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Monetary Union Dynamics with Unsustainable Public Debt

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Abstract

The goal of this paper is to model the dynamics of an economy belonging to a monetary union, when the possibility of leaving that union arises. For this, we extend the Drazen-Helpman (1990) model, introducing a new component of the interest rate, i.e. the "spread", that allows for bridging the interest rates' dynamics inside the union with the anticipated future outside the union.

In the context of the neoclassical Ramsey infinite horizon model, with optimizing individuals and competitive markets, the spread, differently from inflation, affects the real side of the economy as a sort of distortionary taxation on investments. This implies that a country belonging to the monetary union but characterized by weak public finances will suffer from lower capital accumulation, lower output, and lower consumption levels than the ones achievable by the steady state "golden rule". In reality, we will show that Pareto-optimality requires either to embrace the path to a fiscal union or to break-up.

In this paper the focus is on the break-up option, when public debt becomes unsustainable. We analyse the dynamics of the economy before and after the break-up, with specific attention to interest rates, capital accumulation and exchange rate. We derive that the nominal interest rate will not change around the break-up event, thanks to the "bridging" property of the spread. The real interest rate instead will decrease, and consumption will jump down, allowing for higher investments necessary to reconstitute the optimal stock of capital. The exchange rate will overshoot initially and then will appreciate, converging toward the new equilibrium level.

JEL Classifications: E58, E63, H63

Keywords: debt monetization, monetary union, seignorage, sovereign risk and default

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1. Introduction

There are many historical examples of currencies areas, but the euro area is special in many respects. Among them, the fact that the countries belonging to the euro renounce to their own currencies and to the monetary financing of their public deficit, while maintaining full responsibility for fiscal policies. In theory, it should not be possible for a country to leave the euro; in practice, after the outbreak of the "sovereign debt crisis" in 2010, in many occasions a country has been on the brink of leaving the euro (last example, Cyprus) and the euro break-up has become an issue heavily discussed on the financial press and the blogosphere.

For our purposes, it is not relevant to know the causes of the public finances imbalances. They could originate from the public sector, as in Greece and Italy, or from the banking system, as in Cyprus and Ireland, or from the real estate sector, as in Spain. The result is always the same: financial markets lose faith in the capabilities of the country to repay the debt and rebalance the deficit via only the fiscal policy. In those cases, the alternatives are some forms of financial aid by the other members of the currency area, debt restructuring or, as a last resort, leaving the union and re-denominating the debt in a new currency. Before the country reaches the point of no return, financial markets anticipate and pretend an extra-return, i.e. the "spread", for holding the government bonds and compensate the associated risk.

The fact that monetary financing of public deficit is ruled out and many countries are reaching unsustainable public debt levels sounds like a revenge of the classical Sargent-Wallace (1981) textbook model, with the variant that, unless a country opt-out and regain control of its currency, the public debt's run has to be stopped via restructuring and default.

The goal of this paper is to model the dynamics of an economy belonging to a currency union (e.g. the "euro"), when the possibility of leaving that union arises. In particular, we extend the Drazen-Helpman (1990) model, introducing a new component of the interest rate, i.e. the "spread", that allows to bridge the present economy's dynamics (inside the union with the anticipated future outside the union.

In the context of the neoclassical Ramsey infinite horizon model, with optimizing individuals and competitive markets, the spread, differently from inflation, affects the real side of the economy as a sort of distortionary taxation on investments. This implies that a country belonging to the monetary union but characterized by weak public finances will suffer from lower capital accumulation, lower output, and lower consumption levels than the ones achievable by the steady state "golden rule". In reality, we will show that for a currency union where some countries are tax-exhausted, Pareto-optimality requires either to embrace the path to a fiscal union or to break-up.

When the country leaves the union, the spread disappears and replaced by the additional inflation created by reverting to monetary financing of public deficit. However, inflation is a pure monetary phenomenon in a Ramsey growth model, so the country dynamics jumps to a trajectory of capital accumulation (financed by a temporary reduction in consumption) that brings the economy back to the "golden rule" equilibrium in the long-run. The exchange rate of the new currency shows the typical "overshooting" behaviour.

Obviously, in a real world situation, the break-up of a monetary union or the default of a big, interconnected country can have huge systemic effects across the entire world economy. There might be serious social unrests in weak countries, serial defaults in the financial system, etc. We perfectly understand this, but the objective of this paper is to derive the consequences of such an event in the simplified theoretical framework of a Ramsey growth model. These results might represent the benchmark for measuring the additional explanatory power of more realistic and complicated models.

2. Modelling Inflation and Debt Dynamics in a Monetary Union

In order to analyse the problems posed by an unsustainable public debt inside a monetary union we extend the original Drazen-Helpman (1990) model, that represents a reference framework for investigating the relationship between public debt and inflation. Drazen-Helpman (1990) analysed within the framework of a Ramsey growth model the relationship between inflation and public deficit when the latter is financed by money creation and bonds issuance. Depending on how the accumulation of debt terminate, they derive a relationship between deficit and inflation. In general, if economic agents anticipate a stabilization program based on full monetary financing the relationship will be positive. If they anticipate an increase in taxes, the relationship will be negative. A detailed description of the model is in Blanchard-Fischer (1989).

The assumptions that we will make are the following. The monetary union is composed by a certain number of countries where individuals are identical in terms of time preferences and demographical dynamics. There is only one central bank and the inflation expectations are the same across the countries of the union. The only difference between the countries is that in some of them there is a problem of public debt sustainability. These countries are "peripherals", in the sense that they are unable to affect the economic dynamics of the virtuous countries, the so-called "core" countries.

In the core countries, where public finances do not pose any problem of sustainability, the interest rate is set according to the classical Ramsey growth model with money neutrality. Optimality requires the so-called "golden rule" for the real interest rate:

$$r = \theta + \gamma \tag{1a}$$

Where θ is the rate of time preference of the representative individual and γ is the population's growth rate. For the sake of simplicity, as in Drazen-Helpman (1990), we assume that the constituents of the real interest rate are constant.

As far as the peripheral countries are concerned, we assume that there are problems of debt sustainability and then interest rates need to reflect the possibility of a credit event for the government bonds. Since inside the monetary union inflation is not a viable solution for resolving the public debt problem, interest rates need to take into account the possibility that a country might default on its debt either by restructuring its financial terms (e.g. rescheduling the payments, cutting the principal, ...) or by redenominating the bonds in a new currency (or both). The redenomination occurs if the country leaves the monetary union. Since the agents anticipate that restructuring or redenomination might happen, they request a premium as a compensation for the risk. This premium is what we call the "spread". The spread is not present in the original Drazen-Helpman (1990) model, because in their economy there is always the possibility of resorting to money financing and then to inflation in order to solve public finances problems.

Assuming perfect capital mobility inside the union, the real interest rate in a peripheral country is equal to the real interest rate in a core country plus a "spread", *x*.

$$r_t^{periphery} = r + x_t \tag{1b}$$

The spread is proportional to the level of the public debt, in the sense that an higher level of public debt implies an higher probability of debt default and this in turn implies an higher risk premium requested by bondholders.

The nominal interest rate, *n*, is the sum of the real interest rate, *r*, and the inflation expectations, π:

$$n_t^{core} = r + \pi_t \tag{2a}$$

$$n_t^{periphery} = r + x_t + \pi_t \quad (2b)$$

Differently from inflation, the spread affects the real side of the economy. Assume in fact that the technology and the demographics are uniform across the monetary union, this implies that for the core countries, where there are no problems of public debt sustainability, the marginal product of capital is equal to the real interest rate:

$$y'(k) = \theta + \gamma = r \quad (3a)$$

Where *y(k)* denotes the production function of the economy, and *k* the stock of capital per-capita.

Government debt is in competition with private projects to attract savings. If the interest on government bonds has a spread component, it will crowd out the projects with a lower rate of return.[1] The marginal product of capital in a peripheral country is:

$$y'(k) = r + x \quad (3b)$$

If the spread is positive, the amount of capital will be lower, producing a lower consumption level.

2.1. The Money-Market Equilibrium in a Peripheral Country

The usual money market equilibrium equation establishes that real money supply is equal to the money demand:

$$\frac{M}{P\,Y} = f(n_t; x_t) \quad (4)$$

Where M denotes money supply, P the price level, Y the output, n the nominal interest rate, and x the spread. The nominal interest rate in a peripheral country is composed of a fixed component, (θ + γ), and a time varying component, (π+x):

$$n_t^{periphery} = r + x_t + \pi_t$$
$$= r + \omega_t$$

Money demand, *f(n;x)*, is decreasing in the nominal interest rate and increasing in the spread.

Let's analyse first the relationship with inflation. As in the literature on hyperinflation, we assume that f(n;x)π is concave in π for a given level of the spread. This implies that, for a given spread level, the "seignorage" shows a sort of Laffer curve property against inflation. In other words, after a certain level of inflation, the inflation tax revenues start decreasing because the money demand contraction more than offset the increase in inflation.

The relationship with the spread is instead positive. An increase in the spread is caused by a problem of public debt sustainability in our model. A problem like this can end up, as we will see, with a debt restructuring or with the country leaving the union. In both cases, money hoarding can be an optimal strategy for investors to avoid the consequences of a default or a devaluation.[2]

[1] Implicitly, we are assuming that, inside the monetary union, the financial system is bank-centric. Moreover, the domestic government is the sole guarantor of the banks' deposits, and the capital of the banks is mainly invested in the domestic government bonds. In other words, there is no banking union paralleling the monetary union. If a debt sustainability problem arises in the peripheral countries, the immediate consequence is a fragmentation of the financial systems, i.e. the individuals and the firms of the peripheral countries will have to sustain a higher level of real interest rates.

[2] In our model, the banking system is not modelled, so an increase in money demand is essentially an increase in coins and paper money held by the public.

Differentiating the left-hand side of equation (4) with respect to time, we obtain:

$$\frac{d\left(\frac{M}{P\,Y}\right)}{dt} = \left(\frac{\frac{dM}{dt}}{P\,Y}\right) - \frac{M}{P\,Y}\pi_t \tag{5}$$

Differentiating the right-hand side of equation (4) and equating the resulting expression with (5), we obtain:

$$\left(\frac{\frac{dM}{dt}}{P\,Y}\right) - \frac{M}{P\,Y}\pi_t = \frac{df}{d\pi}\frac{d\pi}{dt} + \frac{df}{dx}\frac{dx}{dt} \tag{6}$$

$$\left(\frac{\frac{dM}{dt}}{P\,Y}\right) - f(n_t)\pi_t = f'_\pi\frac{d\pi}{dt} + f'_x\frac{dx}{dt}$$

If the sole goal of the central bank of the monetary union is to keep constant the inflation rate to a predetermined level $\hat{\pi}$, for example $\hat{\pi}$= 2%, and the central bank policy is successful, then equation (6) becomes:

$$\left(\frac{\frac{dM}{dt}}{P\,Y}\right) - f(n_t; x_t)\hat{\pi}_t = f'_x\frac{dx}{dt} \tag{6a}$$

2.2. Government Deficit, Debt and Money Dynamics

The government deficit is the sum of a primary deficit, -s, and the interest rate expenditures on existing debt, b, all measured in real terms and with respect to output. For simplicity, we assume that the (real) primary deficit is constant, so that the (real) deficit at time t is equal to:

$$\delta_t = -s + (r + x_t)b_t \tag{7}$$

The deficit can be financed in part via money creation or by issuing new debt. Assume that the proportion of the deficit financed by money creation is α. In the currency union that proportion will be low, but not zero, because in any case the objective of the central bank is to create a target amount of inflation $\hat{\pi}$.

The seignorage can be defined as the proportion of public deficit financed by the money printing:

$$\left(\frac{\frac{dM}{dt}}{P\,Y}\right) = \alpha\ \ \delta_t \tag{8}$$

The government debt dynamics is described by the following equation:

$$db_t/dt = (1-\alpha)(-s + (r + x_t)b_t) \tag{8a}$$

Whereas equation (8) and equation (6a) generate:

$$-\pi_t f(n_t; x_t) + \alpha(-s + (r + x_t)b_t) = f'_x\ \frac{dx}{dt} \tag{8b}$$

Since our goal is to analyse the behaviour of the economy before and after the monetary union, when money financing through inflation might become a viable solution for debt sustainability, we want to use a variable that encompasses both the spread and the inflation rate. For this reason, we will use the ω variable that is the sum of the spread and the inflation expectations:

$$w \equiv \pi + x$$

It has to be noted that both inflation and the spread can take negative value, so there is no reason why ω should be limited to be positive. However, mostly for "graphical" reason, we will assume that the minimum level for ω is zero. This implies that the spread can't be less than –π.

As we said before, we will assume that inside the monetary union the central bank controls strictly the inflation rate, so that its variability around the target level, $\hat{\pi}$, is relatively modest with respect to the variability of the spread. For this reason, the spread is the major source of time variation for ω inside the monetary union and consequently, we will assume without much loss of generality that inflation is stable at the central bank target level. Below figure 1, we draw the phase diagram for the economy in the (b, ω) space.

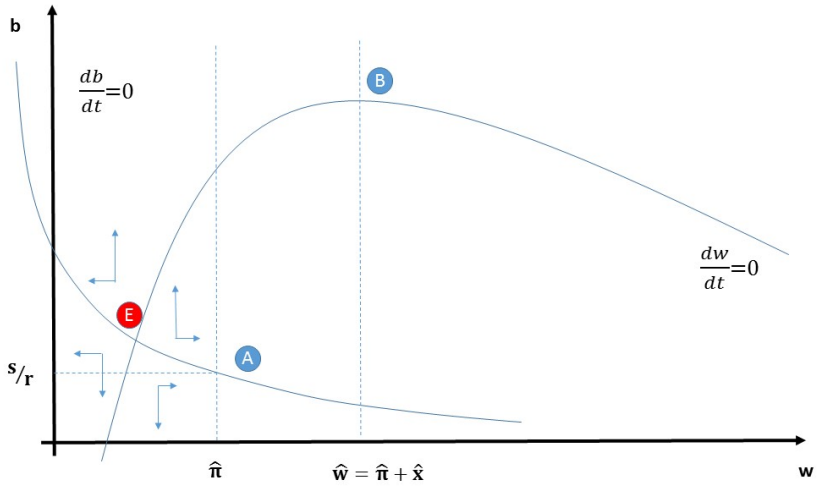

Figure 1. Public debt and spread dynamics

The phase line db/dt=0 is the locus of points where the public debt is stable. Obviously, for a given level of primary surplus, the phase line is downward sloping because the higher the interest rate the lower will have to be the level of public debt in order to have a stable public debt. In point A, where the spread is zero and the equilibrium level of public debt is equal to the primary surplus divided by the real interest rate, s/r. It has to be noted that in Drazen-Helpman (1990), the phase line db/dt is a horizontal line, because the spread is not present and inflation does not appear in the r.h.s. of equation (8a).

The phase line dω/dt=0 is the locus where the spread is constant (recall that inflation has been targeted by the central bank and is for our purpose to be considered as constant). This happens when seignorage, as defined by equation (8), is equal to the inflation tax $\hat{\pi} f(n_t; x_t)$. When the spread increases, the money demand increase and then, since inflation is stable, the inflation tax increases. This implies that the feasible level of debt increases. For higher level of debts, however, the impact of the spread on the interest expenditures can overcome the increase in the inflation tax and then the level of feasible debt decreases with an increase in the spread.

The shape of the phase line dω/dt=0 is similar to the one of Drazen-Helpman (1990), but for a different reason. In Drazen-Helpman (1990) the spread is not present and inflation is time varying. So the increase in the inflation tax is offset because the money demand with high levels of inflation start to decrease faster than the increase in inflation.

Assuming that the primary surplus does not compensate the interest rate expenditures on debt, the dynamics of public debt is explosive and no stable equilibrium is possible. The agents know this and anticipate that at a certain time T in the future a regime change will be necessary to stop the public debt's explosive spiral.

The alternative interventions studied by Drazen-Helpman (1990) are either an increase in taxes or a shift to full monetary financing. Since in our monetary union full (or partial) monetary financing is ruled out, the only option should be "austerity", i.e. an increase in taxes or a reduction in public expenditures such that the primary surplus compensates the interest rate expenditures on debt. But, in reality, there are other three options.

The first option is to default and restructure the debt, while the country remains inside the monetary union. This has been the case of Greece, for example.

The second option is to resort to money creation, by leaving the union and adopting a new currency. In this case, the debt is re-denominated in the new currency and the country resorts to the printing press to close partially or fully the budget gap.

The third option is the political union and then the fiscal union, i.e. the core countries transferring fiscal resources to the peripheral countries.

3. Regime Change: Embracing a Political Union or Leaving the Monetary Union

Assuming that the primary surplus does not compensate the interest rate expenditures on debt, the dynamics of public debt is explosive and no stable equilibrium is possible. The agents know this and anticipate that at a certain time T in the future it will be necessary a regime change in policy to stop the public debt explosive spiral.

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The third option is the political union and then the fiscal union, i.e. the core countries transferring fiscal resources to the peripheral countries.

The first two options (and the austerity's one) are mostly under the control of the peripheral country. The third option requires instead that the other countries agree. Before analysing the first two options, we want to focus on the third one and we want to understand if there is a reason for the core countries to accept a fiscal union with a weaker country.

3.1. Pareto-Optimality of a Fiscal Union

Obviously, our model is unable to tackle all the issues that in the real world have to be considered before deciding a political union between countries. However, we will see that also in this oversimplified model, some interesting implications can be drawn.

When debt sustainability problems arise in a monetary union, it is easy to understand that the union is not in a Pareto-optimal situation. Peripheral countries are characterized by a positive spread and lower capital than the optimal one. But it should be noted that if a core country is perceived as a "safe haven" and attracts capital, the pressure on the demand of its government bonds might generate a negative spread and then lower the real interest rate below the optimal one.

In the classical Ramsey model, as presented by Blanchard-Fischer (1989), the dynamics of capital and consumption is represented in the (k,c) space by a well-known phase diagram. The locus dk/dt reaches a maximum when the capital stock is equal to the "golden rule" level (the marginal product of capital is equal to the growth rate of the population, n). The locus dc/dt is a vertical line because the optimal consumption level is obtained when the capital stock is equal to the "modified golden rule" level (the marginal product of capital is equal to the growth rate of the population, n, plus the rate of time preferences, θ). It can be shown that, at point E, the economy is in equilibrium, there is only one saddle path bringing the economy in equilibrium, and this the optimal solution that a central planner would chose. (See figure 2).

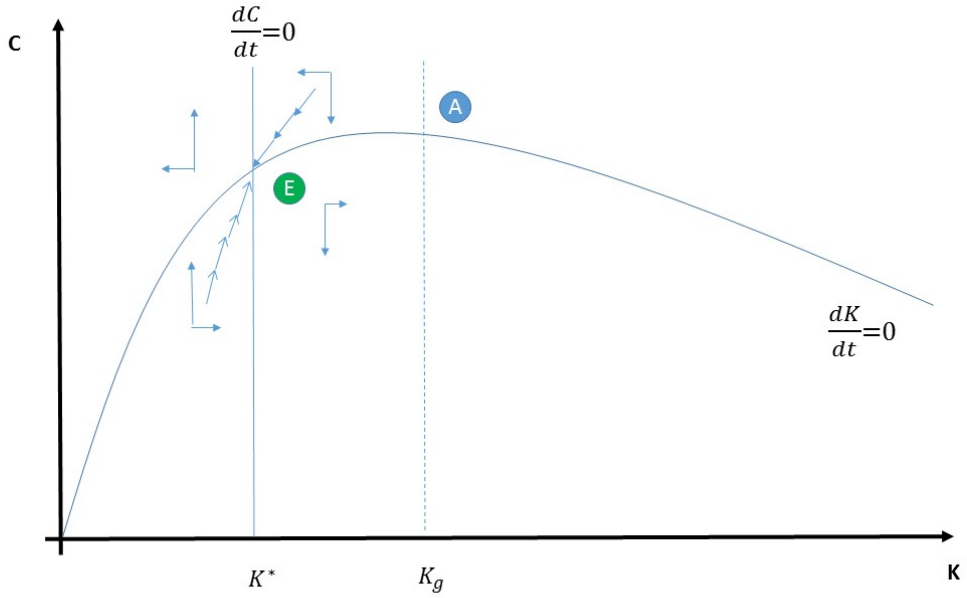

Figure 2. Pareto optimality of a political union

If the real interest is different from the modified golden rule one, this implies that the capital stock might be higher or lower than the optimal one, i.e. the level of consumption is lower than the optimal one. In this case, the equilibrium will be to the right of the maximum achievable, implying higher capital but lower consumption with respect to the optimal one.

Assuming a perfect symmetry among the countries, the total capital of the union, being the sum of the periphery's and core's capital, might be equal to the optimal one. But consumption levels both in peripheral and core countries are below the optimal ones. Then, we don't have the optimal amount of consumption at the monetary union level. Both countries would be better off eliminating the spreads either by breaking the union or by mutualising public debts.

If debt mutualisation is in fact sufficient to stabilize the aggregate debt level, the risk of debt default disappears and so the premium required by bondholders. In the peripheral country, the decrease of the real interest rate will favour capital formation via higher investments. Eventually, the stock of capital will converge to the optimal one implied by the golden rule, producing a higher level of consumption. In the core country, instead, the increase in the real interest rate will lower investment and increase consumption, bringing the capital stock to the optimal level implied by the golden rule.

3.2. The Dynamics of Interest Rates in the Case of a Monetary Union Break-Up

Assuming that mutualisation of debt, requiring a political union, is not a viable option; we focus on the alternative, i.e. the break-up of the union with the weaker country leaving.

Since the debt dynamics of the peripheral country is explosive, economic agents forecast, at time t <T, that at some time T in the future the debt becomes unsustainable (say, when it reaches 150% of GDP). At time T, the agents forecast that the government will either restructure its debt or leave the monetary union re-denominating the debt in another currency and eventually resorting to the printing press (for the new currency). In anticipation, then, the flows variables of the economy at time t will jump to the path that makes the stock variables converge at time T to the new equilibrium level.

As in Drazen-Helpman (1990), let's assume that we can calculate the amount of inflation necessary to stabilize the debt level and work out the percentage α of public deficit necessary to stabilize public debt (and inflation). If α is equal to 1, there is full monetary financing after T. If α>1, the government will have to restructure partially its debt.

At the beginning of the monetary union, the public finances of all the countries are sustainable. The spread is almost nil and, since the central bank determines the money supply in such a way that inflation remains in the neighbourhood of a low, predetermined level (say 2%), the economy is hovering near the vertical axis in the (b, π+x) space. If, for whatever reasons (an external shock, a series of mistakes in the reform process, …), the primary surplus in peripheral countries does not compensate for the interest expenditures and the public debt starts to move higher, at time t the day of reckoning comes. The agents recognize that at a certain future time T the country might have to leave the euro and impose a spread. The dynamics is described in figure 3.

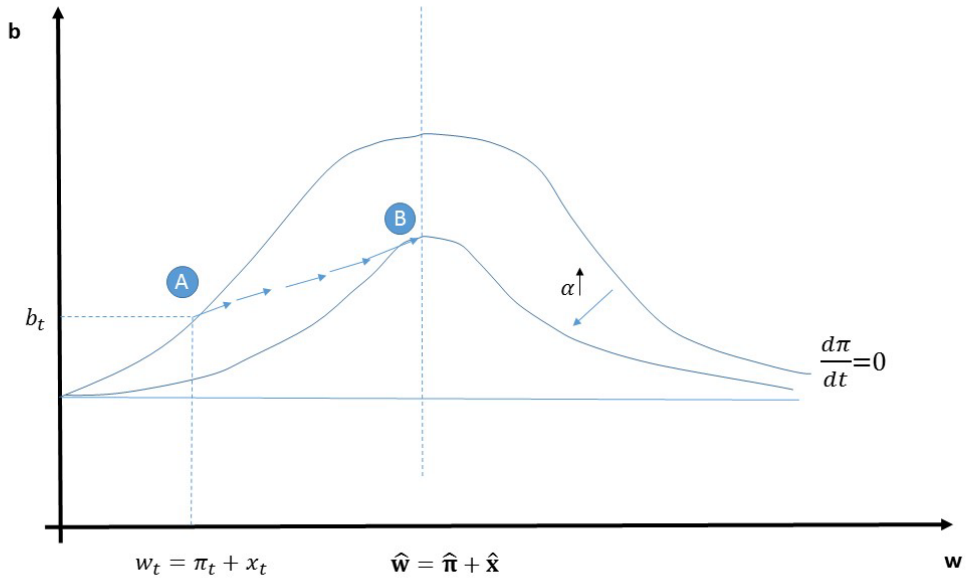

Figure 3. Interest rate and public debt dynamics in case of break-up

As in Drazen-Helpman (1990), the locus of the points where the inflation is stable, $^{d\pi}/_{dt}$=0, shifts downward as α increases. This implies that, for a given level of public debt, the interest rate necessary to keep inflation stable is higher.

Since at time t (point A in figure 3) we are still inside the union and inflation is under the control of the central bank, the only component of the interest rate that can move is the spread. At time t, then the economy will jump to the path that will bring it to the new equilibrium level of the public debt and the interest rate at time T (point B in figure 3). The path of the economy starts to bend rightward in the (b, π+x) space, with higher public debt generating higher spreads that, in turn, generate higher public debt.

When at time T the country leaves the currency union and introduces a new currency, whose supply the government perfectly controls, the spread component of interest rates disappears, substituted by the inflation rate of the new currency. In fact, since the event is completely anticipated, the nominal interest rate cannot jump at time T, otherwise there would be an arbitrage opportunity. Then the spread at time T has to be exactly equal to the level of inflation rate necessary to stabilize public debt.

3.3. The Dynamics of Consumption and Capital after the Break-Up

Before leaving the currency union, an increase in the spread causes a continuous reduction in consumption, capital and output. It has to be noted that when the regime changes, the spread disappears. In a Ramsey growth model, the monetary side of the economy does not affect the real side so the real interest rate (i.e. the difference between nominal interest rate and inflation) has to converge to the modified golden rule, where capital, output, and consumption are higher.

The typical phase diagram (see Blanchard-Fischer, 1989) of such an economy in the (*k,c*) space is represented in the figure below.

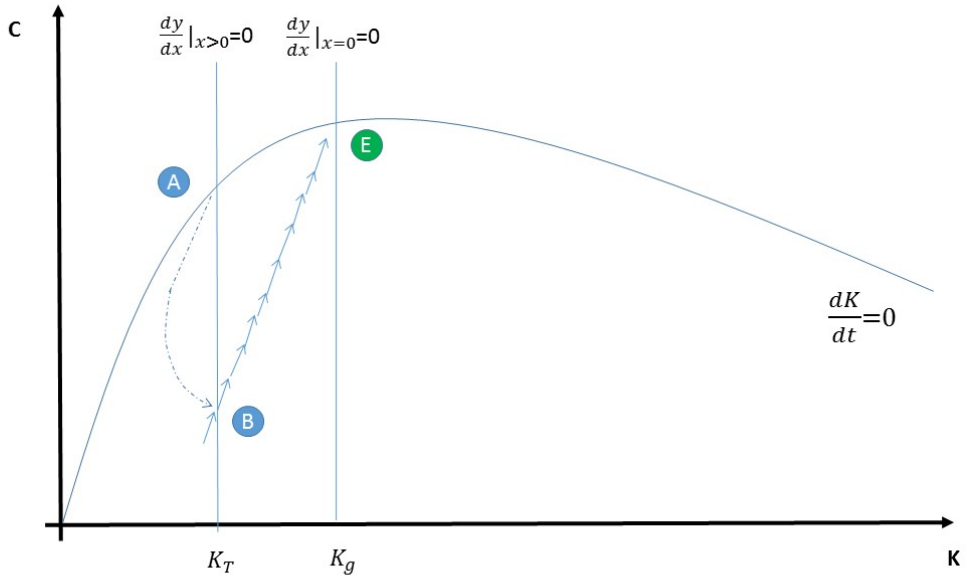

Figure 4. The capital-consumption dynamics after the break-up

Since capital is a stock variable, it can't immediately adjust. The adjustment happens in the (*k,c*) space, thanks to a downward jump in consumption (i.e. an upward jump in investment) so that the economy jumps from A to B, on the saddle path bringing to the golden rule equilibrium in the long-run. The immediate impact of leaving the euro is then a reduction in consumption to favour

investments and capital formation. After a certain date, however, consumption too will overcome the level reached at time T.

Obviously, we are aware of the limitations imposed by the simplicity of the assumption behind our model, where money is neutral and there is neither a financial sector nor a social and political structure. In the "real world", a break-up event with a big country leaving the union would generate such a high level of uncertainty that it might be very unlikely that in the aftermath of the break-up investments will increase.

3.4. The Dynamics of the New Exchange Rate

Obviously, before the country leaves the union there is no exchange rate. But at time T, the new currency will be introduced so it is interesting to analyse what happens after time T. We will follow Dornbusch (1976). Recall that in the (*e,y*) space, where *e* is the exchange rate, the LM curve represents the locus where the exchange rate does not change and it is a vertical line. The IS curve represents the locus where the output does not change and it is instead a curve sloping upward, as usual. At time T, the country abandons the monetary union and increase overnight the money supply. This implies that the LM curve shifts to the right, crossing the IS curve at a certain (e*,y*) point, denoted by C. Note that y* is the golden rule output level. (See figure 5).

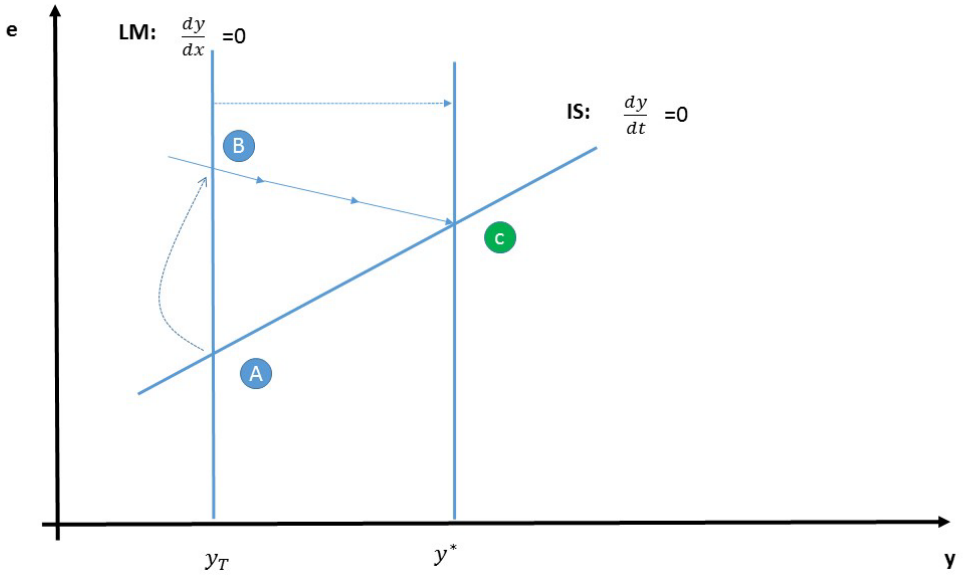

Figure 5. The dynamics of the exchange rate after the break-up

The economy will jump from point A to the new saddle path, point B, with the exchange rate immediately moving up (i.e. devaluating) with a typical overshooting with respect to the long-run equilibrium level.

Since this is the behaviour of the exchange rate after time T, it is now important to analyse what happens before.

It is in fact evident that, if the exit is perfectly anticipated, rational agents would export capital before time T and make infinite gains: there is no level of the spread that can compensate for such gains. If this is the case, limitations to capital movements would be necessary and unavoidable.

Another consequence is paper money hoarding before time T. This could be contrasted imposing limits to the amount of cash transactions and taxes on bank deposits.

4. Conclusions

Our goal is to understand the dynamics of a monetary union when a debt sustainability problem arises. We used the basic neoclassical model, developed by Ramsey (1928) to analyse the optimal economic growth of an economy with infinite horizon rational individuals and competitive markets. Specifically, we extended the Drazen-Helpman (1990) model. Notwithstanding the strong and unrealistic assumptions behind these basic models, we found that the neoclassical "benchmark" is full of implications for the dynamics of the economies belonging to a monetary union.

We derived that, when a debt sustainability problem arises in a peripheral country, the monetary union is no more Pareto-optimal. Both for core and peripheral countries, it would be better either to embrace a political (i.e. fiscal) union or to break the monetary union. In fact, inside the monetary union, the central bank acts in such a way that inflation expectations are homogeneous across countries but the real interest rate paid by peripheral countries will be higher than the optimal one by a factor known as the "spread". The "spread" compensates debt holders for the risk either of restructuring or of leaving the monetary union and redenominating the debt in a new currency.

If the public debt is unsustainable given a certain level of primary surplus, a country has different options. The first option is austerity, i.e. increasing taxes and/or reducing expenditures in order to generate a primary surplus sufficiently high to compensate for the interest rate expenditure. The second option is to restructure the debt, remaining inside the monetary union. The third option is a political union with the core countries, bringing to some forms of debt mutualisation. The fourth option is leaving the monetary union and redenominating the public debt in the new currency. The first two options have already been experimented inside the euro area. The third is on the table. The fourth has not been yet experimented, albeit in the case of Cyprus we are not very far. In this paper, we explore this option and its consequences for the dynamics of the economy before and after leaving the monetary union.

Leaving the monetary union allows for regaining access to monetary financing and, in this sense, the spread can be considered as a "bridging" factor for interest rates before and after the break-up of the union. However, differently from inflation, the spread affects the real side of the economy, reducing the level of capital stock and consumption, exacerbating the debt sustainability problem inside a monetary union. When the country leaves the monetary union, the spread disappears, substituted by the inflation rate generated by the increase in the money supply necessary for financing the public debt; there is a sudden drop in consumption due to the necessity of reconstituting an optimal capital stock; the exchange rate overshoots initially its long-run equilibrium level.

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