Theory of Optimum Currency Areas: A Literature Survey

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Theory of Optimum Currency Areas: A Literature Survey

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Abstract

This article aims at providing an eclectic analysis of the theory of optimum currency areas (OCAs). Although the basic tenets of the theory were anticipated during the late 1940s and the 1950s, the theory was developed and matured in three highly influential papers of Mundell (1961), McKinnon (1963) and Kenen (1969). However, because of internal conflicts and contradictions, the theory gathered gloom for the next two decades before it could make a solid comeback in the early 1990s. Much of the reason of this revival was the efforts towards the reconciliation of these internal conflicts. During this period, the theory moved beyond the usual cost–benefit analysis and reflected a shift from the criteria that emphasise on the state of the economy towards the criteria that focus on desired policy trade-offs. Recent advancements in the area using dynamic general equilibrium analysis shows that the revival of interest in the theory of OCA reflects developments in a literature that has little to do with the subject of OCAs itself. The merit of the OCA theory is that it helps to bring together several strands of the literature on monetary integration.

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Introduction

'One country, one currency' is the very novel idea of the recent past. In the world of modern welfare economics, this raises the question: Does a country gain maximum benefits when it uses its own currency? In other words, can any country be considered a currency area?[1] On the positive side, a currency union thus corresponds to the 'optimum currency area (OCA)'[2] insofar as the political considerations for creation of the country correspond to the economic considerations of currency optimality. A slight doubt about this statement brings up the Mundell's seminal question: What is the appropriate domain of a currency area? In other words, it sums up to answering the question of how large should the territory using a single currency be. Much of the monetary economics literature deals with this issue. More specifically, the theory of OCAs is devoted to such an analysis.

The OCA theory determines the conditions which countries need to satisfy in order to make the monetary union more attractive, that is, to ensure that the benefits of the monetary union exceed its costs. Broadly speaking, the benefits include: (a) the elimination of currency conversion costs and the disturbances in relative prices arising from nominal exchange rate fluctuations; (b) lower transaction costs; (c) synchronisation of shocks within a currency union and the potential to discipline policies, in particular, of a new entrant to combat inflation, insofar as the anchor country (or the monetary union's authority) is better able to commit to monetary rules; (d) higher integration in goods and capital markets; and (e) insulation from monetary disturbances and speculative bubbles that might otherwise lead to unnecessary temporary fluctuations in the real exchange rate (given sticky domestic prices) while the main cost is the loss of independence by a member country to tailor monetary policy to its local needs. Based on the benefit–cost criteria, the theory has been widely used to analyse whether countries should join a monetary union or not. Besides, the theory can be seen as a tool which helps in answering the question of how to choose the optimum exchange rate regime. It should be mentioned, however, that there is no standard theory of OCA, but rather several approaches which all started with the Mundell's (1961) seminal paper 'A Theory of Optimum Currency Areas'. In what follows, a precise account of the various contributions towards the theory is presented. More specifically, we discuss in more detail the various benefits and costs stemming from currency unions and critically review the theoretical features of the currency areas analysis offered by the OCA theory. We trace the developments of the OCA theory which

after an initial surge in the 1960s, went into an intellectual purgatory for about two decades. We also discuss factors that led to the renewal of interest in the theory in the early 1990s, and the current state of knowledge (related to the theory of OCA) is also narrated. This helps us to elaborate the applications of the OCA theory in the areas of: (a) selecting an optimal exchange rate regime for a given country; (b) analysing the relationships among countries, regions and currencies; and (c) practical applicability of the theory of monetary integration.

The remainder of this article is organised as follows. The second section provides the background in which the OCA theory originated. The third section addresses the foundations of this theory through the contributions of Mundell (1961), McKinnon (1963) and Kenen (1969). The fourth section highlights the reasons for the virtual abandonment of academic research in the field during most of the 1970s and 1980s. The fifth section presents recent work that has contributed to revival of interest in the subject. The sixth section provides a chronological overview of the events happened towards the monetary integration of the eurozone as an optimum currency area. Finally, the seventh section concludes.

Origins of the Theory of OCA

The theory of OCA deals with complicated and intermingled issues with the basis in international economics. The theory originally developed in a world characterised by the Bretton Woods system of fixed, but adjustable, exchange rates and limited international capital flows. The widely held views of the time were: (a) inflation–unemployment trade-off in the short run, popularly known as stable short-run Phillips curve and (b) wage–price stickiness associated with the existence of monetary and fiscal policy to successfully fine-tune the economy along the Phillips curve. Because of the presence of 'limited' and not 'complete' capital mobility, the sector-specific or industry-specific shocks were the main focus of academic analysis. Also, with limited capital mobility, the early contributors to the OCA literature dealt with two extreme regimes of exchange rates: (a) the floating and (b) the permanently fixed exchange rates. In fact, the origins of the theory of OCA can be traced back to the long-standing debate about the merits of fixed versus floating exchange rates (Ishiyama, 1975).

Although Mundell (1961) is mostly referred to as the originator of the concept of an OCA, yet, the basic tenets of OCA theory were anticipated

no later than late 1940s and 1950s (Cesarano, 2006). For instance, Friedman (1953), in his article 'The Case for Flexible Exchange Rates', presaged Mundell's identification of the conditions required for the smooth functioning of a single currency area. Other writers include Lerner (1947), Meade (1951) and Scitovsky (1958). These authors, while analysing the effectiveness of inter-regional adjustment within countries, drew attention towards the crucial role played by single, central fiscal and monetary authorities and the free movement of goods and factors of production among regions in economic adjustments. It was their rejection of the paradigm of fixed exchange rates regime that set them apart from Mundell.

The Genesis

The earlier authors who wrote about OCA are Mundell (1961), McKinnon (1963) and Kenen (1969). They sought to show that an economy's characteristics should be a determinant of its exchange rate regime. The main aim was to identify the conditions which, if satisfied, diminished the case for flexible exchange rate regime.

Mundell

Mundell defined the OCA as the geographic area, and not the national territory, in which the goals of internal balance (full employment associated with stable prices, i.e., low inflation) and external balance (a sustainable balance of payments position) could most easily be achieved. He gave three examples to illustrate this hypothesis favouring single currency introduction. First, a situation in which there are two countries, say country A and country B, and country B is negatively affected by an asymmetric demand shock. To the extent that prices are allowed to rise in country A, the changes in terms of trade will help to reduce some of the adjustment burden in B. However, if A's central bank tightens credit to restrain inflationary pressure, the rise in the prices of A will not help to reduce unemployment in B. In this case, B will have to bear the entire burden through reduction in its employment level. Second, a situation in which a country is divided into two distinct regions,[3] say region A and region B, and an asymmetric demand shock affects region B negatively. This leads to an inflationary pressure in A and creates unemployment

pressure in B. If the central bank increases money supply in the country as a whole, inflationary pressure in A will aggravate and the negative terms of trade for B will correct the employment problem in B. Third, a situation in which there are two countries, the USA and Canada, with independent currencies and two regions, East and West, which run across these two countries. East, in both countries, produces timber, while West makes cars. Assume that East experiences a rise in productivity (asymmetric demand shock). This will lead to excess supply of East's product and excess demand for the product of West. In other words, productivity shock causes unemployment in the East, inflation in the West, a trade deficit in the East and a trade surplus in the West (both internal and external disequilibrium). Central banks in both the countries attempt to relieve the unemployment pressure in East region. If unemployment is prevented in both the regions, inflation in both regions cannot be avoided. The reverse also applies. This does not make clear which country should devalue its currency, which implies that flexible exchange rates do not bring back the equilibrium. The conclusion is that the two countries do not form an OCA (Mundell, 1961). However, the argument still remains valid when currencies are organised at the regional level. If these two regions have a fixed exchange rate, then another adjustment mechanism is needed to bring back the economy to equilibrium. This is the core of Mundell's argument.[4]

Mundell proposes three criteria to judge optimality. First, he identified 'labour mobility' as the key attribute of an OCA. The existence of high labour mobility within the two regions will shift labour from East to West, resulting in no unemployment in East and no inflationary pressure in West. This means that there will be no need of having their own exchange rates, but one common monetary policy will be satisfactory to both the regions. Therefore, the two regions should have a fixed exchange rate within their borders/boundaries, but a flexible exchange rate with the rest of the world. Second, Mundell emphasises the importance of 'wage and price flexibility' as mechanisms to cope with idiosyncratic demand shocks. If wages are not sticky in both the countries, the excess demand in the West (caused by a productivity shock in the East) would raise wages in that country, leading to a backward shift in its aggregate supply curve (decline in the aggregate supply of goods and services) and, hence, a rise in the price level. Also, excess supply in the East would decrease wages in that country, leading to a rightward shift in its aggregate supply curve (increase in the aggregate supply of goods and services) and a decline in the price level in that country. Economic agents in both countries would buy lesser products produced by the West and more products produced by the East,

thereby restoring equilibrium. Third, if two countries with flexible nominal exchange rates, and hence independent monetary policies, face disturbances in such a way that the policies responding to such disturbances depress economic activity in one region in both countries and at the same time stimulate economic activity in the other region in both countries, there exists an argument for forming two currency areas, one consisting of the depressed regions of the two countries and the other consisting of the stimulated regions of both the countries (Kawai, 1992). Mundell concludes this argument with the idea that in the absence of labour mobility and/or wage–price flexibility, the 'incidence of asymmetric shocks' across regions should be a criterion for assessing optimality.

On the microeconomic front, Mundell notes an inverse relationship between efficiency of money (in terms of a medium of exchange and unit of account) and number of currencies under flexible exchange rates (Dellas & Tavlas, 2009). The greater the number of currencies, the higher the transactions costs (medium of exchange) and information costs (unit of account) of money. Also, a large number of small currency areas could result in thin foreign exchange markets, thereby making it easier for speculators to affect the market prices (exchange rates) of the currencies, and thus, hinder the conduct of monetary policy (Mundell, 1961). All this supports relatively large currency areas.

Much less is known about the 1973b paper of Mundell (McKinnon, 2004). De Grauwe (2006) calls it 'new Mundell' (Mundell II) as opposed to the earlier contribution of Mundell towards the OCA theory, referred as Mundell I. According to Mundell II, in the presence of free capital mobility, the exchange rate becomes a target of destabilising speculative movements and, thus, a source of large asymmetric shocks.[5] Thus, it abandons the Mundell I view of exchange rate to be used as a tool to stabilise the economy after an asymmetric shock. In the world of free capital mobility, joining a monetary union should not be seen as a cost (arising from the loss of the exchange rate as an adjustment mechanism), but rather as a benefit (because the source of asymmetric shock, i.e., variable exchange rate gets eliminated). In fact, this is based on the idea that 'foreign exchange markets are not efficient'[6] and, hence, should not be trusted to guide countries towards macroeconomic equilibrium. No need to say that there is now substantial empirical literature which backs the non-efficient foreign exchange markets hypothesis. Mundell II also highlights the use of capital markets as an insurance mechanism against asymmetric shocks. However, this is possible only in a monetary union. A country that stays outside the monetary union will have to deal with large asymmetric shocks that arise from the instability of international capital flows. Thus,

it is not surprising to say the Mundell II became a major promoter of monetary union in large parts of the world, including Europe.

McKinnon

The second important contributor to the OCA theory is McKinnon (1963), who emphasised the 'degree of openness' and 'size of the economy' as crucial criteria for joining the OCA. Assuming that the output of an economy is divided into tradables and non-tradables, McKinnon defines openness as the ratio of tradables to non-tradables. He argues that more open economies favour fixed exchange rates, while flexible exchange rates are more advantageous for more closed economies. To illustrate this point, suppose an economy experiences a negative terms of trade shock so that its nominal exchange rate depreciates. If the authorities of the economy in question aim at stabilising the general price level, the rise in the price of tradables, because of the exchange rate depreciation, require a contraction in domestic demand to push down the price of non-tradables. The more open the economy (i.e., the larger the share of tradables in output), the larger the required contraction, other things being equal. Also, the more open an economy, the smaller it is likely to be in terms of aggregate GDP (McKinnon, 1963). Thus, smaller economies are more suitable candidates for monetary unions.

McKinnon also argues that changes in the nominal exchange rates in a relatively more open economy are less efficient in changing the terms of trade and less useful as an adjustment mechanism, because such changes would lead to fast and large offsetting changes in domestic wages and prices. The changes in foreign prices of tradables will be transmitted to the domestic cost of living. In other words, the wage contracts and prices will be highly influenced by the changes in prices of tradables through the changes in exchange rate. This will lead to reduction in 'money illusion'. In such cases of small open economies with balance of payments problems, McKinnon suggests that these economies should rely more on alternative instruments (e.g., on the fiscal policy).

Kenen

Peter Kenen is the third important contributor to the OCA theory. His 1969 paper analysed the effects of shocks to particular export products (i.e., sector specific or industry specific shocks). Through this paper,

Kenen made a three-fold contribution to the OCA theory. First, 'fiscal integration' is an important criterion to judge optimality. The higher the level of fiscal integration between two regions, the greater is their ability to smooth asymmetric shocks through fiscal transfers from a low unemployment region to a high unemployment region. Second, two countries with similar production structures and high labour mobility are highly suitable for a monetary union consisting of these two countries since a terms of trade shock (i.e., sector specific) is likely to affect them symmetrically. Third, since perfect mobility of labour rarely exists, a new criterion of 'product diversification' should be used to determine whether an economy should have a fixed exchange rate or a flexible exchange rate. Suppose a less diversified country producing only one product, which it also exports, is hit by a negative demand shock, resulting in reduction in its export sales. This fall in export revenues can be attenuated by a flexible exchange rate. This will occur through the depreciation of domestic currency caused by fall in export demand via reduction in demand for domestic currency. If the economy is under fixed exchange rate regime, this mechanism cannot be exploited, and adjustment should be done through a reduction of wages and prices or through increased unemployment. On the other hand, suppose a sufficiently diversified economy with highly diversified export sector faces uncorrelated shocks: a positive shock in one industry/sector and a negative shock in another industry/sector. These shocks will cancel each other because diversification will provide some insulation, and there will be no need of frequent changes in the terms of trade via the exchange rate. Thus, highly diversified economies are better candidates for currency areas than less diversified economies.

1970s and 1980s

After the initial upsurge of research activity on OCA theory in the 1960s, the theory took a back seat during the next 20 years. The main reason behind this was the presence of conflicts and inconsistencies in the existing criteria (of OCA theory). For instance, the following conflicts, which are worth mentioning: (a) Mundell's definition of regions is too broad and has little practical application (Grubel, 1970). (b) Mundell's concept of factor mobility implies that in the long run, the whole world is an OCA (Giersch, 1973). This is contrary to the Mundell's own view that the OCA is not the world (Mundell, 1961, p. 659). (c) Corden (1973) is skeptical regarding the importance of labour mobility in the adjustment

to asymmetric shocks. Also, in the long run, the capital mobility cannot solve the adjustment problem of the two countries affected by asymmetric shocks, though in the short run, it can be helpful (Corden, 1973, pp. 168–169). (d) OCA criteria suggest that small (in terms of GDP) and open economies should go for pegged exchange rates. However, such economies might also possess a low degree of labour mobility with adjoining countries, implying the desirability of flexible exchange rates. (e) Kenen's product diversification criterion implies that the most diversified economy is the world economy (Mundell, 1969, p. 111). Then, on the basis of insurance principle and from the point of view of hedging against risks of fluctuation, a world/universal currency is the best solution. (f) Small, but highly open, economies should adopt pegged exchange rate (McKinnon, 1963). However, small economies may also be relatively less diversified, thus making suitable candidates for flexible exchange rate (Kenen, 1969, p. 112). (g) Large (e.g., Germany), and not small countries (e.g., Luxembourg), are better suited for pegged exchange rates (Kenen & Meade, 2008). (h) De Grauwe (2003) explains a paradox where a country with a less diversified output is more prone to asymmetric shocks, and hence makes it a better candidate for flexible exchange rate regime. Also, small, open economies that trade a lot with the rest of the world become more specialised. This leads to the paradox that small and very open countries should keep their own currencies and not join the currency area (Broz, 2005). (i) Also, according to diversification principle, two relatively undiversified economies should float their currencies. However, if the same economies combine together and form a currency union, then the resulting economy will be more diversified with pegged exchange rate. This leads to a paradox. Besides, the diversification criterion can be turned around. Highly diversified economies can afford to have flexible exchange rates, whereas undiversified economies are less able to deal with exchange rate fluctuations. This reduces the diversification principle to a smoke screen. (j) Sustainability of the fiscal position: If the nominal interest rate on the government debt (raised to smooth adjustment to a shock) exceeds the nominal growth rate of the economy, a debt dynamic that leads to an ever-increasing government debt relative to country size (in terms of GDP) is set in motion (De Grauwe, 2014, pp. 209–210). (k) Trade openness leads to specialisation in production (Krugman, 1991). Thus, sector-specific shocks might become country-specific shocks. This suggests the desirability of flexible exchange rates, contrary to the inference drawn from openness criterion. (l) Contractionary devaluation debate: Devaluation does not always have a positive effect on income and output and, sometimes, this effect is

contractionary (Krugman & Taylor, 1978). (m) Lastly, the existence of current account deficit in an economy arising from the occurrence of positive productivity shock in the economy in question is in itself a paradox.

Canadian economist, Harry Gordan Johnson (1923–1977), concluded the proceedings of the 1966 University of Chicago conference with the observation that 'the various criteria used to assess optimality of an OCA had rendered the subject too complex for its statement to be very illuminating' and 'the OCA problem has proved to be something of a dead-end problem' (Johnson, 1969, p. 396).[7] In a survey of the OCA literature as of mid-1970s, Ishiyama (1975) concluded that 'the theory of OCA is primarily a scholastic discussion which contributes little to practical problems of exchange rate policy and monetary reform'. However, the theory did not suffer complete stagnation during these two decades. Some important contributions towards the theory of OCA, during this period, are worth mentioning. Fleming (1971) notes that it will be highly costly to peg exchange rates between two countries characterised with differences in unemployment preferences, productivity growth rates and/or trade union aggressiveness. Fleming stresses the importance of similarities in inflation rates when countries decide to form a monetary union. Similar argument is presented by Giersch (1973) and De Grauwe (1975): Formation of a common currency area will be more costly among countries that have different inflation rate preferences. However, De Grauwe (2003) presents a different insight. According to Grauwe, 'Rates of inflation and unemployment may depend on structural factors (state of production) of a country's economy, and these factors may change after a possible unification.' Haberler (1970) highlights that it is the similarity of policy attitudes, and not the characteristics of the economy, which creates the conditions for a flourishing currency area. Ingram (1969) listed the integration of financial markets among the conditions of monetary union. Tower and Willet (1976) focus on the factors that influence the relative costs and benefits of flexible and fixed exchange rates for each individual country, while Vaubel (1987) believes real exchange rate to be a comprehensive criterion of forming OCA than the traditional criteria of labour mobility, diversification and openness. Mussa et al. (2000) point out the quantity of reserves as a characteristic in judging optimality: Under fixed exchange rate regime and in the absence of capital controls, a high level of reserves is required to deal with speculative capital flows. Till now, the contributions towards the OCA theory reflect the stress given on one particular criterion in the determination of an OCA. Ishiyama (1975) became one of the first to acknowledge that there should not be only one criterion in determining an OCA. It is in the interest of

each country to evaluate the costs and benefits of entering a common currency area (Ishiyama, 1975). Also, he identifies other criteria to consider, such as differences in inflation rates and wage increases among the countries forming the common currency area that result from different social preferences.

Recent Developments in the Theory of OCA (The Comeback)

Having seen that the development of OCA theory has not been a smooth one, the theory again started resuscitating in the early 1990s. Part of the reason is its popularity being reflected in the real world developments. For example, the intensification of efforts in the late 1980s and early 1990s aimed at the monetary integration of Europe and helped underpin the renewed interest in the theory (De Grauwe, 1992). Also, the developments in macro theory allowed the original OCA approach to be cast in a new light (Tavlas, 1993). Now, the discussion turned to expectation formulation, credibility, no permanent inflation–unemployment trade-off and time inconsistency. For instance, time inconsistency proposes that inflation may increase if policy-makers and wage-fixers engage in a 'game' (Barro & Gordon, 1983). The costs of decreasing inflation are also lowered as the credibility of the central bank increases. Thus, a shift from the criteria that depend on the state of the economy (e.g., labour mobility and the like) towards the criteria that depend on desired policy trade-offs (policy-oriented criteria) served the requisite revival of OCA theory. Moreover, the efforts of the researchers to reconcile the frictions existing in earlier contributions towards the OCA theory also helped the theory to re-emerge as a relevant tool of the analysis. De Grauwe (1992) calls these new theoretical developments the 'new theory of optimum currency areas'.

The new theory of OCA has shifted its focus towards the issues including credibility and effectiveness of monetary policy, endogeneity of OCA, correlation and variation of shocks, character of shocks and their probable impact on an economy, synchronisation of business cycles and alternative commitment mechanisms for policy-makers, convergence of economies towards the steady state, trade patterns and specialisation in production arising from comparative advantage, various types of frictions prevailing in labour, goods and capital markets, and the role of non-economic (political) factors in monetary unifications. These advancements are discussed, in detail, as follows.

Effectiveness and Credibility of Monetary Policy

Earlier literature believed in the stability of long-run Phillips curve, implying that the loss of monetary policy independence will impose a huge cost on the economy (Corden, 1972). In contrast, the recent literature believes inflation prevention as the main macroeconomic objective of a central bank, with a secondary objective of dampening business cycle fluctuations. For example, Alesina, Barro and Tenreyero (2002) argue that the higher the association of shocks between countries, the lower the costs of giving up an independent monetary policy, while Calvo and Reinhart (2002) emphasise that the loss of monetary policy will not be a significant cost if the monetary authority of a country is unable to use its monetary policy adequately. The latter conclusion follows from 'discretion versus credibility literature' on monetary policy, also known as 'fear of floating' literature. Pioneering works in this area are Kydland and Prescott (1977) and Barro and Gordon (1983).

While Kydland and Prescott (1977) or Barro and Gordon (1983) study the consequences of discretion versus credibility within one economy, Calvo and Reinhart (2002) use an open economy model to show that emerging market economies often shelter a fear of floating. Several ideas emerge from this area of literature. Consider the following. (a) As mentioned above, the traditional OCA theory was developed in such an academic and policy setting that attached substantial weight to the monetary authorities' ability to attain a desired point along the short-run Phillips curve. This implies that in such an environment, the loss of monetary policy is a huge cost on an economy. However, each time monetary authorities try to reduce unemployment by increasing inflation along the short-run Phillips curve, they will end up with higher inflation in the future at the same rate of unemployment. The private agents who set their expectations about inflation in the next period and form wage contracts according to those expectations will feel cheated once they become aware about this cheat/game on the part of monetary authorities and incorporate the information in their inflation expectations for the next period (expectations-augmented Phillips curve).[8] This 'inflation-bias problem' of the 'discretionary' monetary policy puts the credibility of the monetary authorities in danger.[9] The alternative is to join a credible fixed exchange rate regime (Alesina et al., 2002). An implication of this is that in the presence of high capital mobility, the only two viable options are floating rates or currency unions, but no intermediate regime solutions (see, among others, Eichengreen, 2002).[10] (b) 'Natural-rate hypothesis' suggests that in the presence of long and variable lags associated with

monetary policy actions and long-run neutrality of money, the best a macroeconomic policy can hope to achieve is price stability in the medium term (Friedman, 1968). Intuitively, this implies that an economy hit by an external shock should allow its nominal exchange rate to adjust to the new equilibrium level after the shock has rendered the old constellation of relative prices useless (Larrain & Velasco, 2001). (c) Countries with histories of high inflation can join a monetary union with a credible anchor country or set of countries, and gain low inflation repute overnight. Thus, the similarities of inflation rates might result from joining a currency union and hence is not a necessary precondition (Gandolfo, 1992).

Endogeneity versus Specialisation Hypothesis

The traditional OCA theory argued that an economic area has to be optimal before using a common currency or a fixed exchange rate mechanism. With the writings of Mundell (1973a, 1973b), the causality is reversed in 1973 since using a common currency or joining a fixed exchange rate mechanism may help an economic area become optimal. Mundell (1973b) argued that optimal 'risk-sharing' is attained when countries exhibit a wide 'degree of heterogeneity'. This was indeed a major refinement to the OCA theory, initiated by Mundell (1961) himself (Warin, Wunnava, & Janicki, 2009). Earlier, Mundell believed that asymmetric shocks (those unexpected disturbances to national output that affects one country differently from another) undermine the case of common currency. Mundell II (1973a) showed how having a common currency across countries can mitigate such shocks by better 'reserve pooling' and 'portfolio diversification' (McKinnon, 2004). Under a common currency, a country suffering an adverse shock can better share the loss with a trading partner because both countries hold claims on each other's output (Mundell, 1973b).[11]

Mundell's (1973) intuition developed a chronological anteriority of what will later be known as the Endogenous Optimum Currency Area Theory (Frankel & Rose, 1998). It also served a good answer to what will later become a debate on two definitions of economic convergence between Krugman (1993), on the one hand, and the European Commission (EC) (1990), on the other hand. Consider the following. (a) Borders (existence of large number of currencies) constitute an impediment to trade. Monetary unions narrow down distances (remove borders) and raise incentives of agents to trade amongst themselves within a monetary union (Engel & Rogers, 2004; McCallum, 1995). The implication is that

the introduction of a single currency lowers transaction costs, removes market segmentation, eliminates exchange rate volatility (and, therefore, the cost of hedging) and encourages competition by raising price trans- parency (Skudenly, 2003). This amounts to saying that currency unions promote reciprocal trade, economic and financial integration and the accumulation of knowledge (De Grauwe & Mongelli, 2005). (b) The existence of high trade within a monetary union gives rise to two special issues—it can cause increased industrial specialisation between regions in the goods in which they have comparative advantage, leading to asyn- chronous business cycles resulting in industry specific shocks or increased trade may result in increased correlation amongst the currency union members' business cycles if common demand shocks prevail or if intra-industry trade accounts for most of the trade. Frankel and Rose (1997, 1998) believe in the second one and argue that the international trade pattern and international business cycle correlation is endogenous. In their opinion, joining a currency union moves countries closer to meeting the OCA criteria. This has been termed as the 'endogeneity of OCA effect'. So, it represents a simple application of the famous 'Lucas critique'.[12] According to Frankel and Rose (1997), 'countries which join EMU, no matter what their motivation may be, may satisfy OCA proper- ties ex-post even if they do not ex-ante'. More elaborately, it rejects the earlier literature's focus on the number and/or severity of asymmetric shocks among economies as a criterion for choosing potential members in a monetary union in favour of endogenous OCA theory which sug- gests that monetary union itself reduces the incidence of asymmetric shocks among members in a monetary union. The implication is that the presence of endogeneity lessens the need of country-specific monetary policies and reduces the cost of giving up a nationally tailored mon- etary policy. (c) Corsetti and Pesenti (2002) take the endogeneity argu- ment a step further by developing a theoretical model dealing with the micro-structure of national economies instead of bilateral trade. Using a two-country general equilibrium, choice theoretic, stochastic model with imperfect competition in production, nominal rigidities in the goods markets and forward-looking price-setting by firms, they show the self-validating property of the common monetary policy (Horvath, 2003; Warin et al., 2009). (d) Standard trade theory predicts that as an economy becomes more open to trade, it could become more special- ised in the line of production in which it has comparative advantage, leading to higher inter-industry patterns of trade (see, among others, Bayoumi & Eichengreen, 1992; Krugman, 1993). In other words, even a successful economic and monetary union (EMU) may become less of

an OCA over time as its regions naturally become more specialised in what they produce (Krugman, 1993; McKinnon, 2004). An implication of this is that the countries could fail in satisfying the OCA criteria ex-post, even though they did not ex-ante.

Nature of Shocks and Synchronisation of Business Cycles

Much of the literature believes that the higher the association of shocks between the anchor and the client (the potential member of a currency union), the lower the costs of loosing an independent monetary policy (see, e.g., Alesina et al., 2002). However, Berger, Jensen and Schjelderup (2001) question the very importance of symmetric shocks. They use a one period model in which private agents in a small country set their expectations for inflation early on in the period, that is, before the shocks are realised. After observing the shocks, the authorities steer the monetary policy so as to counter the adverse effects. This challenges the very traditional 'flexibility versus credibility' view of exchange rate choice.

The model was developed later so that it becomes clear how the degree and direction of correlation between shocks that spill over from the anchor country and/or how the domestic-born shocks in the pegged country impact the domestic economy. The three basic conclusions which they derive are worth mentioning. First, negatively correlated shocks strengthen the case for a fixed exchange rate. Second, an increase in the standard deviation of shocks unambiguously weakens the case for fixing the exchange rate on the condition that the correlation of shocks is non-negative. Third, they use a proxy for nominal rigidities which shows the extent to which nominal shocks have real effects and found that these rigidities become more profound after the adoption of a pegged exchange rate. This, together with negatively correlated shocks, allows them to show that there are flexibility gains after pegging.

Buiter (1995) presents a thorough analytical discussion of the theoretical issues of forming currency areas by using a seven-equation semi-small open economy model with perfect capital mobility. In this model, Buiter distinguishes the 'character of shocks' affecting the economy. He identifies an important role for nominal exchange rate flexibility in adjustment to real shocks, but this is not the case when it comes to financial shocks.[13] In the latter case, the exchange rate flexibility is undesirable. In the presence of dominant monetary shocks, a fixed exchange rate provides more stability, while floating exchange rate is preferable if shocks are real or external. In other words, a country more exposed to

external shocks (nominal or real) should typically use flexible rates to insulate its domestic economy.

Regarding the effectiveness of 'exchange rate adjustments', there exist two opposite views. One view holds that changes in the nominal exchange rates foster adjustments (see De Grauwe, 2003; Ghosh, Gulde, Ostry, & Wolf, 1997; Sachs, Wyplosz, Buiter, Fels, & Menil, 1986, among others), while the other one argues that they do not (see, for instance, Krugman, 1993).

One of the important criterions for joining a common currency area is the 'synchronisation of business cycles'. It means that if the business cycles of currency union members are synchronised, then the cost of not having its own monetary policy that would fight against disturbances is minimised. The synchronisation of business cycles is an important element in the discussions of endogeneity and specialisation hypothesis, trade integration and real convergence hypothesis of this study.

Labour Market Frictions

In determining whether to enter a common currency area, several more issues are important to consider. One such issue is 'differences in labour market institutions'. De Grauwe (2003), while using the theory of Bruno and Sachs (1985), differentiates among the three types of labour market centralisation and the implications they pose for joining a currency union. (a) Markets with centralised unions (centralised wage bargaining): If such an economy faces a supply shock, nominal wages will not increase much because unions know that excessive wage increases will lead to more inflation, leaving real wages the same as before. (b) Markets with decentralised unions (wage bargaining occurs at the company level): If such a country is hit with a supply shock, excessive wage increases will lead to loss in competitiveness of the company. So, if a union is pushing too hard, this could lead to lay-offs. Hence, just like centralised union markets, these markets may also not have an incentive to ask for excessive wage increases. (c) Labour markets with intermediate union centralisation: Such markets have different approach towards supply shocks. Knowing the fact that its actions will have a small effect on aggregate inflation, an individual union will start the bargaining process. Other unions will do the same because if they do not, their members will end up with lower real wages. The result of this process is higher nominal wages and higher inflation, with same real wages as before. All this ends up in a paradox.[14]

The main policy implication of Grauwe's analysis is that the countries with different labour market institutions may find it costly to form a currency union.

Real Convergence

Prior to entry into the European monetary union, the EC and the European Central Bank (ECB) pressed prospective entrants into the euro area to achieve a degree of real convergence of their macro variables (see, e.g., Buiter, 2008). In order to show the role played by 'convergence' in a monetary union, let us consider two economies at different stages of economic development (one with high per capita income and the other with a relatively low level of per capita income) form a monetary union. In such a monetary union, with a regional central bank assigned the objective of price stability, the less developed economy face the following situations: (i) relatively high expected rate of return on investment; (ii) low real (and nominal) interest rates because of the low area-wide inflation rate maintained by the regional central bank; (iii) because of (i) and (ii), overly optimistic income expectations and excessive domestic demand in the presence of free capital mobility; and (iv) because of (i), (ii) and (iii), the less developed economy may eventually face the need to undergo a prolonged deflation in order to regain competitiveness (Dellas & Tavlas, 2009). The above factors suggest that the degree of real convergence should be an important characteristic underpinning the choice of exchange rate regime. Melitz (1991) makes a similar observation: Countries confronted with identical shocks might need different policy responses to such shocks due to differences in their initial economic positions. The implication is that the OCA theory does not consider the appropriateness of a single monetary policy for countries at different levels of economic development.

Political Factors

A part of the OCA literature posits that formation of an OCA is more about long-term political commitment than economic criteria. As Goodhart (1995) argues, 'any currency union formation is primarily governed by political concerns'. Ingram (1969) claims that economic considerations take a back seat in choosing exchange rate arrangements,

so it is somewhat futile to stress the definitions of OCA characteristics. Similar views are held by Mintz (1970) and Machlup (1977). Edwards (1996) stresses the increase in the credibility of monetary authorities to be the main reason behind the adoption of permanently fixed exchange rate regime, while Collins (1996) shows that exchange rate adjustments under the flexible exchange rate regime are less visible to private agents and, as a result, are less politically costly then devaluations under a pegged exchange rate regime. In the latter case, there may be the need of unpopular measures to be enforced in order to defend the peg. Neumeyer (1998) delves deeper into the role of political authorities by differentiating between the economic and non-economic (political) shocks. He writes:

> Political interference in monetary affairs implies that given the realization of an economic shock, there still is uncertainty about the future actions of monetary authorities since such actions will be influenced by future political events. For example, the timing of monetary stabilizations in inflationary economies, the value at which currencies enter a fixed exchange rate regime, and exchange rate realignments are instances of monetary policy decisions that depend on the realization of political shocks.

Alternative Exchange Rate Regimes

One can see the discussion on the OCAs as a part of the problem of how to choose optimum exchange rate regime. The only difference is that OCA theory is typically concerned with the choice between the pure floating and completely fixed exchange rate regime, while the economic policy-making deals with the subtler problem of choosing among the intermediary types of exchange rate regimes. Based on this reasoning, there exist three different approaches in the literature on the search of an optimum exchange rate regime (Horvath, 2003). The very first approach uses a macroeconomic model to evaluate which exchange rate regime could ease the response of the economy to different disturbances (see Nature of Shocks and Synchronisation of Business Cycles section for a detailed discussion of this approach).

The second approach deals with the choice of an optimal exchange rate regime in the context of stabilisation plans. In other words, the main objective of this approach was to stabilise a high inflation country with minimal costs of adjustment. Most of the studies in 1990s dealing with country-specific discussions (more specifically, the transition economies) of optimum exchange rate regimes were framed in this context.

The important ones are Dornbusch (1986), Fischer (1986), Dornbusch, Sturzenegger and Wolf (1990), Blanchard, Dornbusch, Krugman, Layard and Summers (1991), Edwards (1993), Bruno (1994), Guitian (1994), Bofinger, Flassbeck and Hoffmann (1997) and Horvath and Jonas (1998).

Over the period of time, the progress of the theory of OCA makes it clear that different country characteristics are associated with different optimal exchange rate regimes. Also, which exchange rate regime is most optimal for an economy is again guided by this theory. The underlying implication of this statement (of OCA theory) is that the exchange rate regime that a country chooses should matter for key welfare criteria, such as growth performance, output volatility and inflation. This forms the basis of the third approach towards an optimal exchange rate regime. While the traditional contributions towards the OCA theory were based on tenuous assumptions with partial equilibrium based static models that ended up with limited real-world applicability of the results derived, the new approach deals with modern theoretical contributions in the context of general equilibrium models and is based on microeconomic foundations. This implies that the earlier literature lacked welfare function, while the new contributions introduce an explicit welfare function by the means of which the welfare implications of exchange rate regimes could be compared. In the latter case, there exists a large body of literature deriving from the Kollmann (1992) and Obstfeld and Rogoff (1995) open economy extensions of the new Keynesian model. This branch of literature deals with the issues pertaining to the properties and optimal choice of the exchange rate regime.

Under the assumption of the neutrality of money and in the environment where asset markets are complete, Helpman (1981) and Karekan and Wallace (1981) show that the exchange rate regime does not have any impact on welfare. Helpman concludes that the method for choosing among different exchange rate regimes depends on the given rigidities and imperfections. This raises the question: Which regime is preferable under a given type of friction? Subsequent literature in this area introduces various rigidities and imperfections into the modelling of currency unions. For example, Bayoumi (1994) and Ricci (2008) represent the literature in which wage and price rigidities are the frictions, while Helpman and Razin (1982) and Neumeyer (1998) use financial market incompleteness as the friction. In the two-period general equilibrium model of Helpman and Razin (1982), a floating exchange rate regime dominates over a fixed exchange rate regime, since the latter reduces the number of assets in the economy. Bayoumi (1994) has a different insight/ finding. In his model, a currency union can raise the welfare of the

regions within the union, but unambiguously lowers welfare for regions outside the union. Ricci (2008) presents a two-country model of the OCAs with nominal rigidities, in which he segregates the variables that increase net benefits from participation in a currency union from the factors that tend to diminish the benefits of monetary unions. One important insight of his model is the ambiguous effects for the degree of openness when both real and monetary shocks are taken into account. Canzoneri and Rogers (1990) consider the issue of OCA from the perspective of public finance, while Neumeyer (1998) shows that the adoption of a currency union is the result of a trade-off between the benefits of reducing excessive volatility of exchange rates and the costs of reducing the number of assets in the economy.

Eurozone as an OCA

The Bretton Woods system, which fixed every member country's exchange rate against the US dollar, came to an end in 1973. Since it also fixed the exchange rate between every pair of non-dollar currencies, now, the countries hoped to free their monetary policies by shifting from fixed exchange rates to floating exchange rates. While other countries allowed their currencies to float against the US dollar, European Union (EU) countries tried progressively to narrow down the extent to which they allow their currencies to fluctuate against each other (Krugman & Obstfeld, 2003). These efforts culminated in the introduction of the 'euro' on 1 January 1999. However, this birth of the euro did not happen all of a sudden. It was the combined result of the efforts in late 1980s and the early 1990s that were taken towards the monetary unification of Europe. Such efforts towards the monetary unification of Europe were directly influenced by the ideas of the protagonists of the OCA theory.

As discussed above, the theory (of OCA) proposes that using a common currency creates benefits as well as costs for the member countries. Knowing the fact that the EMU economies have gone a long process of integration even before the adoption of the euro, the costs of adopting a single currency by these economies were considered very low (Berger & Nitsch, 2008). This was one of the official motivations behind the EMU project (European Commission, 1990), which culminated in the formation of the euro. Table 1 gives the complete history of the steps taken towards the monetary unification of Europe.

Table 1. Integration Timeline of European Countries

Year	Major European Events
1948	Marshall plan (helped to establish the traditional European division of labour in trade)
1951	European High Authority, which later became the EU Commission, set up; Treaty of Paris signed; German balance of payments crisis solved with the help of Marshall plan institutions (i.e., the European Payments Union). This, in turn, allowed bringing back the European division of labour
1954	European Coal and Steel Community (ECSC) comes into force (The Netherlands, Luxembourg, Belgium, Italy, Germany, France)
1957	Among other things, the European Economic Community (EEC) established under the Treaty of Rome; original EU members formed customs union
1960	Establishment of European Free Trade Agreement (EFTA). Members are Switzerland, Sweden, Portugal, Norway, Denmark, Austria and the UK
1961	Expansion of EFTA: New member is Finland
1962	Launch of Common Agricultural Policy
1965	European Community (EC): Merger of the three European 'unions' (EEC, ECSC and Atomic Energy) in a treaty; Establishment of European Commission and single Council of Ministers to head the new institution
1969	European leaders met at The Hague in December 1969 and initiated drive towards EMU
1971	Werner report adopted by the EU. It proposed a three phase program that, when completed, would result in the integration of the individual national central banks into a federated European system of banks and locked EU exchange rates
1971–1973	Dollar crises
1973	Expansion of EC: the UK, Ireland and Denmark
1974	Expansion of EFTA: Iceland added
1979	European Monetary System (EMS) established; eight original participants in the EMS's exchange rate mechanism (Italy, Ireland, Luxembourg, Belgium, the Netherlands, Germany, France and Denmark) began operating a formal network of mutually pegged exchange rates; First direct Europe-wide election to European Parliament

(Table 1 Continued)

(Table 1 Continued)

Year	Major European Events
1981	EC expansion: Greece
1986	The Single European Act (amended the founding Treaty of Rome); Expansion of EC: Portugal, Spain
1987	Single European Act comes into force, setting up 'Single Market' framework and streamlines EC's work
1989	The Delors Plan (recommended 3-stage transition of EU members to achieve the goal of single Currency Union (CU))
1991	EU established under Maastricht Treaty. Treaty sets up timetable for the EMU, initiates EU enlargement process and defines European citizenship
1993	Single market takes effect
1995	Expansion of EU: Sweden, Finland, Austria; Schengen Treaty takes effect (some countries)
1997	Among other things, the Treaty of Amsterdam updates Maastricht and further prepares eastward expansion; Stability and Growth Pact
1999	Eurozone introduced (Members: Portugal, the Netherlands, Luxembourg, Italy, Ireland, Germany, France, Finland, Belgium, Austria and Spain)
2001	Greece joins eurozone as 12th member
2002	Eurozone introduced physically
2007	Slovenia joins eurozone as 13th member
2008	Cyprus and Malta join eurozone (14th and 15th member)
2009	Slovakia joins eurozone as 16th member
2011	Estonia joins eurozone as 17th member
——	Iceland and Croatia, Latvia, Lithuania, Denmark join Exchange Rate Management (ERM) II
2013	Croatia joins EU as 28th member (1 July 2013)
2014	Latvia joined eurozone as 18th member by replacing its pervious currency, the lats, with the 'euro' on 1 January 2014
2015	Lithuania joined eurozone as the 19th member (1 January 2015)

Source: Author's own compilation.

Conclusions

In this article, we argue that there is not just one criterion, but many criteria in judging optimality. Over the years, the theory of OCA reflected a shift from the criteria that emphasise the state of the economy (such as labour mobility, openness and product diversification) towards the criteria that depend on desired policy trade-offs including similarity of rates of inflation, degree of policy integration, degree of wage and price flexibility and real exchange rate variability and so on. After a rise in research activity during the 1960s, the subject fell from favour in the 1970s and 1980s because of the internal conflicts and contradictions, before it re-emerged as an active area of research in the 1990s. The upshot of these recent developments is that the revival of interest in the theory of OCA reflected developments in a literature that had little to do with the subject of OCAs itself. All in all, the OCA theory helped to bring together several strands of the literature on monetary integration. In the words of Krugman (1993), '…that the issue of optimum currency areas, or, more broadly, that of choosing an exchange rate regime, should be regarded as the central intellectual question of international monetary economics'.

On the practical grounds, the theory of OCA showed its success by the formation of the euro as a single currency. The adoption of the 'euro' as a common currency by 11 Western European countries (Spain, Belgium, Finland, France, Luxembourg, Germany, Ireland, the Netherlands, Portugal, Italy and Austria) in 1999 and the extension of the eurozone members to 19 countries (new members are: Greece, Slovenia, Cyprus, Malta, Slovakia, Estonia, Latvia and Lithuania) by the end of 2015; the joining of Croatia, Denmark and Iceland to Exchange Rate Management (ERM II);[15] an ongoing negotiation of Bulgaria, Hungary and Romania regarding 'euro accession'; the chances of Denmark, Sweden and the UK to join the euro in the near future; recent episodes of dollarisation in Ecuador, El Salvador, Guatemala and the serious consideration given to dollarisation by the governments of Central and South America; contemplation by a number of West African countries to form a currency union by 2015; the intention of six oil-exporting countries (Bahrain, Oman, Qatar, Kuwait, Saudi Arabia and the United Arab Emirates) to form a currency union and the other developments in international monetary arrangements have made it 'imperative' to assess the 'economic effects' of currency unions and give a serious consideration to the arguments given by the OCA theorists (Barro & Tenreyro, 2007; Roy, 2014). Also, no one can deny the fact that the euro has completed 16 successful years of its existence. Such a

success story of the euro can serve as a role model for other regions which are considering forming the currency union, such as the Asian Monetary Union (AMU) and the like.

Notes

1. A currency area is an area in which exchange rates are fixed, or which has a common currency.
2. In economics, an OCA, also known as an optimal currency region, is a geographical region in which it would maximise economic efficiency to have the entire region share a single currency.
3. Regions are areas within which there is factor mobility, but between which there is factor immobility (Mundell, 1961, p. 658).
4. The OCA is not the world (Mundell, 1961, p. 659).
5. A situation of free capital mobility emerged in the 1970s but seemed remote at the start of the 1960s.
6. Non-efficient foreign exchange markets suggest that exchange rate is disconnected most of the time with its fundamental value and that its volatility cannot be explained by the underlying fundamental volatility. In other words, the exchange rate follows a random walk and, hence, there is no reliable relation between fundamentals and exchange rates.
7. The conference was attended by all the main contributors towards the OCA theory, including Mundell, McKinnon and Kenen.
8. The idea that the Phillips curve should be augmented with a variable representing price expectations (expectations-augmented Phillips curve of Edmund Phelps) and that its steady-state value is unity, resulting in a vertical long-run Phillips curve is now an important part of mainstream economics. The implication from this vertical Phillips curve is that unemployment rate returns back to its natural rate (of unemployment) following a disturbance (Friedman, 1968).
9. The inflation-bias problem stems from (a) attempt to over-stimulate the economies on average (Dellas & Tavlas, 2009) and (b) the incentives to monetise budget deficits and debt (Alesina & Barro, 2001).
10. The debate of 'flexible exchange rates versus hard pegs' as the only viable exchange rate regimes was raised by Friedman (1953) in his essay 'The Case of Flexible Exchange Rates'. Throughout his career, Friedman was an advocate of both types of regimes (see, for instance, Friedman, 1973, 1974, 2000). Friedman recommended floating exchange rates for larger and relatively closed economies, while regarding smaller but more open economies, he argued: 'My position has always been that a small economy should do one of the two things: eliminate its central bank and really hard peg…. or it ought to float completely' (Friedman, 2000, p. 418).
11. Ching and Devereux (2003) considers Mundell's (1973) intuition to examine from a theoretical perspective the trade-off between the adjustment benefits of a flexible exchange rate, on the one hand, and the risk-sharing benefits of a single currency area, on the other, as in Mundell (1973b).

12. According to the Lucas Critique, a prediction based on historical data would be invalid if some policy change alters the relationship between relevant variables. Under such a situation, future relationship between the variables may differ from the historical relationship. According to Frankel and Rose (1997), a naïve examination of historical data gives a misleading picture of a country's suitability for entry into a currency union, since the OCA criteria are endogenous.

13. Broadly speaking, real shocks are 'IS shocks', that is, shocks to the public or private demand for goods and services, while financial shocks are money demand shocks (liquidity preference shocks) or shocks to the domestic money supply process.

14. When laws or generalisations are true of constituent individual parts but untrue and invalid in case of the whole economy, paradoxes seem to exist. Boulding (1950) calls them macroeconomic paradoxes. The insight is that the behaviour of the economic system as a whole or the macroeconomic aggregates is not merely a matter of addition or multiplication or averaging of what happens in the various individual parts of the whole.

15. The Maastricht Treaty of 1992 (formally known as the Treaty of European Union) developed a set of criteria, known as the Maastricht Criteria or the Convergence Criteria, which European Union member states need to fulfil in order to adopt the 'euro' as their currency. One such criterion is that the applicant countries need to join the exchange rate mechanism (ERM-II) under the EMS for two consecutive years and must not have devalued its currency during this period of two years.

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