Mundell Revisited: A simple approach to the Costs and Benefits of a Single Currency Area

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Abstract

This paper develops an analytical model to evaluate the costs and benefits of a single currency area within a unified framework, inspired by the separate arguments of Mundell (1961) and (1973). The more familiar argument is that, in the presence of country-specific shocks, a single currency area imposes a welfare cost associated with the lack of exchange rate adjustment. But Mundell (1973) argues that a single currency area offers risk-sharing benefits in the face of country-specific shocks and restricted ability for capital markets to facilitate consumption insurance. In our model, a single currency area, as compared with a system of national currencies and floating exchange rates, brings both welfare costs associated with the absence of exchange rate adjustment and welfare benefits associated with risk-sharing. The model provides a utility-based comparison of costs versus benefits. While theoretically, either monetary regime may dominate, quantitatively, the net welfare benefits of a single currency area are likely to be negative.

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1. Introduction

The debate on the integration of national currencies has not ended with the establishment of the euro area. Instead, attention has been focused on the degree to which the European Central Bank policy can sustain a “one-size fits all” monetary policy, and at the same time, commentators have discussed the merits of proposals to establish single currency areas in North America and Latin America, and in East Asia (e.g. McCallum 2000, Eichengreen 1998, Bayoumi and Eichengreen, 2000).

There has been a wide literature documenting the pros and cons of a single currency (see De Grauwe 1994 for early references). Broadly speaking, most of the critics of the euro area argued that the 11 countries of Europe did not comprise an “optimal currency area”, along the lines of Mundell (1963), McKinnon (1963) and Kenen (1969). The proponents, on the other hand, argued for the transactions and efficiency benefits of eliminating national currencies, as well as the “non-economic” benefits associated with enhancing the European Union. It is fair to say, however, that at an analytical level, there has been much more attention paid to the costs of a single currency area, in terms of the absent adjustment role of the exchange rate, and the lack of independent monetary policy, than there has been to the economic benefits of a single currency[1].

Recently, McKinnon (2000) has highlighted a less well known contribution by Mundell (1973), who develops an argument for a single currency based on the risk-sharing benefits of using a common means of exchange among regions that are hit by idiosyncratic shocks. Mundell’s perspective is implicitly one where consumption insurance via the use of international private capital markets is difficult or impossible to attain, due to market incompleteness, or the absence of “stabilizing speculation”. Then, in a system of flexible exchange rates, the full extent of a negative shock has to be absorbed within a country, while under a common currency regime, a country can run a balance of payments deficit by running down its holdings of the international currency.

Although the development of private international capital markets has proceeded dramatically since the time of Mundell’s writing, there is still substantial evidence that capital markets do not provide much international consumption insurance (e.g. OR). In addition, when we focus on emerging market economies, capital market constraints seem to be even more binding, as generally these economies find it impossible to issue debt denominated in national currencies.

One interesting aspect about the Mundell (1973) argument is that the potential benefits of a single currency - the existence of idiosyncratic national shocks, represents exactly the environment in which the Mundell (1961) “optimal currency area” index would point towards the benefit of separate national currencies with floating exchange rates. Thus, the two arguments may seem at odds with one another[2].

1 See however Voss (1998), for a notable exception. Voss identifies a risk-sharing benefit of a single currency area similar to that of Mundell (1973) (see below), the key difference being that in Voss’s mechanism, a single currency area central bank plays an active contingent redistributive role through its use of seigniorage revenue.

2 Mundell (1973) develops a simple exchange economy model where there is a benefit from use of money flows to cushion movements in national endowments. But he does not allow for any nominal rigidities.

The purpose of this short paper is to develop a very simple model which encompasses both the costs and benefits of a single currency, based on Mundell's two papers, within the one modelling framework. In our model, there are two countries, each of which is hit by separate country specific shocks. There are also nominal rigidities, which make it desirable to have exchange rate adjustment when confronted by shocks. But at the same time, there are strong limitations on capital markets which prevent international risk-sharing taking place even if national exchange rates can adjust. The establishment of a common world currency allows for risk sharing through flows of money from one country to another in response to country-specific shocks. Thus, the model encompasses both the costs *and the benefits* of a single currency, within the one framework. In addition, as in Mundell (1961) and (1973), both the costs and benefits are related to the presence of country-specific productivity shocks.

Our model implies that from a theoretical point of view, a single currency can offer either net gains or net losses, relative to a system of national currencies and floating exchange rates. As to be expected, when net losses are more likely, the more important are nominal rigidities. When net gains are more likely, the more important is the transactions role for money in the economy. One clear result we note is that an increase in the variability of country specific shocks does not necessarily increase the desirability of national currencies with flexible exchange rates. This represents a caution for much of the empirical work that has been conducted in this area.

On a very rough quantitative calibration, however, we find that in general the likelihood is that the presence of country specific shocks will make a floating exchange rates more desirable. While the welfare differences between the two regimes are very small in our model, for a reasonable configuration of parameter values we find that the Mundell (1961) argument for an optimal currency area to enhance adjustment to region specific shocks tends to dominate the Mundell (1973) argument for a single world money to enhance international risk sharing.

The rest of the paper is organized as follows. Section 2 below outlines the model. Section 3 illustrates the model when national currencies and floating exchange rates exist. Section 4 shows the costs of a policy of unilaterally pegging the exchange rate for a single country. Section 5 sets out the effects of a single currency area, highlighting both the costs and benefits. Section 6 offers some brief conclusions.

2. The Model

Take a model of two countries, called "home" and "foreign". Preferences are identical across countries. There is just one world goods. In addition, there is only one period. Wages must be set in advance before the state of the world is known. This is a starkly simplified environment, but it suffices to draw out clearly the trade-off between costs and benefits of a single currency area as outlined in the two Mundell papers.

2.1. Households

Within each country, there is a unit measure of individuals or "households". An individual supplies labour to a final goods firm, and receives profits from ownership of a firm. In addition, the individual consumes some of the final goods, and holds real balances. Home country consumer i maximizes the following utility function:

(2.1) $$EU = E(\ln(C_i) + \gamma \ln(\frac{M_i}{P}) - \eta \frac{h_i^{1+\psi}}{1+\psi})$$

subject to the budget constraint:

(2.2) $$P(s)C_i(s) + M_i(s) = W_i h_i(s) + \Pi_i(s) + M_{i0} + T_i(s)$$

where $C_i(s)$ is consumption at state s, $P(s)$ is the final goods price, $M_i(s)$ is the quantity of domestic money held, with M_{i0} being initial money holdings and $T_i(s)$ a money transfer from the government/central bank, W_i is the preset wage for individual i, $h_i(s)$ is total hours worked, and $\Pi_i(s)$ is profit income.

The household sets the wage in advance, and then chooses consumption and money balances after the state of the world has been revealed.

2.2. Firms

The final goods firm in the home country uses labour to produce output. Labour is differentiated across households. Define the composite labour supply as $H(s)$, where $H(s) = \left(\int_0^1 h_i^{\frac{(\rho-1)}{\rho}}(s)di \right)^{\frac{\rho}{(\rho-1)}}$. The final goods firm has the production function:

(2.3) $Y(s) = \theta(s)H(s)^{(1-\alpha)}$.

The final goods firm chooses employment to maximize profits given the set of wage rates it faces. This implies an implicit labour demand schedule:

(2.4) $$P(s)(1-\alpha)\frac{Y(s)}{H(s)}\left(\frac{h_i(s)}{H(s)}\right)^{-\frac{1}{\rho}} = W_i$$

Each worker i faces a downward sloping labour demand curve, given by equation (2.4). Wages are determined in advance. The worker chooses the wage to maximize expected utility as given in equation (2.1) subject to equation (2.4). This gives the resulting wage[3]:

(2.5) $$W_i = \frac{\rho}{\rho-1}\eta\frac{Eh_i^{1+\psi}}{E(\frac{h_i}{PC_i})}$$

3 In this derivation, we take into account that the worker will choose consumption and money balances optimally in the second stage, after the state of the world has been chosen.

Given the wage, employment is determined by the demand for labour (equation (2.4)). Since each individual within a country is alike, we can dispense with the individual-specific subscripts, and thus, we must have $H(s) = h(s)$.

After the state of the world has been revealed, the home household chooses consumption and money balances to maximize *ex post* utility, taking the wage and employment as given. Thus we have

(2.6)
$$C(s) = \frac{1}{1+\gamma}\frac{Wh(s)+\Pi(s)+M_0+T(s)}{P(s)}$$

and

(2.7)
$$\frac{M(s)}{P(s)} = \gamma C(s).$$

Profits are defined as

$$\Pi(s) = P(s)\theta(s)h(s)^{1-\alpha} - Wh(s)$$

The conditions pertaining to the foreign economy are exactly analogous.

Since there is free trade in the world economy, it must be true that PPP holds at all time, so that

$$P(s) = S(s)P^*(s)$$

where S is the exchange rate. Finally, the world goods market must clear, so that

$$Y(s) + Y^*(s) = C(s) + C^*(s).$$

3. Floating Exchange Rates

Now we look at the operation of the model under a freely floating exchange rate. Under this environment, the monetary authority makes no commitment to purchase or sell foreign currency in order to protect the value of the exchange rate. Domestic households hold all domestic currency. Therefore the home country money supply is

$$M(s) = M_0 + T(s).$$

It follows from equation (2.2) that

(3.1)
$$C(s) = \theta(s)h(s)^{1-\alpha} = \theta(s)\left(\frac{W}{\theta(s)(1-\alpha)P(s)}\right)^{-\frac{1-\alpha}{\alpha}}$$

Equation (3.1), along with equation (2.7), determines the equilibrium value of consumption and the domestic price level under a floating exchange rate[4]. The equilibrium price is

(3.2)
$$P(s)=\left(\frac{M(s)}{\gamma}\right)^{\alpha}\left(\frac{W}{1-\alpha}\right)^{1-\alpha}\frac{1}{\theta(s)}$$

and the exchange rate is

(3.3)
$$S(s)=\left(\frac{M(s)}{M*(s)}\right)^{\alpha}\left(\frac{W(s)}{W*(s)}\right)^{1-\alpha}\frac{\theta*(s)}{\theta(s)}$$

From equations (3.1) and (3.2) we can establish that employment under floating exchange rates is given by

(3.4)
$$h(s)=\left(\frac{M(s)}{W}\right)\left(\frac{1-\alpha}{\gamma}\right)$$

Note from equation (3.4) that if the money supply is non-stochastic, then employment is constant, independent of the productivity shock. But this also means that $C(s)\,P(s)$ is non-stochastic, so from the wage setting equation (2.5), there is no effective uncertainty for workers choosing wages *ex ante*. In other words, the equilibrium wage that would hold in the flexible wage economy is unaffected by productivity shocks, and therefore non-stochastic. As a result, without monetary uncertainty, the economy under floating exchange rates in fact replicates the allocation of a flexible wage economy.

4. Fixed Exchange Rates

Now let us look at the equilibrium under a fixed exchange rate regime in which the home government adjusts its transfer policy (domestic credit) in order to keep the exchange rate fixed at S=1. Under a unilaterally fixed exchange rate, it is still the case that consumption equals income for the home economy. But now the home price level must equal $P^*(s)$. As a result, home country employment is

(4.1)
$$h(s)=\left(\frac{M^*(s)}{W^*}\right)\left(\frac{1-\alpha}{\gamma}\right)\left(\frac{W}{W*}\right)^{-1/\alpha}\left(\frac{\theta(s)}{\theta^*(s)}\right)^{1/\alpha}$$

In contrast to equation (3.4), employment will now be positively influenced by domestic country productivity shocks, and negatively influenced by foreign country productivity shocks. This makes sense,

4 Note that in this model, a floating exchange rate implies that the trade account is always zero, and, because the home and foreign final goods are perfect substitutes, there is no trade between countries. This property of the model could easily be altered by allowing home and foreign final goods to be imperfect subsitutes. But the results would be unaltered, as long as the elasticity of substitution across goods was high enough, and the alternative formulation would forfeit most of the simple analytical properties of the current specification.

since under a floating exchange rate, a home productivity shock would lead to a fall in the home price and an exchange rate appreciation. To eliminate this, the authorities must expand the home country money supply, which increases home employment.

Note that since both employment and nominal consumption (which is proportional to the home money stock) for the home country is variable, then by equation (2.5) it must be the case that the pre-set wage cannot always equal the *ex post* labour market clearing wage - thus wage stickiness has real effects under the unilateral fixed exchange rate.

How does the unilateral peg affect expected employment and output in the home country economy? Take equation (2.5) again, and note that since, in equilibrium, home country employment satisfies $(1-\alpha)PC = Wh$, we must have employment satisfying

(4.2) $$1 = \omega E h^{1+\psi}$$

where $\omega = \dfrac{\rho\eta}{(\rho-1)(1-\alpha)}$. Since $h^{1+\psi}$ is a convex function, an increase in the variance of h generated by the fixed exchange rate must lower expected h, in order to keep the expression $Eh^{1+\psi}$ constant. As a result, expected employment must be lower under fixed exchange rates. It immediately shows that expected home country utility is lower under fixed exchange rates. This result is not surprising. With pre-set money wages, the exchange rate plays a key role in this economy in helping the price level to adjust to country specific shocks. When the price level is pinned down by the need to maintain a unilateral peg, the economy cannot respond adequately to these shocks.

5. A Single Currency Area (SCA)

The analysis of a unilateral peg is revealing, but it is not identical to a single currency area. In order to identify the cost-benefit trade-off implicit in Mundell's papers, we now look at the case of a single currency area encompassing both the home and foreign country. This regime differs from the unilateral pegged exchange rate in one critical way: the policy rule is no longer asymmetric in that one country has to adjust its monetary policy to maintain the peg. Rather, there is a common currency which is acceptable to residents of both countries. The common currency introduces the possibility that there may be real transfers of goods for money across countries. Consumption no longer need necessarily equal income for each country. This is the feature of the single currency area stressed in Mundell (1973). In and of itself, this feature allows for some risk-sharing between countries that may not exist under separate currency regimes. But against this risk-gain, there is the standard efficiency loss by the inability of the exchange rate to respond to shocks. We want to examine the nature of this trade-off.

In a single currency area, there is just one money which is held by households in both the home and foreign economies. The household in the home economy has the budget constraint (equation (2.2)) but since the money stock initially held by the home country residents may be exchanged with foreign residents, it is no longer the case that home income must equal home consumption. Home consumption demand is given by equation (2.6) and money demand by equation (2.7), as before. But now money market clearing is given by

(5.1) $$\bar{M}(s) = M_0 + M_0^* + T(s) + T^*(s) = \gamma P(s)(C(s) + C^*(s))$$

Substituting from equation (2.6) into equation (2.4) gives the solution for the world price level in a single currency area as

(5.2) $$P(s) = \frac{1}{\gamma}\frac{\bar{M}(s)}{(\theta(s)h^{(1-\alpha)} + \theta^*(s)h^{*(1-\alpha)})}$$

From equation (5.2) we can substitute back into equation (2.6) to get the solution for consumption as

(5.3) $$C(s) = \frac{1}{1+\gamma}(\theta(s)h^{(1-\alpha)}(1+\gamma m(s)) + \gamma m(s)\theta^*(s)h^{*(1-\alpha)})$$

where $m(s) = \dfrac{M_0 + T(s)}{\bar{M}(s)}$.

Equation (5.3) establishes that the single currency area allows for a degree of cross country risk sharing, to the extent that agents value money holdings ($\gamma > 0$). The mechanism works through the impact of productivity shocks in any one country on the world price level. Say that the foreign country experiences a positive productivity shock. This will reduce the world price level through equation (5.2) and raise the real value of the home country's nominal balances. Thus, home country consumption rises. Effectively, the rise in foreign country income encourages it to hold both higher money balances and increase consumption. The fall in the world price level encourages the home consumer to exchange money balances for consumption. Both countries gain as a result of the productivity shock. This captures the risk-sharing arguments for a single currency made by Mundell (1973).

But equation (5.3) is only a partial solution, because employment is endogenous as well. The full effects of the single currency area depend on what happens to employment. First, let's look at the fully flexible wage case. In that case, wages are set *ex post*, and labour supply and demand are equated. It is straightforward then to show that

(5.4) $$h(s) = \left(\omega\frac{\theta(s)}{C(s)}\right)^{\frac{1}{\psi+\alpha}}$$

Employment is no longer necessarily constant, even with flexible wages, because consumption and productivity shocks are not necessarily proportional to one another when there is implicit risk-sharing taking place in the single currency area.

Substitute equation (5.4) into equation (5.3) and we obtain

(5.5) $$C(s) = \frac{\omega^{\frac{(1-\alpha)}{(\psi+\alpha)}}}{(1+\gamma)}\left((1+\gamma m(s))\left(\frac{\theta(s)}{C(s)}\right)^{\frac{1+\psi}{\psi+\alpha}}C(s) + \gamma m(s)\left(\frac{\theta^*(s)}{C^*(s)}\right)^{\frac{1+\psi}{\psi+\alpha}}C^*(s)\right)$$

Equation (5.5) and the corresponding equation for the foreign country give the implicit solution for home and foreign consumption in the flexible wage case with a single currency area. The degree of implicit risk-sharing that takes place depends on the share of world money that is initially held by each country. But there is always some value of $m(s)$ at which both countries are better off in the single currency area than under floating exchange rates.

In the single currency economy, employment is no longer independent of productivity shocks, even with flexible prices. This is because in face of a productivity increase in the home economy for instance, consumption will rise only a fraction of the increase in productivity, allowing for foreign consumption also to rise. This means that domestic employment (e.g. equation (5.4)) will rise, while foreign employment will fall.

The benefits of a single currency in this environment arise from the ability of the country to run balance of payments deficits or surpluses, drawing on their reserve holdings of the regionwide currency. In a dynamic model, this role could be played by trade in nominal bonds. But under floating exchange rates, there is a risk with nominal bond trade that one country might resort to surprise inflation to reduce the real value of outstanding asset claims. Empirically, only a few countries can issue bonds denominated in their own currencies, as documented by Eichengreen and Hausmann (1999)[5]. McKinnon (2000) has suggested that the establishment of the euro as a single currency for Europe may enhance the development of capital markets that facilitate risk-sharing that would not take place within a system of national currencies and floating exchange rates. Thus, according to this perspective, the risk-sharing benefits of a single currency area might even be underestimated by our analysis.

Now let us address the central trade-off in the paper, the case of a single currency area where there exists nominal wage stickiness. Equations (5.2) and (5.3) still hold as before, but now since wages are pre-set, equation (4.4) does not hold. Instead, employment is determined by

(5.6)
$$h(s) = \left(\frac{W}{P(s)\theta(s)(1-\alpha)} \right)^{-\frac{1}{\alpha}},$$

in the home economy. Substitute equation (5.6) and the analogous equation for the foreign economy into equation (5.2) to obtain the solution for the world price level as

(5.7)
$$P(s) = \gamma^{-\alpha}(1-\alpha)^{-(1-\alpha)} \frac{\bar{M}(s)^{\alpha}}{(\theta(s)^{\frac{1}{\alpha}} W^{-\frac{(1-\alpha)}{\alpha}} + \theta(s)^{*\frac{1}{\alpha}} W^{*-\frac{(1-\alpha)}{\alpha}})^{\alpha}}$$

Note that when productivity shocks are equal across countries, and there is no monetary variability, then equations (5.6) and (5.7) indicate that employment is constant. This means that the pre-set nominal

5 Of course, in an infinite horizon model, trade in indexed, non-contingent bonds could provide both inflation security and a high degree of risk sharing, even under floating exchange rates, as long as country specific shocks were relatively transitory. For permanent shocks, real non-contingent bonds cannot share risk effectively. Our analysis is therefore perhaps better thought of as pertaining to either a) an environment with permanent country specific shocks, or b) an environment where the horizon is limited, either because of political myopia, or problems of private contract enforcement.

wage is exactly equal to the market clearing wage, *ex post*, and there is no effect of nominal wage stickiness, as in the floating exchange rate regime. But in general, this will not happen, since technology shocks can differ across countries. This leads to movements in employment, and wage stickiness has real effect.

Now, using equations (5.3) and (5.6), we obtain the implicit solutions for home consumption given by

(5.8) $$C(s)=\frac{1}{1+\gamma}\left(\theta(s)^{\frac{1}{\alpha}}\left(\frac{W}{P(s)(1-\alpha)}\right)^{-\frac{(1-\alpha)}{\alpha}}(1+\gamma m(s))+\gamma m(s)\theta(s)^{*\frac{1}{\alpha}}\left(\frac{W^{*}}{P(s)(1-\alpha)}\right)^{-\frac{(1-\alpha)}{\alpha}}\right)$$

Equation (5.8) indicates that the single currency area sustains some international risk-sharing, as was seen for the flexible price economy of equation (5.5). But at the same time, given sticky nominal wages, output and employment respond by too much to productivity shocks.

Given equations (5.6), (5.7) and (5.8), wages can be determined by equation (2.5).

Again, let us focus on a particular special case. Say that there is no monetary uncertainty, and assume that the home and foreign productivity disturbances are independent and identically distributed. In addition, it is then natural to assume that the allocation of initial reserves is such that $m=\frac{1}{2}$. Then the pre-set wages must be identical in the two economies, and the solution for the world price level and home consumption:

(5.9) $$P(s)=\gamma^{-\alpha}(1-\alpha)^{-(1-\alpha)}\frac{\bar{M}^{\alpha}W^{1-\alpha}}{\left(\theta(s)^{\frac{1}{\alpha}}+\theta(s)^{*\frac{1}{\alpha}}\right)^{\alpha}}$$

(5.10) $$C(s)=\frac{1}{1+\gamma}\left(\left(1+\frac{\gamma}{2}\right)\theta(s)^{\frac{1}{\alpha}}+\frac{\gamma}{2}\theta(s)^{*\frac{1}{\alpha}}\right)\left(\theta(s)^{\frac{1}{\alpha}}+\theta(s)^{*\frac{1}{\alpha}}\right)^{-(1-\alpha)}\left(\frac{W}{\bar{M}}\frac{\gamma}{(1-\alpha)}\right)^{-(1-\alpha)}$$

Equation (5.10) again makes clear the costs and benefits of the single currency area. On the one hand, there is some international risk-sharing, as was seen for the flexible price case. This risk sharing is not available in the flexible exchange rate economy with limited international capital markets. But on the other hand, the absence of the exchange rate as an adjustment device means that domestic prices cannot respond enough to productivity disturbances. As a result, output and employment respond by too much to these disturbances, generating a welfare loss from the single currency area, relative to the flexible exchange rate regime.

Finally, wages are set according to equation (2.5). Thus, equations (2.5), (5.6), (5.9), (5.10), and the corresponding equations for foreign employment and consumption, give six equations in the variables W, $P(s)$, $h^{*}(s)$, $h(s)$, $C(s)$, $C^{*}(s)$, which characterises the equilibrium under the single currency area with pre-set nominal wages.

Note that in this case, the sole difference between floating exchange rates and the single currency area arise from country-specific productivity shocks. If productivity shocks were identical, then consumption, employment and welfare would be the same across regimes. The presence of country specific productivity shocks offers risk-sharing benefits from a single currency area, on the one hand, but adjustment benefits from floating exchange rates (or non-adjustment costs from a single currency area) on the other. Thus, both costs and benefits of a single currency area are related to country specific shocks, as in Mundell (1961) and (1973).

The model therefore implies that in principle, there are both costs and benefits to a single currency area, as compared to a free floating exchange rate regime (while there are no gains at all to a unilateral pegged exchange rate regime). The question of whether costs exceed benefits is a quantitative issue. Therefore, we now provide a rough calibration of the model to provide insight into the critical welfare-related parameter values.

With a one-period model it is hard to argue that we can calibrate easily to real-world data. Rather than attempting to achieve empirical accuracy, we merely take some suggestive cases. Table 1 describes the parameters used. We let the joint distribution of technology shocks be symmetric and have standard deviation δ[6]. The elasticity of labour supply is set at unity, and the elasticity of substitution between differentiated labour is set so that the average mark-up of the wage over the marginal dis-utility of working is 10 percent. Although this is not directly grounded on empirical evidence, it does square with the usual mark-up parameter used in sticky price models . The parameter γ is important, because it controls the degree to which the single currency area facilitates risk sharing through flows of money across regions. We set this equal to unity, and then allow for a higher figure of three. The share of non-labour income in final output, α, is also important, because the higher this parameter is, the less important is wage stickiness for the outcome, since as α rises variable employment has less of an effect on output and consumption. We set this share equal to 0.4 initially, and let it rise to 0.8. Finally, we let the standard deviation of productivity shocks range from five percent to 10 percent.

In table 1, the parameter τ measures the proportion of consumption under the single currency area that a resident of either country would need to make them equally as well off as under a free floating exchange rate regime. If τ is positive, then floating exchange rates dominate. But if τ is negative, the single currency area welfare-dominates.

The table indicates that for low values of α, the floating exchange rate dominates, either in the case with γ=1 or γ=3. But for higher α, the single currency area can be preferable. But the welfare difference between the regimes is small, as might be expected. Even for a 10 percent standard deviation of productivity shocks, and a high labour share, (low capital share), agents would need only a 1.2 percent increase in consumption under the single currency area to make them indifferent to moving towards a floating exchange rate regime. In the case where the single currency area dominates, the welfare gains are even smaller. When γ is three, and for a 10 percent standard deviation of productivity shocks, welfare would be reduced to that of a floating exchange rate with just less than two tenths of one percent cut in consumption.

6 The states are {(1+δ), (1-δ)}, {(1+δ), (1+δ)}, {(1-δ), (1-δ)}, {(1-δ), (1+δ)}, each with probability 0.25.

The table also illustrates the principle that we discussed above: the presence of country specific productivity shocks may either raise or lower the case for flexible exchange rates relative to a single currency, depending on the other parameters of the model.

6. Conclusions

This paper has set out a simple framework within which to examine the costs and benefits to a single currency area from a utility-based perspective, where both costs and benefits are related to the original suggestions of Mundell (1961) and Mundell (1973). The model implies that asymmetric national shocks may not necessarily increase the cost of a single currency. In fact, through the risk sharing implicit in a single currency, they may increase the benefits. Our calibrated model suggests that, in general, the costs will exceed the benefits. There are clearly a lot of questions left unanswered by our analysis. Principally we would like to know how a single currency area is likely to spur the growth of capital markets as vehicles for enhanced risk-sharing within the area. These questions are left for future work.

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Table 1

γ	δ	α	τ	γ	δ	α	τ
1	0.05	0.4	0.003	3	0.05	0.4	0.002
1	0.1	0.4	0.012	3	0.1	0.4	0.007
1	0.05	0.8	-0.0002	3	0.05	0.8	-0.0004
1	0.1	0.8	-0.0007	3	0.1	0.8	-0.0017

Parameters: η=1, ψ=1, ρ=11.