U.S. Citizenship and Immigration Services. "F-1, J-1 and H-1B visa information." <http://www.uscis.gov/>.

Wadhwa, Vivek and AnnaLee Saxenian. "America's Immigrant Entrepreneurs: Then and Now." Kauffman Foundation, January 2007.

Wadhwa, Vivek. *The Immigrant Exodus: Why America Is Losing the Global Race to Capture Entrepreneurial Talent*. Wharton School of Business, University of Pennsylvania: Wharton Digital Press, October 2012.

Yang Ning. "Rise in US tuition fees no deterrent." *China Daily USA*, July 25, 2011.

Zhao, Emmeline. "Chinese Students Struggle for Returns on Education in U.S." *China Real Time Report*. *The Wall Street Journal*, March 27, 2013.

Professional Networks/Associations

Asian-American MultiTechnology Association (AAMA). <http://www.aamasv.com/>.

Bradsher, Keith. "In Taiwan, Lamenting a Lost Lead." *The New York Times*, May 13, 2013: B1.

Chinese-American Semiconductor Professional Association (CASPA). <http://www.caspa.com/>.

Hua Yuan Science and Technology Association (HYSTA). <http://www.hysta.org/>.

Monte Jade Science and Technology Association. <http://www.montejade.org/blog/>.

Pfanner, Eric. "Taiwan Chip Industry Powers the Tech World, but Struggles for Status." *The New York Times*, September 16, 2013: B3.

Silicon Valley-China Wireless Technology Association. <http://www.svcwireless.org/svcw/>.

Zhang Qidong. "California group guides Chinese companies into US mainstream." *China Daily USA*, October 26–28, 2012: 9.

Trade and Tourism

Ante, Spencer, Paul Mozur and Shira Ouide. "NSA Fallout: Tech Firms Chill Inside Chin." *The Wall Street Journal*, November 15, 2013.

Areddy, Jim T. "Explosion Kills 3 at Foxconn Plant." *The Wall Street Journal*, May 21, 2011.

Beckett, Lois. "By the Numbers: Life and Death at Foxconn." *ProPublica*, January 27, 2012.

Blumenstein, Rebecca, Andrew Browne and Dinny McMahon. "China Deflects Pressure for Yuan Rise," *The Wall Street Journal*, September 1, 2010: A9.

Bureau of Economic Analysis, U.S. Department of Commerce. "Detailed statistics for cross-border trade: U.S.-China 2011 Services Trade." http://www.bea.gov/international/international_services.htm#detailedstatisticsfor.

China Tourism Academy. "China Outbound Travel Trends." April 12, 2012.

"Chinese Traveler Profile." Visit California survey of 45 outbound travel agencies across China, July 2011.

City of Oakland. "Neighborhood Investment: Oakland Army Base Project." <http://www2.oaklandnet.com/Government/o/CityAdministration/d/NeighborhoodInvestment/o/OaklandArmyBase/index.htm>.

Chun-Wei Yap and Paul Mozur. "China Targets More Clout in Electronics." *The Wall Street Journal*, January 23, 2013: B10.

Duxbury, Sarah. "Free-spending Chinese boost California tourism." *San Francisco Business Times*, February 3–9, 2012.

Duxbury, Sarah. "San Francisco braces for Chinese tourist flood." *San Francisco Business Times*, July 18–24, 2008: 11.

Frangos, Alex. "China Flips Switch to Fancy Exports," *The Wall Street Journal*, March 25, 2013: B1.

Frojo, Renee. "China to become number one tourist market in California." *San Francisco Business Times*, February 21, 2013.

- Frojo, Renee. "North Face, Gap, Levi's tap China's 1.3B consumers." *San Francisco Business Times*, November 2, 2012.
- Goel, Vindu. "Foxconn Audit Finds a Workweek Still Too Long." *The New York Times*, May 17, 2013: B7.
- Governor's Office of Business and Economic Development. "California Data Sheet, April 2013: International Trade and Investment Profile." <http://www.business.ca.gov/Portals/0/AdditionalResources/Docs/2013%20Factsheet%20v2%20-%20CA%20Trade.pdf>.
- Hale, Galina and Bart Hobijn. "The U.S. Content of 'Made in China'." *FRBSF Economic Letter*, Federal Reserve Bank of San Francisco, August 8, 2011.
- Heffernan, Margaret. "What Happened After the Foxconn Suicides?" *CBS MoneyWatch*, August 7, 2013.
- Holmes, Elizabeth. "Stores Push for Chinese Tourists." *The Wall Street Journal*, June 9, 2011.
- Horn, John, Vivien Singer and Jonathan Woetzel. "A Truer Picture of China's Export Machine." *McKinsey Quarterly*, September 2010.
- Jim, Clare. "Smaller Manufacturer Seeks to Take Apple Business from Foxconn." *Reuters*, May 13, 2013.
- Klein, Karen. "Big tourism market: Chinese on Rodeo Drive." *San Francisco Chronicle*, November 25, 2012.
- Kuruvila, Matthai. "Oakland Army Base plan OK'd by City Council." *San Francisco Chronicle*, June 20, 2012.
- Lai, Richard. "Riot Breaks Out at Foxconn Taiyuan Plant, Reportedly Over Guards Beating Up a Worker." *Reuters*, September 23, 2012.
- Lin Yang. "Foxconn Tries to Move Past the iPhone." *The New York Times*, May 7, 2013.
- Liu Jiayi. "Riot in Foxconn's Chengdu Factory; Dozens Arrested." *ZDNet*, June 8, 2012.
- Mance, Henry and Tim Bradshaw. "Google in Patents Deal with Foxconn." *Financial Times*, August 24, 2013: 8.
- Mandiant. *APT1: Exposing One of China's Cyber Espionage Units*. March 2013.
- "Market Profile: China 2011." Office of Travel and Tourism Industries, International Trade Administration, U.S. Department of Commerce, 2012.
- McMahon, Dinny. "Chinese Industrial Subsidies Grow 23%." *The Wall Street Journal*, June 24, 2013.
- Meckler, Laura. "CEOs Ask for Deals, Not Obstacles." *The Wall Street Journal*, January 20, 2011: A6.
- Office of the United States Trade Representative. "2012 Report to Congress on China's WTO Compliance." <http://www.ustr.gov/about-us/press-office/reports-and-publications/2012/report-to-congress-china-wto-compliance>.
- Palmer, Doug. "U.S. Blames China for Breakdown of Trade Talks," *Reuters*, July 17, 2013.
- Port of Oakland. "Projects: Oakland Global Trade & Logistics Center (Former Oakland Army Base Port Development Program)." <http://www.portofoakland.com/maritime/oab.aspx>.
- Rust, Susanne. "California Looks to Milk China's Growing Dairy Demand." *Center for Investigative Reporting*, June 13, 2013. <http://cironline.org/reports/california-looks-milk-china%E2%80%99s-growing-dairy-demand-4726>
- Sherraden, Samuel. "Why Trade Figures Do Not Prove China is Rebalancing." *New America Foundation*, April 27, 2010. http://newamerica.net/publications/policy/why_trade_figures_do_not_prove_china_is_rebalancing.
- United States Census Bureau, U.S. Department of Commerce. "Trade in Goods with China." 1985–2012. <http://www.census.gov/foreign-trade/balance/c5700.html#2012>.
- US-China Business Council. "US Congressional District Exports to China 2003–12."
- USA Trade Online, U.S. Census Bureau, U.S. Department of Commerce. "U.S. Import and Export Data via the San Francisco Customs District for China, Taiwan and Hong Kong, 2008–12." <https://usatrade.census.gov/>.

"When workers dream of a life beyond the factory gates." *The Economist*, December 15, 2012.

Wingfield, Brian. "Talks to Expand Technology Pact Collapse." *Bloomberg*, July 17, 2013.

Young, Eric. "FedEx set to deliver in Oakland." *San Francisco Business Times*, September 28, 2012.

Key Industry Sectors

Architecture and Urban Planning

Davison, Nicola. "Is the Shanghai Tower the world's first eco-friendly skyscraper?" *Chinadialogue.net*, October 14, 2013.

Dineen, J.K. "Land of giant opportunity." *San Francisco Business Times*, February 24–March 1, 2012: 21.

Liu Yujie. "Urban futures." *China Daily*, August 15, 2011: 9.

Paulson, Henry M., Jr. "How Cities Can Save China." *The New York Times*, December 5, 2012: A31.

Qiu Quanlin. "2 cities in bid to cool real estate market." *China Daily*, April 1, 2013: 5.

Ross, Andrew S. "Special report from Shanghai: Bay Area architects leaving imprints on city." *San Francisco Chronicle*, November 13, 2008.

Energy/Environment

Chao, Julie. "Berkeley Lab Creates New Energy Model for Chinese Cities." *Lawrence Berkeley National Laboratory News Center*, September 29, 2010.

Ma, Wayne. "Pollution Forces North China to a Standstill." *The Wall Street Journal*, October 23, 2013.

"Planning Cities for People: A Guide to Prosperous, Low-Carbon Urbanization." Urban design proposal by Climate Works Foundation, Calthorpe Associates, the China Sustainable Energy Program, Institute for Transportation and Development Policy.

Silk, Richard. "Coal Pollution Cuts Life Expectance in China, Study Finds." *The Wall Street Journal*, July 9, 2013.

"Xiamen University Partners with Leading Technology and Energy Providers to Build China's First Direct Current Microgrid." *Smart Grid News*, March 19, 2012.

Cleantech

Andrews, Steven Q. "Beijing's Hazardous Blue Sky." *Chinadialogue.net*, December 5, 2011.

Baker, David R. "Clean energy: U.S. has surplus in trade to China." *San Francisco Chronicle*, March 7, 2013: C1.

Barkley, Tom. "U.S. Targets China's Wind Subsidies." *The Wall Street Journal*, December 23, 2010: A10.

Bay Area Council Economic Institute. "Global Competitiveness, China and California's Emerging Clean Energy Economy." December 2010.

"China to Spend \$315 Million Yearly on Alternative-Energy Cars." *Bloomberg*, May 28, 2012.

Denning, Liam. "China Storms into Wind and Solar Power." *The Wall Street Journal*, August 22, 2011: C8.

Fu Jing and Xie Songxin. "Green energy program drafted." *China Daily*, March 2, 2010.

Johnson, Keith. "U.S. Levies New Tariffs on Chinese Wind Tower." *The Wall Street Journal*, July 30, 2012: B3.

Li Jing. "Industrial zones come clean due to green drive." *China Daily USA*, November 11, 2010: 1.

Liu Yiyu and Zhou Siyu. "China pushes to develop green economy." *China Daily USA*, November 23, 2010.

Plafker, Ted. "China May Soon Put its Sunshine to Use." *The New York Times Global Edition*, September 30, 2010.

Riddell, Lindsay. "Cleantech connection." *San Francisco Business Times*, November 21–27, 2008: 1.

Riddell, Lindsay. "Cleantech runs low on venture capital fuel." *San Francisco Business Times*, February 15–21, 2013: 8.

Riddell, Lindsay. "Dim outlook for Chinese solar industry." *San Francisco Business Times*, November 21–27, 2008: 57.

Riddell, Lindsay. "Electric motorcycle parts maker shifts gears." *San Francisco Business Times*, August 26–September 1, 2011: 5.

Riddell, Lindsay. "Suntech: Tariff will not hurt it." *San Francisco Business Times*, May 25–31, 2013.

Ross, Andrew S. "Zap charges into China's EV market in pivotal deal." *San Francisco Chronicle*, November 25, 2010: D1.

Sandler, Travis & Rosenberg, P.A. "China Terminates Wind Power Equipment Subsidies After U.S. WTO Challenge." *Sandler, Travis & Rosenberg Trade Report*. World Trade/INTERACTIVE, June 8, 2011.

Wang Qian. "Car sales blamed for pollution." *China Daily USA*, November 5–7, 2010.

Banking/Finance

Bradsher, Keith. "China's Banking Leaders Seek to Calm Concerns over Loan Quality." *The New York Times*, November 11, 2012.

Bryso, Jay H. "Will the Renminbi Eventually Rival the Dollar?" *Wells Fargo Bank Economics Group Special Commentary*, August 24, 2011.

Elliott, Douglas J. and Kai Yan. *The Chinese Financial System: An Introduction and Overview*. John L. Thornton China Center at Brookings, July 2013.

Leuty, Ron. "S.F. bank branch heralds new era." *San Francisco Business Times*, October 21–27, 2011: 25.

Li, Cindy. "Shadow Banking in China: Expanding Scale, Evolving Structure." *Asia Focus*. Federal Reserve Bank of San Francisco, April 2013.

Liu Chenggang. "CNH Market – A Burgeoning Offshore RMB Market." Bank of China presentation, September 2011.

Lee, Charles M.C., Kevin K. Li and Ran Zhang. "Shell Games: Are Chinese Reverse Merger Firms Inherently Toxic?" February 19, 2013. [http://leeds-faculty.colorado.edu/zeyun/workshop12-13_files/LLZ%20\(02-19-13\).pdf](http://leeds-faculty.colorado.edu/zeyun/workshop12-13_files/LLZ%20(02-19-13).pdf).

McMillan, Rob. "Silicon Valley Wine Report: State of the Wine Industry, 2013." Wine Division, Silicon Valley Bank.

Qi Liyan and Tom Orlik. "China's Local Governments Boost Borrowing." *The Wall Street Journal*, January 15, 2013: A12.

Rabinovitch, Simon. "China Opens Door Wider to Foreign Investment." *Financial Times*, July 13–14, 2013: 12.

Rabinovitch, Simon. "Mao-Era Saving Habits Shunned as Chinese Get the Good Life on Credit." *Financial Times*, August 29, 2013: 1.

Ross, Andrew S. "SVB Financial opens in Beijing." *San Francisco Chronicle*, October 13, 2010: D1.

Spegele, Brian. "U.K., China to Increase Yuan's Role." *The Wall Street Journal*, October 16, 2013.

Tozzi, John. "Chinese business helpers growing in region." *San Francisco Chronicle*, March 11, 2013.

Tudor, Alison. "Banks Find Promise Unfilled in China Foray." *The Wall Street Journal*, January 14, 2013.

Wei Lingling. "Landscape Shifts for China Banks." *The Wall Street Journal*, November 12, 2012: C1.

Wei Lingling. "New move to Make Yuan a Global Currency." *The Wall Street Journal*, January 12, 2011.

Yu Ran and Wei Tian. "China launches 1st free trade zone." *China Daily USA*, August 23, 2013.

Zhang Yuwei. "The 11-square-mile experiment." *China Daily USA*, October 25, 2013.

Mobile/Internet

Brustein, Joshua. "Yahoo's worth without Alibaba? Not much." *San Francisco Chronicle*, October 17, 2013.

Chen, Lulu Yilun. "Google Looks to China Gathering to Help Growth." *San Francisco Chronicle*, March 3, 2013: D7.

Dalton, Matthew. "Europe Raises Cry over Chinese Technology." *The Wall Street Journal*, October 6, 2010.

Fu Jing. "Up, up, Huawei finds new friends in Europe nations." *China Daily USA*, October 31, 2013.

Gao Yuan. "Nation sees world's biggest growth in smartphone sales." *China Daily USA*, November 7, 2013.

Hille, Katherine. "Huawei Pledges to Open Up." *Financial Times*, January 22, 2013: 15.

Hille, Katherine. "Huawei Shifts Focus After US U-Turn." *Financial Times*, April 30, 2013: 15.

Mozur, Paul. "China Vexes Smartphone Makers." *The Wall Street Journal*, June 29, 2012.

Mozur, Paul. "In China, iPhone Fights to Stay Cool." *The Wall Street Journal*, September 14, 2012.

Mozur, Paul. "How Upstart Xiaomi Rattled China's Smartphone Race." *The Wall Street Journal*, October 8, 2013.

Mozur, Paul and Juro Osawa. "Web Spree Takes China." *The Wall Street Journal*, November 12, 2013.

Osawa, Juro. "Huawei Will Put Big Deals on Hold." *The Wall Street Journal*, October 11, 2013.

"The company that spooked the world." *The Economist*, August 4, 2012: 19.

Wakabayashi, Daisuke, Lorraine Luk, Ian Sherr and Paul Mazur. "Apple Nears Major Chinese Expansion." *The Wall Street Journal*, September 7, 2013.

Law

"Cooley Opens China Office." Cooley LLP press release, December 13, 2011.

Haynes, William-Arthur. "Pillsbury Gets China Group from Thelen." *Silicon Valley Business Journal*, October 3, 2008.

Young, Eric. "Wilson Sonsini expands in China." *San Francisco Business Times*, January 11–17, 2013: 12.

Life Sciences/Healthcare

Burkitt, Laurie. "China Calls for Health System Overhaul." *The Wall Street Journal*, July 25, 2012.

"China's Health Reform and Economy: Where It's Heading." Presentation by Gordon G. Liu, PhD, Peking University Guanghua School of Management, at the Stanford Asian Health Policy Program, May 29, 2012.

Freeman, Charles W., III and, Xiaoqing Lu Boynton, editors. *Implementing Health Care Reform Policies in China*. A Report of the CSIS Freeman Chair in China Studies, Center for Strategic and International Studies, December 2011.

Le Deu, Franck, et al. "Health Care in China: Entering 'Uncharted Waters'." McKinsey & Company Healthcare Systems and Services Practice, November 2012.

Leuty, Ron. "Bay Area companies with big China markets face increased scrutiny at home and abroad." *San Francisco Business Times*, October 18, 2013.

Nussbaum, Alex. "China wants drugmakers to discount their wares." *San Francisco Chronicle*, April 10, 2013.

Torres, Blanca and Ron Leuty. "Chinese cash seeks to build next bio hub." *San Francisco Business Times*, December 21–27, 2012: 1.

Xu, Sue. "Investor Q&A: Profile—Dr. Dan Zhang, Founder and CEO, Fountain Medical Development." *China Life Sciences Newsletter*. Morrison & Foerster, January 2013.

Wu, Yvonne, Mike Braun and Flora Ma. "The Next Phase: Opportunities in China's Pharmaceuticals Market." *Deloitte China Life Sciences and Health Care*, November 2011.

Wu, Yvonne and Andrew Chen. "Life Sciences and Health Care in China." *Deloitte China Life Sciences and Health Care*, 2012.

Investment

Berkitt, Laurie, "USA, Inc. a Division of China Corp." *The Wall Street Journal*, May 31, 2013.

Bradsher, Keith and Michael J. De La Merced. "China Woos Overseas Companies, Looking for Deals," *The New York Times*, December 12, 2012: B1.

Browne, Andrew. "U.S. Firms Criticize Chinese Policy." *The Wall Street Journal*, April 27, 2010: A13.

Deloitte. *China Real Estate Investment Handbook*. 2012 edition.

Dolan, Matthew and Craig Carmen. "China Moves to U.S. Projects." *The Wall Street Journal*, October 29, 2013.

Donato-Weinstein, Nathan. "Chinese investors circle Silicon Valley real estate market." *Silicon Valley Business Journal*, October 19, 2012,: 1.

Frojo, Rene. "Luxury boutique hotel coming to Pacific Heights." *San Francisco Business Times*, October 25, 2013.

"Jerry Brown in China: Chasing the dragon." *The Economist*, April 13, 2013: 33.

Kidder Matthews. "China Services." <http://www.kiddermathews.com/services/china.php>. Accessed Fall 2013.

Li Jiabao. "China passes US as top FDI destination." *China Daily USA*, October 26–28, 2012:1.

Mergermarket Group and Squire Sanders. *Global M&A Series: China Outbound M&A Trends*. 2012.

Orlik, Tom. "Investors Shift Money Out of China." *The Wall Street Journal*, August 15, 2012: A6.

Pollack, Andrew. "Chinese Company to Acquire DNA Sequencing Firm." *The New York Times*, September 17, 2012.

Riddell, Lindsay. "China's Gold Rush." *San Francisco Business Times*, November 2–8, 2012: 23.

Ross, Andrew S. "Chinese firms make gains with Bay Area projects." *San Francisco Chronicle*, December 03, 2012: D1

Ross, Andrew S. "Partnership to broker U.S.-China businesses." *San Francisco Chronicle*, March 9, 2012: A1.

Rusli, Evelyn and Paul Mozur. "China Taps Silicon Valley." *The Wall Street Journal*, November 5, 2013.

Segall, Eli. "Bank, angel, VC firm partner on China-focused incubator." *San Francisco Business Times*, April 13, 2012: 5.

Schindelheim, David. "Variable Interest Entity Structured in the People's Republic of China: Is Uncertainty for Foreign Investors Part of China's Economic Development Plan?" *Cardozo Journal of International and Comparative Law*. Benjamin N. Cardozo School of Law, Cornell University, December 11, 2012.

Schubarth, Cromwell. "Q&A: Victor Wang on why his San Jose incubator is best route to China." *Silicon Valley Business Journal*, March 1, 2013.

Terlep, Sharon. "China Steps Up Buying in U.S." *The Wall Street Journal*, February 9, 2013.

"The Future of VIEs in China." Presentation by Thomas Shoesmith, Pillsbury China Practice at the SVC Wireless and Mobile Conference, 2012.

"Tishman Speyer, China Vanke to build San Francisco condo towers." *San Francisco Business Times*, February 19, 2013.

Tozzi, John. "China's Next Export: Venture Capital." *Bloomberg Businessweek*, May 17, 2012.

Wang Ying. "Affluent Chinese pursue overseas properties." *China Daily USA*, August 28, 2013.

Zhao Yanrong. "Good time for foreign investment in real estate." *China Daily USA*, October 20, 2012.

Connectors

Arns, Christopher. "California opens trade office in China." *Sacramento Business Journal*, April 12, 2013.

Cain, Josh. "Darlene Chiu Bryant hunts new deals for ChinaSF." *San Francisco Business Times*, March 15, 2013.

Chang Jun. "Z-Park hosts a high-tech contest." *China Daily USA*, October 14, 2013.

Chen Jia. "Jobs creation tied to investment." *China Daily USA*, August 9, 2013.

Department of Homeland Security, Office of the Inspector General. *United States Citizenship and Immigration Services' Employment-Based Fifth Preference (EB-5) Regional Center Program*. December 2013.

Grimaldi, James V., Angus Loten and Vanessa O'Connell. "Chinese Investors Get Picky Over U.S. Visa-for-Cash Deal." *The Wall Street Journal*, March 19, 2013: 1.

Kuruwila, Matthai. "Brown unveils Oakland waterfront deal." *San Francisco Chronicle*, April 19, 2013.

Leuty, Ron. "Chinese pay to play visa game." *San Francisco Business Times*, March 16-22, 2012: 1.

Olivo, Antonio. "Fast track to the American dream." *Chicago Tribune*, July 15, 2012.

Ross, Andrew. "Trading green cards for money." *San Francisco Chronicle*, July 7, 2013.

Ross, Andrew S. "California's China trade office open for business; more deals signed." *Bottom Line*, *SFGate.com*. April 12, 2013.

<http://blog.sfgate.com/bottomline/2013/04/12/californias-china-trade-office-open-for-business-more-deals-signed/>.

Torres, Blanca. "Tom Henderson's Chinese empire." *San Francisco Business Times*, July 12, 2013.





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