The Rise and Demise of Robert Mundell's Theory of "Optimum Currency Areas"

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Robert Mundell – who passed away this last April – received the Nobel Prize in 1999 chiefly for two short articles in 1961 and 1963 which he wrote as a young man. The first in 1961 was an 8-page paper on "Optimum Currency Areas" (OCA), the second in 1963 was on stabilisation policies under fixed and flexible exchange rates, which evolved into the Mundell-Fleming-Model. The latter was incorporated in the ISLM-model which became then a cornerstone of international macroeconomics and a guideline for shaping the global world order.

In the OCA paper he argued for "optimum currency areas" for special cases with high cross-border or cross-regional mobility of labour and capital. Thus, it was an advice for no or only small currency unions in special cases since normally cross-border factor mobility, especially regarding labour, is limited. The OCA paper inspired a number of authors to criticise, amend or revise his theory, first and foremost McKinnon (1963 and 2000) hinting to the important role of trade openness and monetary advantages of larger currency areas. Kenen (1969) emphasised the neglected role of shock-absorbing structural diversification and the need for fiscal policy in a currency union. Frankel and Rose (1998) held that trade openness and factor mobility tend to emerge endogenously once a currency union is established. Actually, the first wave of resonance was limited. However, the strongest critic was the author himself (cf. Priewe 2007).

When Mundell received the Nobel prize in 1999, he was lauded by Jean-Claude Trichet – later the President of the European Central Bank (ECB) – as the "father of the Euro" and also because of his 1961 article (besides others), although he had rejected at the time large currency areas or qualified them as sub-optimal. Later he published only a few articles in favour of much broader “optimum currency areas”. The first paper in this direction was written in 1969, an influential paper in favour of a common European currency, hence a plea for a large currency area or a monetary union, evidently in stark contrast to the 1961 article. The paper remained unpublished until 1973 when it appeared, unrevised, in an anthology, supported by a second analytical paper in 1973. In a number of more popular writings and interviews he outed himself as a vocal supporter of the euro project. The second Mundell is the adversary of the early Mundell. Mundell II refers to his alter ego from 1961 only seldom, and then only in sub-clauses. In retrospect, there are three options: either Mundell I is correct or Mundell II is correct (both cannot be correct), or both are flawed. In this essay it will be argued that the third view is correct, with the wisdom of hindsight.

In the following I review Mundell I and Mundell II, in order to trace the reasons for his mind shift. I also search for overlapping common opinions of both authors. Afterwards I sketch briefly a few pillars of a theory of a currency union, using the evidence from the euro area.

Mundell I

Mundell’s basic idea for an optimum “currency area” is simple. There are five components of his theory: the notion of an optimum currency “area”, the properties of flexible exchange rates, the focus on asymmetric shocks, the role of factor mobility as a substitute for exchange rate flexibility, and the criterion for optimality.

Currency areas

Mundell invented the term “currency area” and includes it in the old debate about flexible (floating) versus fixed exchange rates which were applied to states/countries. An “area” in this context can refer to five very different geographies: (i) the region of a one-currency-country with full internal factor mobility and no external factor mobility; (ii) the region in which factor mobility exists within a country with a single currency but several regions; (iii) a set of several regions, connected by factor mobility, across different multi-regions-countries with different currencies; (iv) a region embracing several countries with different currencies or (v) a unitary currency, a currency union. An optimum currency area is a region of any of the geographies mentioned with a high degree of internal factor mobility, fixed exchange rates of member countries (or a regional currency) and flexible exchange rates vis à vis other currencies. An OCA need not necessarily be a monetary union with a common currency. The specific features of a currency union are not described or designed by Mundell. It could be a group of countries with different currencies with fixed or pegged exchange rates, a currency board, official dollarisation or an area with a single common currency, i.e. a monetary union. He holds that the "domain" of an optimal currency area is not a country or a state, but a region. Since Mundell remains so vague on what an optimal currency area really is, he opens Pandora's Box to manifold questions, such as whether Canada or the US are an OCA or whether both countries together are an OCA, hence better off with a fixed exchange rate or a common currency. To some extent, the OCA theory is a contribution to the debate on fixed or flexible exchange rates.

The conventional view that a currency area has to be congruent with a nation state is however not explicitly challenged by Mundell, so that his new category could only apply to new states: "In the real world, of course, currencies are mainly an expression of national sovereignty, so that actual currency reorganization would be feasible only if it were accompanied by profound political changes. The concept of an optimal currency area therefore has direct practical applicability only in areas where political organization is in a state of flux, such as in ex-colonial areas and in Western Europe." (p. 661) In other words, this geography is very large and his theory is highly relevant – in Mundell's view – to a large number of countries. Yet, factor mobility – without distinguishing labour and capital – is mostly limited to all or some regions within countries, so that optimal currency areas are likely small. The criterion of factor mobility stemmed from classical trade economics in which factor immobility between countries prevails while factors are fully mobile within the regions of countries (type i). He questioned this assumption so that the applicability of OCA theory could embrace a large part of the world.

The first half of the article deals only with regions of type (ii) and (iii), an ostensibly rather irrelevant case when a country considers to use different monies in different regions or the splitting of the country into two independent ones with different currencies – each now an OCA. In the latter case, the world would embrace many sub-national small OCAs. Nevertheless, his valid point is that the regions of large countries with rigid factor prices should be assessed as suboptimal currency areas, since they lack internal exchange rates, but can use factor mobility as a substitute in the case of asymmetric shocks hitting the regions differently. Without this mobility, unemployment cannot be tackled by standard macroeconomic policies. This insight from regions (ii) and (iii) is then used for the analysis of case (iv) which can be highly relevant in the future, including the age after Bretton Woods.

A few sentences reveal that he was critical of the Bretton Woods system, which had led to many disequilibria, as he asserted. It is clear that the 44 countries that signed in 1944 the Bretton Woods Agreements did not establish an optimal currency area although their currencies were indirectly fixed to gold as a common currency and directly to the US-Dollar – apparently a non-optimal currency area lacking both flexible exchange rates and cross-border factor mobility. Then Mundell's eight pages have to be read as an attack in disguise against the Bretton Woods agreement. Although Mundell discusses the difference between inter-regional adjustments within a country and international adjustments among countries with fixed exchange rates, he blends both issues and concludes "The optimal currency area is not the world." (p. 659) in order to ascertain his message: "The optimum currency area is the region." (p. 660), and the logical consequence would be: The optimal currency area is not necessarily the nation state.

His focus on the region reveals a disconnect between money and state, thus ignoring (or belittling) overwhelming historical evidence and also the logical connect: the central bank is part of the state, no matter whether independent or not, and money in its nucleus is therefore created by the state (cf. Priewe 2007, p. 43-47, Goodhart 1998). So, I conclude the novel concept of OCA is vague and remains so opaque that it cries out for being changed or abandoned. Mundell II did it.

The function of flexible exchange rates

Mundell did not differentiate the types of flexible exchange rate regimes, such as hard pegs, soft and adjustable pegs or full floating, especially under full international capital mobility (which did not exist in 1961). There was hardly any experience with flexible exchange rates in the sense of full floating, except a short period of experimentation between the US and Canada which remained unsuccessful. Mundell had observed that Canada is divided in several regions with limited factor mobility among them. Hence a change of the Loonie against the US-dollar has mixed effects on the Canadian regions and may be ineffective and senseless. Yet, in principle, Mundell believed in the shock-absorbing capacity of flexible exchange rates between countries with no or low factor mobility among them, following both the monetarist Friedman and the Keynesian James Meade.[1]

Yet, Mundell was even at the time sceptical of the effectiveness of flexible exchange rates so that he mentioned five conditions for making them effective and efficient, otherwise his OCA concept would collapse. Among the conditions which he mentioned (p. 663) were dynamic stability even under conditions of speculative capital flows; absence of too strong changes of rates which could distort trade; protection of creditors and borrowers against

[1] Keynes differed from Meade. He advocated stable but adjustable exchange rates but not floating under full international capital mobility, neither irreversibly fixed rates. But he clearly distinguished a global monetary system from a currency union.

changes; wages and prices should not be indexed to import prices. This amounts to the prevalence of money illusion regarding money wage changes. In modern terminology, the pass-through of exchange rate effects on wages must be kept small. Mundell did not mention the Marshall-Lerner conditions, but it is likely that he had them in mind when stipulating effectiveness of exchange rate adjustments. His caveat regarding flexible exchange rates might be a prescient hint to the later Mundell II.

Mundell was also mute on fixed exchange rate regimes. He did not differentiate soft and hard pegs, with or without cross-border capital mobility, and all the various exchange rate regimes with semi-fixed or fully fixed rates. So, he argues about corner solution regimes, flexible or fixed, black and white with no shade of grey. The difference between hard pegs and a common currency is not discussed, so that the theory cannot capture the specifics of a multi-countries currency union with one currency and one central bank. So, OCA theory marks Mundell I lacks a theory of a currency union. He does not address that a currency union is more than a group of countries with fixed exchange rates.

The focus on asymmetric shocks

The issue that needs to be tackled – following Mundell I – in a currency area is an "asymmetric shock" which affects a currency area with two or more regions. As a representative example of an asymmetric shock Mundell chose an aggregate demand shock which hits only one region negatively and the other(s) positively. How about a negative demand shock without a positive shock in the other region? Actually, a negative shock is defined in a way that it can always be healed by either factor mobility (out-migration, net capital inflows), i.e. by changes in the quantity of production factors, factor prices assumed as fixed, or by exchange rate depreciation that changes the terms of trade. There might be a host of other types of shocks, e.g. shocks that hit only one region but have no positive effect on the other region, be it demand or supply shocks. Then out-migration might not occur in the affected region, unless there is a government embarking on expansionary monetary or fiscal policy. Furthermore, there might emerge a special type of adverse shock that comes with factor mobility: brain drain or "sudden stop" problems with capital inflows triggering sudden outflows. Many asymmetric shocks, demand and supply shocks, may require fiscal policy of the central state. Many asymmetric shocks come alongside symmetric shocks, hitting one region more than another. The focus on asymmetric shock seems overstated and too narrow.

How about *symmetric* shocks hitting all regions in the currency area equally? He did not even mention them, probably because he believed that they can easily be tackled by exchange rate adjustments, induced by foreign exchange markets so that explicit monetary and/or fiscal policy is unnecessary. If monetary or fiscal policy were necessary, he would have to address the need for a common central bank and a common treasury in a multi-countries union. The most important issue for a currency union – forgotten? That would be like Hamlet without the Prince.

Factor mobility as a substitute for flexible exchange rates

Mundell defines an OCA by factor mobility within the area, but he focuses mainly on labour. In principle he follows both James Meade and Milton Friedman in the notion that currency areas, traditionally countries, should let their exchange rates float. If regions were affected by asymmetric shocks, price and wage flexibilisation cannot warrant macroeconomic adjustments because of stickiness, at least in the short run. Then either exchange rates can adjust or factor mobility substitutes for exchange rate adjustments. Hence, an OCA requires internal factor mobility as the key or even the only requirement. Exchange rate adjustment is ineffective if a country like Canada has two or more regions with little factor mobility between them if one region is hit by an external shock. So, there are three adjustment mechanisms, flexible exchange rates, factor mobility or redefining the optimal currency area.

Apparently, Mundell believed that labour and capital mobility is in OCAs quicker than sluggish wage-price adjustments. This is an empirical issue, but one can expect that inter-regional labour mobility may sooner or later materialise, unless there are legal constraints or hard cultural or language restrictions. Even if cross-border labour mobility were possible, it might cause more problems than it solves in both the origin and the destination region. Furthermore, it takes time and is costly. Hence, labour mobility might be a questionable mechanism to replace exchange rate adjustments. To some extent intra-nation labour mobility may substitute cross-border mobility as later critics remarked. Inter-regional or cross-border capital mobility is not analysed at all in Mundell's paper. This issue of factor mobility as a prerequisite of an OCA was considered an empirical issue while he intended to focus on theory. Overall, factor mobility as the key factor for an OCA seems overstated, especially if induced – involuntary - labour mobility, with time lags, would be included in the analysis. Later critics assumed factor mobility as endogenous, once a currency union is established.

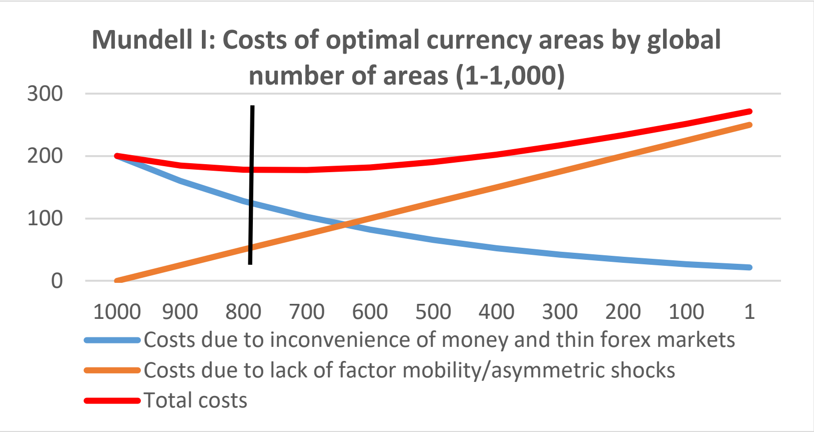
Optimality of currency areas

The criterion for optimality in Mundell's concept for currency regions is the capacity to adjust after an asymmetric shock to regain full employment. This implies that either exchange rates or factor mobility can facilitate the return to full employment or the macroeconomic equilibrium, given that wage-price-flexibility does not exist. Thus, fiscal policy is implicitly ruled out and not even addressed. Monetary policy in conjunction with flexible exchange rates supports the adjustment, and monetary policy is effectively usable under flexible exchange rates, as elaborated in Mundell's second seminal paper published in 1963. Regarding an OCA with a region of type (v), i.e. a currency union comprising several countries, all important issues remain unaddressed: what kind of central bank? How about structurally heterogenous Member States (MS)? What are the advantages of joining such a union? What kind of statehood is required? Even if factor mobility comes endogenously but not as a precondition, will it function to warrant balance of payment equilibrium? In short, the feasibility of a currency union is more important than "optimality" in Mundell's sense, and even if optimality is not given up front, could it be achieved later? These issues are of a conceptual nature and not simply empirical.

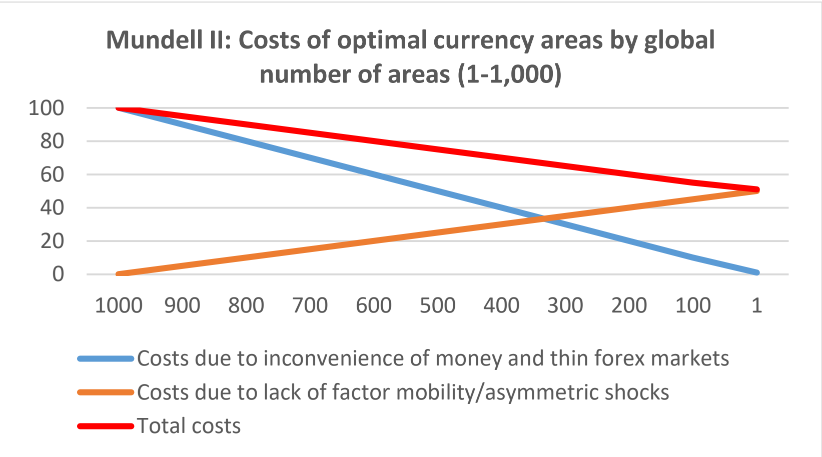
Mundell adds another determinant of optimality to his theory – the *"convenience of money"* (borrowing this term from John St. Mill, p. 662). If there were little interregional factor mobility, then optimal currency areas would be small and hundreds or thousands of currencies would exist on the globe, given that exchange rates work in the way hypothesised. This would raise transaction costs regarding the functions of money (unit of account and medium of exchange, the function as a store of value is not mentioned), so that these currency areas and their currencies become "inconvenient". Furthermore, the smaller the currency regions become, the more likely that forex markets are thin so that speculative exchange rate changes become more prevalent. Hence, there are upper limits on the number of currencies on the globe. The opposite solution would be a global currency area with one global currency – with minimised transaction costs, but costs due to limited factor mobility and asymmetric shocks.

At this juncture Mundell I seems to meet the early Mundell II. The argument put forward makes the optimal currency area undefined: it could be the world, or it could be small regions with internal factor mobility and immobility between them. Seemingly there is a trade-off, so that Mundell I is depicted in graph1 with a high number OCAs, but not too high (upper limit), while Mundell II prefers a single world currency with giving attention to factor immobility.

Graph 1



Graph 2



Summing up, the biggest shortcomings of Mundell's OCA concept are the following four points: First, declaring factor mobility as the pivotal criterion for an OCA is a too narrow and misleading approach, especially if capital and labour mobility fall geographically apart. Under globalisation of finance, the OCA of the 21st century would be – almost the whole world. Under labour mobility as the main criterion the demarcation lines differ greatly. Second, flexible exchange rates in cases of little labour mobility may not function as a satisfactory adjustment mechanism for both symmetric and asymmetric shocks – the world of floating exchange rates under full capital mobility is different than its early proponents and the critics of Bretton Woods believed. Hundreds of currencies on the globe, mostly for small and medium countries, cannot fulfil the functions of money properly, including the store of value function. A steep currency hierarchy will emerge. Third, having five different types of regions (i-v) in one box is not a fruitful undertaking for designing one concept of OCA. Fourth, a monetary union is not just one form of OCA. A union needs a special theory, embracing a special institutional setting and several policies, especially fiscal policy, monetary policy and financial regulation. In short, a currency union needs some form of common statehood, differing from currency areas with pegged exchange rates.

What was appraised in Stockholm as Mundell's prowess to stimulate broad further academic debates over a long period had its origin in an incomplete and grossly simplified model which leans more to small OCAs if the monetary costs (inconvenience) are weighed small. This is what Mundell I probably did without an explanation for the implicit weighing. Otherwise, he would be indifferent and his model useless. Hence it is understandable that the author himself felt so much discontent over the years and decades that he changed his position so radically that he silently morphed into Mundell II.

Mundell II

Presciently, Mundell I had built a bridge to Mundell II by the caveats in his 1961 article – the one on the functioning of flexible exchange rates which reflected his doubts on both Meade and Friedman in this regard, and the caveat on the inconvenience of money in small OCAs. If these reservations gain weight, Mundell II can be captured in Graph 2. The lowest costs are reached when there is a global currency.

Mundell II never wrote a systematic new theory of OCA, heavily criticised by Krugman (2012 and 2021). He kept quiet on his 1961 debut paper as if it were a bastard child. Instead, he published a few papers in favour of a European currency. In 1969, he gave a speech on a conference on the future of the international monetary system with the programmatic title "A Plan for a European Currency". The paper was published four years later in an edited book (Mundell 1973) without any changes. The speech was most likely quite important for debates in Europa and might have given support to the Werner-Plan (1971) which proposed a common currency and was accepted by the European Community. Mundell's speech was given a week after The Hague Summit which commissioned the Werner-Plan.

Mundell's "Plan" mentioned the term "optimum currency area" only once, stating: "Both the U.S. and Europe possess enough of the characteristics of an optimum currency area to move toward narrower, rather than wider fluctuations in exchange rates." (p. 5) Not a single word on labour mobility while he called for "closer integration of capital markets" (ibid). Cross-border labour mobility was small and there were strong restrictions on international capital flows at the time. Mundell saw Europe getting increasingly dependent on the US as the superpower in terms of functions of the currency: "From 1956 to 1960, the dollar became the international currency for central banks, as intervention currency unit of account, unit of quotation, reserve asset, store of value of asset of settlement…" (p.7). Britain, France, Italy and Germany plus a few smaller advanced countries could be stronger together than remaining divided and subject to currency speculation. European central banks had lost control over their money supply, he contended, in face of the expansion of the eurodollar market and strong net inflows of dollars. He feared widespread dollarisation of money functions: "The dollar has become the apex of the international monetary pyramid." (p. 9)

He opposed general flexibilisation of exchange rates which "would enhance rather than weaken the inroad of the dollar" (p.10). Mundell called for the creation of a European money, however in a first step argued for pegging to a regional currency, namely the Sterling, and floating together as a bloc – with narrow margins – against the dollar. Monetary policy should be coordinated with the Bank of England and/or the Bank for International Settlements. For the long term, he demanded equal partnership with the US for "rational monetary management of the world economy". He mentioned five main reasons for creating a common currency: saving reserves, protection against the expansion of the dollar, better control of money supply, more seigniorage and a correction of the US Balance of Payments, hence a devaluation of the dollar (p. 21).

Mundell argued mainly geopolitically: if Europe wants to stop falling back against the US in terms of technology and political influence, Europe has to unite on several fronts, including currency issues. "Europe would become a museum run by American curators", he wrote, adding the calling: "It's time for Europeans to wake up." There was no mention of political unification, fiscal policy and the future of nation states.

Keynes had proposed similar ideas already in 1924 in his "Tract on monetary reform" (Keynes 1924/1978). He was in favour of European currencies floating either with the Sterling bloc or with the US dollar. Yet, Mundell's paper contained little to no theoretical reflections, except that monetary factors and the functioning of monetary policy rather than the real economy motivated him to move to the avant-garde of policy advisers.

In 1973 Mundell added "Uncommon Arguments for Common Currencies" (Mundell 1973a). The main argument is risk sharing of countries with fixed exchange rates. The latter is considered a device for automatic cushioning of shocks "without destroying the image of the international moneyness of the national money in the public mind." (p. 115). The focus is on pooling reserve holdings which is supposed to avoid destabilising speculation. This reflects the opposite view on the functioning of flexible exchange rates as held by Mundell I. The early Mundell assumed efficiency of foreign exchange markets under flexible exchange rates, the later Mundell believed in the efficiency of fixed exchange rates. This and the hope that common money (or pegged exchange rates) can help in risk sharing and in diversification of financial assets in general (cf. McKinnon 2004).

In a short conference paper (1997) Mundell strengthened his preference for fixed exchange rates. He distinguishes "pseudo" and "true" currency areas. The former included the Bretton-Woods system or the European Exchange Rate Mechanism, where there is no automatic stabilisation mechanism and in which low barriers to exchange rate adjustments prevail. Therefore, he agreed to pegged exchange rate regimes only as a transition to irreversibly fixed ones like currency boards or a common currency. Hence, he switched to the corner solution proposition with only two types of regimes: fully floating or fully fixed. Two years later Mundell wrote a short note (Mundell 1999) entitled "The Euro: How Important?". He listed seven characteristics of great international currencies: a large transaction area, stable monetary policy, absence of capital controls, a strong central state like the US (in Europe a weakness, but "strongness" is solely interpreted as military strength and as risk of invasion of hostile military forces), backing with large gold reserves, sense of permanence, and low interest rates. He envisages three currency blocs on equal footing: the euro bloc, the dollar and the yen bloc. The dollar-euro exchange rate will be the most important price in the world. He added in his Nobel-lecture in Stockholm: "There are, however, two pieces of unfinished business [at the end of the 20th century, J.P.]. The most important is the dysfunctional volatility of exchange rates that could sour international relations in time of crisis. The other is the absence of an international currency." (p. 339) Two years later Mundell clarified what he meant by an international currency. In a long interview with Friedman (Friedman/Mundell 2001) he called not for a single world currency that replaces national currencies, but for an international currency similar to Keynes's idea of a "bancor" as a currency only for international transaction within a global clearing union led by the IMF (Keynes 1980). In an early stage of negotiations on the Bretton Woods project also the American negotiator came up with a similar proposal but there was no consensus reachable. Mundell's turn to Keynes comes as a surprise. Mundell abhorred Keynesian fiscal policy with deficit spending under fixed exchange rates as he feared inflation (Friedman/Mundell 2001). The true theoretical identity of Mundell II remains blurred.

Why the turnaround?

Mundell II clearly dissented from Mundell I. Not only is the contradiction amazing, but also the fact that he doesn't deliver a profound theory of a true large currency area in the form of a monetary union, neither for the euro area nor for the world. The core points why Mundell II has become a believer in large currency areas with common money are his rejection of floating exchange rates and the much stronger appreciation of the idea of "convenience of money", hence the huge advantages to have only few or even only one powerful currency (cf. to McKinnon 2000 and 2004).

Mundell himself described in an unpublished paper, actually a manuscript for a luncheon speech at the Tel-Aviv University in 1997 (Mundell 1997a), how he changed his identity. He distrusted already the concept of flexible exchange rates as noted in his caveats in 1961. In the mid-1960s he defected from a group of prominent economists who propagated the transition to floating exchange rates as a recipe for the globe after the dollar-gold standard. In the late 1960s he saw the rise of the dollar and the roll-back of European currencies. The main change came in 1971 and 1973 when the dollar was decoupled from gold and turned to full floating. His conjectures that flexibilization would lead to inflation materialised. Massive depreciations induce in a system of strong trade integration cost push inflation which triggers price-wage spirals. A world without an anchor for money – be it gold, the dollar, commodities, money aggregates or wages – falls in chaos, with around 190 or so floating currencies. Friedman turned to money control which did not work. Europe was more or less forced to respond with monetary reforms after 1973. Related insights were that large economies would dominate small ones which have more problems to live with floating rates.

Furthermore, he had lost his faith in exchange rate adjustment for correcting balance of payments imbalances. Transfers of money could do the job as well. In an interview with the "Journal of Economic Perspectives" in 2006 he mentioned in his provocative style of wording: "Europe has as much labor mobility as it wants. The European Commission sends money to depressed regions so labor won't have to migrate." (Mundell 2006, p. 98) The whole factor mobility argument was downplayed. Labour mobility and also wage-price flexibility would likely materialise once currency areas are established. Monetary discipline with low inflation in all parts of the currency area, enforced by powerful independent central banks, render exchange rate adjustments unnecessary and could dampen currency speculation. And even flexible exchange rates will be ineffective in countries with several regions and limited interregional factor mobility. "Without exception, all the great classical economists favored the idea of fixed exchange rates anchored to gold and abhorred inconvertible currencies and flexible exchange rates." (Friedman/Mundell 2001, p. 27) Instead of gold he looked either for a strong common currency or on the global scale a new world currency. His main argument for fixed exchange rates was however that the economies of scale of the unit of account makes large currency unions stronger and better viable. He meant *de facto* all functions of money. The benefits outweigh possible costs.

His blindness regarding the institutional design of currency unions and his stubborn neglect of dealing with the nexus of money and state are amazing. Certainly, he called for a strong European state and a political union, but this was lip service. He had never responded to Peter Kenen's vision of a currency area with a focus on fiscal federalism, let alone Keynesian and post-Keynesian critiques. His excessive self-confidence hindered him to delve into the obvious problems of fiscal policy, of designing one-size-fits all type of monetary policy and to deal with the loss of national central banks. Therefore, my finding is – Mundell I's OCA theory was fundamentally flawed; Mundell II would agree, but mention his early caveats, and Mundell II's concept of large currency areas never reached the status of a well-elaborated theory. Nevertheless, I share many ideas of Mundell II. Krugman and other textbook writers appraise only Mundell I and regret the author's demise toward Mundell II (Krugman 2012 and 2021).

Some conclusions for currency unions

Mundell II had understated grossly the problems of sharing a common currency in Europe which we have experienced now for more than two decades. The key problems and potential remedies are the following (some of them mentioned by Krugman 2012).

1. Fiscal policy: more important than factor mobility within the monetary union is the lack of a central fiscal capacity capable to stabilise cyclical fluctuations and severe crises. A certain degree of fiscal federalism is indispensable for coordinated fiscal stabilisation in parallel with national fiscal policy of the member states, for genuine European public goods that cannot be provided by national authorities, and for some degree of redistribution to support less advanced or stagnating members or for tackling common challenges. More fiscal space of member states is urgently needed the more heterogenous the union is and the lower the degree of effectiveness of one-size-fits-all monetary policy. Furthermore, the vulnerability of member states to asymmetric shocks of different kinds is much bigger than Mundell thought and can easily make weaker members unstable or even insolvent, especially by shocks emanating from financial markets. Ironically, Mundell's writing on the macroeconomic policy mix under fixed exchange rates offers much scope for fiscal policy (Mundell 1963). But he had become a fiscal hawk in the meantime.

2. Inflation/deflation control and trade imbalances: Having the same inflation rate in all member states without national central banks requires wages as a stability anchor, hence control of unit labour cost dynamics. Prices for tradables might equalise, but not necessarily prices for non-tradeable goods and services. Abandoning national monetary policy without national replacement does not suffice. In case of severe trade imbalances, reflecting a misalignment of real exchange rates, adjustment rules are needed. Internal revaluation in surplus countries should be given priority to internal devaluation of deficit countries. This implies that the monetary union needs an economic government that has tools to deal with macroeconomic imbalances. Prevention of chronic substantial imbalances is key.

3. Unifying sovereign bonds markets: Sovereign bonds can be at risk due to legacy debt which burdens some countries more than others, due to asymmetric shocks and idiosyncratic political features. For keeping risk premia on sovereign bonds low, the central bank should provide support as a lender of last resort for sovereign bonds (or as "market maker") to smooth roll-over of debt. This requires an extended function of the central bank, similar to the de-facto-protection of sovereign bonds of the central government by central banks in advanced national currency countries.

4. Banking supervision and financial regulation: A currency union requires a unified common system of banking supervision and financial regulation, i.e. a banking union.

5. Trade policy: a currency union with free mobility of capital requires free trade with common norms and standards, especially regarding non-tariff barriers, trade policy with third countries and provisions to avoid tax dumping within the union.

6. Political system: A currency union requires political decision making in common democratic institutions with division of powers, including a special common jurisdiction implemented by European Courts. Without majority decision making, legislation would be stymied by unanimity requirements. Hence, a certain degree of state-and-democracy building on the supranational level is indispensable. Decisions by inter-governmental coordination with unanimous consent will not suffice for all areas of policies.

7. *Optimal currency area*: The OCA-approach raises the wrong questions. Cross-border labour mobility, still tiny, would not solve our problems but can be part of the problem, and capital mobility exists in abundance in the euro area. The key question is whether a currency union improves economic and political conditions of its member countries, compared to the prior situation. There is certainly a trade-off: a large currency union with many members in a wide range of per-capita income involves many monetary and financial advantages, but reaching minimal political preconditions with a common federal state is much more difficult. However, without a currency union, some thirty separate currencies in Europe would lead to a strong hierarchy, probably with the German currency on top and the others as satellites, similar to the

prior European Exchange Rate Mechanism which had become obsolete after the German unification. Such a system would be as untenable as separately floating exchange rates against the US dollar. In this respect Mundell was foreseeing the economic problems at an early stage. Unfortunately, the Maastricht Treaty was – and still is – rather imperfect, to say the least (Bibow 2019).

Nothing on these issues can be found in Mundell's "Plan For a European Currency" from 1969 or in later publications. Although an adult now, Mundell's poster child, the euro, needs more and better advice.

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