

New Theories of Optimal Currency Areas
and their application to Poland's adoption of the euro:
the *asymmetric-shocks-on-its-head* and the *lender-of-last-resort* theories of
optimal currency areas

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Introduction

In this paper we propose two new criteria to evaluate the appropriateness of a country joining a larger currency area. The first of these, *asymmetric-shocks-on-its-head*, argues that far from being an argument for sticking to monetary autonomy, asymmetric shocks to real GDP provide an argument for adopting a common currency. The argument comes in three steps.

First, independent monetary policy and a floating nominal exchange rate are not effective instruments for mitigating the consequences of asymmetric shocks. In practice, monetary independence may well amplify country-specific shocks rather than dampen them. Second, standard portfolio diversification arguments support the view that the more asymmetric (the more uncorrelated or negatively correlated) GDP shocks are, the greater the benefits from international portfolio diversification (broadly defined). Third, financial portfolio diversification is greatly encouraged by having a common currency: home bias diminishes significantly when two countries share a currency.

The lender of last resort theory of optimal currency areas starts from the observation that there is no such thing as a safe bank. Even a solvent bank can be brought down by a depositor run or market run. The central bank has to be able to act as lender of last resort and market maker of last resort so ensure the survival of even solvent banks. When much of the balance sheet of the central bank (or of the balance sheet of its domestic customers) is denominated in foreign currency, and specifically when there is either a large net foreign currency exposure or a large net short-term liability exposure in foreign exchange, the survival of banks faced with funding liquidity or market liquidity problems requires either a foreign currency lender of last resort or a domestic currency that is also a global reserve

currency. There are but two serious global reserve currencies today: the US dollar and the euro.

Iceland is a classic example of what can happen to a country with a banking sector that is large relative to the rest of the economy and that has short-term foreign exchange funding needs that outstrip the resources of its central bank. In Poland, the banks may have limited foreign currency exposure, but its domestic customers do. In particular, the household sector has borrowed overwhelmingly in domestic currency, including Swiss franc, euro and yen. The Polish banking system has therefore swapped its foreign exchange risk for credit risk through the unhedged foreign exchange risk assumed by its domestic non-bank private sector. The fact that Hungary is in worse shape than Poland, both as regards its net foreign currency exposure and as regards the currency mismatch in the non-bank private sector is not really a source of much comfort.

We doubt whether the National Bank of Poland has the resources to refinance the foreign currency exposure of the domestic private sector. Both refinancing risk (liquidity risk) and solvency risk due to a large depreciation of the zloty can therefore be avoided only by Poland adopting the euro and gaining access to the lender of last resort and market maker of last resort facilities of the Eurosystem.

I. The Asymmetric-shocks-on-its-head theory of OCAs

The conventional view that asymmetric shocks to the demand for or the supply of domestic output make a common currency undesirable is based on the view that national monetary policy can be used effectively to dampen undesirable fluctuations in the output gap. The economic theory underlying it is Keynesian, Old- or New-, because the ability of monetary policy to influence the real economy depends on the existence of nominal price or cost rigidities.

In the presence of a high degree of international capital mobility, the theory must be 'augmented' to allow for the distinction between 'IS' shocks and 'LM' shocks. In the limiting case of perfect international capital mobility, keeping the domestic nominal interest rate constant is the optimal output and price level stabilising response to a money demand ('LM') shock. One way to achieve this is to have a credible fixed exchange rate regime. The most credible fixed exchange rate regime is a common currency.

Even within a Keynesian setting, and even if the shocks perturbing the output gap are demand shocks (at a given domestic interest rate, a given exchange rate, a given price level and given expectations of future prices and exchange rates), the desirability of discretionary national monetary policy is questionable. It assumes (1) that the monetary policy authority is benevolent, (2) that the monetary policy authority is competent and (3), that asset markets, including the foreign exchange markets are efficient.

All three assumptions are questionable. The authorities could be malevolent or benevolent but opportunistic (incapable of credible commitment). They could be incompetent or the structure of the economy could be sufficiently complex and opaque as to make destabilising policy as likely as stabilising monetary policy. Monetary policy lags are long, variable and uncertain. Policy does not just have to contend with the outside lag (from the instrument to the economy) but also with the inside lag (the lag between the arrival of new policy-relevant information and the right decision being made and implemented). In addition, financial markets are far from efficient, even in the textbook sense of efficiency and certainly in the broader sense of setting prices conducive to socially efficient outcomes. Herding behaviour, panic, fear, exhilaration, mania, confidence and trust all powerfully influence asset prices and do so in unpredictable ways and in ways that cannot be easily harnessed to the pursuit of macroeconomic stability.

So instead of acting as a buffer or as a shock-absorber, damping exogenous shocks and reducing the real resource cost of achieving a given necessary adjustment in the real exchange rate, changes in the nominal exchange rate may contribute to the amplification of shocks, to excess volatility and to possibly quite persistent misalignments of the real exchange rate.

If the economy were Keynesian but simply too complex to stabilise effectively through the use of domestic monetary policy, the exchange rate regime would be a matter of indifference from the point of view of stabilising real GDP. If, however, stabilising consumption rather than GDP is the purpose of policy, then even if GDP fluctuations either are exogenous or not amenable to systematic stabilisation through monetary policy, other more classical consumption stabilisation instruments may be available.

The desirability of economic divergence

Whether real convergence (defined as convergence of per capita GDP levels among EU nations) is good or bad depends crucially on the scope for cross-border redistribution and risk sharing. It is key to distinguish between *first moment convergence* and *second moment convergence*. First moment convergence concerns the convergence of expected levels or growth rates of real per capita GDP. Second moment convergence refers to the degree to which national deviations from the mean level or growth rate of real per capita GDP are positively or negatively correlated, that is, it refers to the conditional covariances between national real per capita GDP levels or growth rates.

It is likely that first-moment divergence, which implies increasing inequality between national per capita GDP levels, even though it does not necessarily indicate inefficient use of resources in any nation, is likely to create increasing political tensions, unless there are effective mechanisms for redistributing income between nations to ensure that divergence per

capita output levels need not imply divergent per capita consumption and economic wellbeing.

Uncoupling of national consumption from national GDP can be done through a number of private, market-based mechanisms, through private non-market mechanisms and through cross-border fiscal transfers. Private market-based mechanisms include international financial portfolio diversification (especially ownership by residents of one nation of equity stakes in companies operating in other member countries) and international labour mobility. Private non-market-based mechanisms include cross-border private transfers, such as remittances and charitable donations.

International transfers can either be made by national governments or by a supranational European entity. In practice, in the EU, the redistributive role of the supranational bodies is negligible: the total budget of the EU institutions is less than 1.25% of EU GDP, and about a third of that goes towards administrative costs. With the exception of the European Investment Bank, the EU institutions have to balance their budgets on a year-by-year basis. Clearly an average contribution of just over one percent of EU GDP can finance a significantly larger EU transfer (as a share of recipient GDP) to poorer countries. Even so, the redistributive role of the Commission is limited indeed. Bilateral or multilateral intergovernmental transfers in the EU are not part of the political-economic landscape.

The same private and public mechanisms that provide redistribution can also provide insurance, that is, they can act as risk sharing mechanisms. Indeed, the difference between redistribution and risk sharing is very similar to the first moment vs second moment distinction we made for convergence. Redistribution concerns income or wealth-contingent transfers in the absence of uncertainty. Risk-sharing involves payments (or other actions-in-kind) contingent on the realisation of some unknown future random variable.

First-moment divergence is at best neutral. This will be the outcome when (a) the divergence in real economic performance (productivity, efficiency) is not due to preventable or corrigible market failure or government failure, and (b) is made congruent with the Union's distributional/fairness objectives through effective and efficient redistribution. If either (a) or (b) fail to be satisfied, first-moment divergence is a problem – in all likelihood both an economic efficiency problem and a political fairness/distributional problem.

If first-moment divergence is a problem in the EU and the EMU, and even if the divergence has been exacerbated by integrationist measures like the Single European Act (SEA) in 1986 or by the adoption of a common currency by 11 EU members in 1999, the policy implications are by no means obvious. Reversing the painfully achieved, albeit still very limited, deep integration pursued by the Single Market Programme (SMP) launched in 1992, would result in massive efficiency losses and would probably mean the end of the EU. Leaving EMU would make absolutely no economic sense for any of the 15 present members.

Unlike first moment divergence, second moment divergence can, provided sufficient cross-border risk sharing is possible, be a highly desirable phenomenon. In what follows, second moment divergence will be associated with asymmetric shocks, that is, negatively correlated shocks to the levels or growth rates of real national GDP. This follows from a straightforward application of portfolio theory under uncertainty.

For simplicity, view the monetary union as a closed system and ignore real capital formation. In the aggregate, therefore, the citizens of the Union consume the aggregate GDP of the Union. Under financial autarky and without labour mobility, each nation's residents own the assets that produce that nation's GDP. Since the abolition of slavery, human wealth (the present discounted value of the future earnings of a worker) cannot be traded either within or across national borders. Without international financial portfolio diversification, claims to the earnings of the domestic capital stock also cannot be traded across borders.

Without labour mobility, and without cross-border fiscal transfers, it follows that each nation's consumers have to consume that nation's GDP. The variance of their national consumption is the variance of domestic GDP.

When national equity markets become integrated into a single Union-wide equity market, risk sharing through risk trading, that is, through financial portfolio diversification becomes an option for capital income. Most of national GDP is, of course, national labour income, which is not perfectly correlated with national capital income and is unlikely to be spanned by the capital income claims of the entire union. Sharing labour income risk will therefore have to occur either through cross-border fiscal mechanisms or through labour mobility. If these risk-sharing mechanisms are sufficiently developed, asymmetric shocks or second-moment divergence, becomes a boon rather than a bane.

Consider the extreme case where there is either a complete set of risk-trading markets or a complete set of national-GDP contingent cross-border transfer payments. It is clear that, in this world, holding constant the variances of national GDP levels, a higher negative correlation between the national GDP levels means that Union-wide aggregate GDP will be more stable, and so will Union-wide aggregate consumption. With complete risk sharing, individual national consumption levels can perfectly match the behaviour of the aggregate Union-wide consumption.

Second-moment divergence is therefore welfare-enhancing when there are sufficient opportunities for cross-border risk sharing. The job of the Commission is to strive to encourage the creation of private and public (intergovernmental and/or supranational) mechanisms for risk sharing. Both the SMP and the EMU are important mechanisms for boosting the scope for international portfolio diversification and cross-border labour mobility.

There may also be a role for policy in ensuring that national GDP moments are not larger than is efficient in the light of the inherent uncertainty and unpredictability of the

economic environment (tastes, technology, information, acts of nature, acts of God etc). Whatever may be achievable as regards reducing the variances of national GDP levels, however, households in the EMU should hope for asymmetric rather than symmetric shocks.

As regards first moment divergence, the first-best strategy is to encourage optimal economic performance, including growth, in each nation state, and to agree on a set of socially acceptable cross-border redistribution policies if the efficient performance levels are too divergent to be politically acceptable. There is no reason to believe, in view of the vast structural differences between the members of the Union, that efficient levels and growth rates of real per capita GDP would be similar, let alone convergent among Union members. Given the extremely limited set of public and private instruments for cross-border redistribution in the E(M)U, it is unlikely that much can be expected from policies to mitigate first moment divergence.

EMU and cross-border portfolio diversification

We pointed to four mechanisms for cross-border risk sharing. First, the public sector can provide cross-border risk-sharing through contingent cross-border fiscal transfers. Second, the private sector can provide cross-border risk-sharing through cross-border private transfers. Cross-border remittances are an example, as are private cross-border charitable transfers. Third, the private sector can trade risk across national boundaries through international financial portfolio diversification. Such markets are well-established at for ownership claims to capital income. Fourth, it is in principle possible, without trading directly in claims on current and future primary labour income (which would be illegal since the abolition of slavery and indentured labour), for the private sector to create financial instruments promising a future payment stream benchmarked against observable and verifiable labour income developments at home and abroad.

Individual labour income is private information and is, within limits, a choice variable of the owner, the individual worker. There are obvious moral hazard and adverse selection arguments that will restrict the market for labour income-contingent securities whose payoffs depend on the income of a single worker or a small number of workers. No such arguments apply against the issuance of labour income-contingent financial claims based on the labour income earned in an entire national economy or even in a significant sector, sub-sector or industry within a national economy. The creation of such social risk-trading instruments (GDP-contingent claims, aggregate labour income-contingent claims etc.) has indeed been proposed by such distinguished financial economists as Robert Shiller (1993, 2003). Real-world examples of such instruments are no longer uncommon. A well-known example are Argentina's GDP growth contingent claims, issued following the default of 2003, which offers a payoff to investors only if Argentine real annual GDP growth exceeds three percent per annum.

The fifth mechanism for sharing risk across national boundaries is migration, specifically labour mobility. When workers move across borders, typically from low wage to high-wage countries, individual labour income risk can be mitigated, even if measures of national labour income for the source country are not necessarily favourably affected. Migration is of course intimately tied up with remittances to relatives left behind.

Monetary union strongly affects a nation's capacity to use the third (cross-border financial portfolio diversification) and the fourth (cross-border trade in Shiller securities) of these mechanisms for cross-border sharing of consumption risk.

The great contribution of the EU to the depth and breadth of cross-border risk-sharing and risk trading cannot be denied. The abolition of effectively all administrative and fiscal obstacles to international financial capital mobility is a core part of the Acquis. The Single European Act has permitted and continues to encourage unprecedented cross-border

integration for all 27 EU members of financial markets and markets for financial services and products. The result has been a marked decrease in the home bias of the portfolios held by private investors in the EU and a huge increase in gross cross-holdings of securities across national boundaries.

For the EMU members, the common currency has been a further important stimulus to financial market integration and development. European corporate bond markets for euro-denominated debt are now larger than their US counterparts. While the exact nature of the cost savings and market-deepening effects of a common currency are hard to quantify, there can be little doubt that the creation of the common currency has dealt a further blow to home bias in portfolio allocation.

Thus, a common currency permits improved cross-border consumption risk sharing through portfolio diversification. This will be more valuable, the greater the degree of second-moment real divergence among the countries of the EMU.

II. The *lender-of-last-resort* theory of optimal currency areas

There is no such thing as a safe bank, even if the bank is sound in the sense that, if it could hold its existing assets to maturity, it would be able to meet all its contractual obligations. More generally, there is no such thing as a safe highly leveraged institution that borrows short and lends/invests long and illiquid. Government guarantees/support are required to make private financial institutions with leverage and asset-liability mismatch sustainable. Such support is provided in the first instance by the central bank acting as lender of last resort and market maker of last resort.

When the short-term liabilities of the banks are denominated in domestic currency, there is no limit to the amount of appropriate liquidity the central bank can create - costlessly and instantaneously. It can simply print the stuff. The only constraints on its willingness to provide liquidity would be fear of moral hazard and fear of the inflation it might create.

Moral hazard can be dealt with by pricing the liquidity support appropriately and by imposing regulatory requirements on entities borrowing from the central bank. The threat of inflation can be eliminated by the Treasury transferring resources to the central bank (recapitalising the central bank).

When a significant share of the short-term liabilities of the banking system (broadly defined to include the AIGs of this world) is denominated in foreign currency, there are limits to the foreign currency liquidity support the central bank can provide. Foreign exchange reserves, credit lines and swaps are small outside a small number of emerging markets. For the UK they were negligible until the beginning of the current financial crisis. So to act as a lender of last resort or market maker of last resort in foreign currency, the Bank of England would, in short order, have to approach the central banks of the only two countries/regions that have serious global reserve currencies: the USA (the US dollar makes up around 64 percent of global reserves) and the euro area (the euro accounts for around 24 percent). No doubt it would be possible for the Bank of England to arrange swaps with the Fed and the ECB (if the UK Treasury were to back such a request), but there would be a cost. This insurance premium for foreign exchange liquidity risk could make the City of London less competitive compared to institutions operating in the jurisdictions of the Fed and the ECB.

Other countries are more vulnerable than the UK to a run on the foreign currency deposits of their banks or to a locking up of foreign currency wholesale markets. Iceland (where gross financial assets and liabilities reached almost 800 percent of GDP at their peak in early 2007 and the banking sector balance sheet in 2007 was around 900 percent of annual GDP, about twice the value of the UK's ratio of the banking sector balance sheet to annual GDP in 2007) is an example. Switzerland is another one, with a banking sector balance sheet of 660 percent of annual GDP in 2007. The Swiss problem aggravated by the fact that Switzerland is a Confederation where the central fiscal authority has very limited revenue

raising powers. Unless a strong and solvent fiscal authority backs up the central bank, the central bank cannot hope to access a significant amount of foreign currency liquidity when an emergency strikes.

The UK is more like Iceland than like the US or the euro area when we consider the size of its financial sector and especially the size of its external balance sheet. With gross foreign assets and gross foreign liabilities both close to 450 per cent of annual GDP, and with much of these assets and liabilities denominated in foreign currency, the UK is a highly leveraged entity - a hedge fund - and therefore vulnerable. In contrast, gross external liabilities of the US are around 100 per cent of GDP. And the US dollar is one of two serious global reserve currencies. Sterling, with 4.7 per cent of the stock of global reserves is a minor-league legacy reserve currency.

It is true that London has prospered mightily with sterling in the past, even after sterling lost its world reserve currency status. But that was then - *then* being before the current global financial crisis. No-one had even considered the possibility that all systemically important financial wholesale markets would seize up at the same time, making lender of last resort and market maker of last resort support from the central bank essential for the very survival of banks and a whole range of highly leveraged financial institutions.

The Bank of England can, at best, be an effective lender of last resort and market maker of last resort in foreign currency *at a cost* - a cost that will undermine the competitive advantage of the City. At worst, if the fiscal credibility of the UK authorities were to be in doubt also (not an inconceivable event, given years of procyclical budgetary policy), the Bank of England would not be able to operate at all as a foreign currency lender of last resort and market maker of last resort.

For the UK, there are just three conceivable ways to handle this problem. The first is to run down the international financial activities of the City. The second is to become the

51st state of the USA. The third is to adopt the euro. Only the third one is reasonable; the first is a waste of a potential comparative advantage and the second is infeasible. Adopting the euro happens to be an excellent choice for other reasons as well.

II The lender-of-last-resort theory of OCAs

There is no such thing as a safe bank, even if its assets are sound, in the sense that they would cover all obligations if held to maturity. Any highly leveraged entity that borrows short and lends long and illiquid is vulnerable to a speculative attack (run). A withdrawal of deposits, refusal to renew credit or inability to sell assets could force a bank into insolvency even if its assets were good, provided they could be held to maturity.

A viable banking system therefore requires a central bank that can act as lender of last resort (to offer support against funding illiquidity) and market maker of last resort (to offer support against market illiquidity of its assets).

A viable lender of last resort and market maker of last resort has to be able to provide ample liquidity in the currency to which the banks it wants to support are exposed. If the bulk of the banks' short-term liabilities are domestic-currency-denominated, the central bank can always act as lender of last resort (LLR) and market maker of last resort (MMLR), although the price of doing so may be excessive inflation.

Excessive inflation will result from central bank domestic-currency LLR and MMLR operations, if the banks have a fundamental solvency problem (a solvency gap even if the assets could be held to maturity) rather than just a liquidity problem. In that case, the LLR and MMLR task can be fulfilled without excessive inflation only if the fiscal authorities can recapitalise the banks.

When a large part of the short-maturity liabilities of the banking system or its customers are denominated in foreign currency, and if these short-term, liquid foreign

currency liabilities are not hedged by liquid foreign currency assets, as was the case in Iceland, for instance, the central bank can act as foreign currency LLR and MMLR only to the limit of its foreign exchange reserves and its ability to borrow foreign exchange, through swaps with other central banks, credit lines or whatever.

The ability of the central bank to borrow foreign exchange is ultimately limited by the ability of the sovereign to borrow foreign exchange. That in turn is limited by the ability of the sovereign to make (1) an internal fiscal transfer (now and in the future) from domestic households and firms to the state and (2) an external transfer of resources (now and in the future) to its foreign creditors.

The internal transfer requires higher taxes or lower public spending. The external transfer requires primary external surpluses (surpluses in the current account excluding net foreign investment income). That in turn requires a depreciation of the real exchange rate and probably a worsening of the external terms of trade.

Both the internal transfer and the external transfer are painful and politically unpopular. The question then becomes whether it was credible that the government would be able and willing to put the domestic economy through the wringer required to guarantee the servicing of the external debt.

There is a range of alternative ways of collateralising external borrowing by the authorities, that might not involve large-scale unemployment and excess capacity. Securitising future revenues from natural resource endowments that have not yet been exploited can be an attractive option.

How would membership of a wider currency union, especially of a currency union whose currency is a global reserve currency make a difference? It would not make any difference if the problem of the banks had been one of fundamental insolvency - if the hold-to-maturity value of the assets was insufficient to cover its obligations. But if the problem

were only one of illiquidity causing a non-fundamental insolvency because the assets of the banks could be realised in the short run only at fire-sale prices, then membership of the eurozone would have permitted the banks to survive. Many of the illiquid assets of the banks could have been used as collateral at the discount window of the Eurosystem or in Eurosystem repos. Because the euro is a global reserve currency, there would not have been no appreciable effect on the external value of the euro from the LLR and MMLR operations of the Eurosystem in support of the banks of any not too large member country.

None of this would do any good if the banks' problem had been one of fundamental insolvency rather than illiquidity creating the risk of non-fundamental insolvency. Even in the euro area, any country with a large banking system could face an unmanageable banking sector insolvency gap. The fundamental solvency gap of the banks could be too large to be manageable for the national fiscal authority. Only international aid, or fiscal risk insurance and fiscal burden sharing would help a country whose banking system's solvency gap exceeded the fiscal capacity of the national authorities. But if the country's banks are fundamentally sound, then membership of the euro area would have prevented a collapse.

This financial stability of lender of last resort theory of optimal currency areas has obvious lessons here for other small and medium-sized countries with large, internationally exposed banking sectors and their own currencies. In Eastern Europe, Hungary, Poland and the Czech Republic.