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Choice of an Exchange Rate Regime: the Role of Optimum Currency Area Theory ¹

This lecture deals with the problem of the choice of exchange rate regime for fiat and fully convertible currencies. We begin with a review of different types of exchange rate regimes and discuss the difference between de jure and de facto regimes. We also briefly talk about how classification of exchange rate regimes leads to different interpretations of the relationship between regime and macroeconomic performance. Afterwards we give a short discussion of the vanishing intermediate exchange rate regime hypothesis. In the second part of the lecture we mention five different approaches to the choice of the optimal exchange rate regime and provide a general overview of the literature on optimum currency areas.

Classification of the Exchange Rate Regimes

One can classify exchange rate regimes according to numerous criteria. The basic classification is founded on the extent of currency flexibility and typically contrasts pegged and flexible exchange rate regimes, and this is what the optimum currency area (OCA) theory considers as well.

Using the criterion of currency flexibility one can distinguish almost a continuum of exchange rate regimes, among which the differences are sometimes blurred. We broadly divide the exchange rate regimes into three main groups: flexible exchange rate regimes, intermediate exchange rate regimes, and rigid exchange rate regimes. In the following we provide a discussion of the basic characteristics of these regimes.

Flexible Exchange Rate Regimes

Full float is characterized by no intervention by the monetary authorities in the foreign exchange rate market. This means the behavior of the exchange rate is not influenced by monetary authorities in any way. However, intervening in the foreign exchange market is not the only channel through which monetary authorities may influence the behavior of the domestic currency. Another channel would be, for example, the interest rate policy. Thus – in addition to the no intervention requirement – really fully flexible regimes may require independence of exchange rate policy from other government policies.

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Managed float is an exchange rate regime which is typically the closest to the fully flexible exchange rate regime. In this regime monetary authorities may pursue a very active intervention policy; however, in a managed float regime no official parity or rule is determined which the authorities are required to follow.

Intermediate Exchange Rate Regimes

We include in the intermediate (limited flexibility) exchange rate regimes a large number of regimes. These are different variants of crawling peg, target zones and pegged but adjustable regimes.

Crawling pegs were originally suggested by Harrod and first applied in Chile in 1965. This regime is also sometimes referred to as a shiftable parities, sliding parities or gliding parities regime. In this regime the exchange rate adjusts frequently but in relatively small steps. In this regime unexpected parity changes are replaced by gradual – typically small and pre-announced – changes of parity.

Target zone is an exchange rate regime in which parity is fixed and there is a band around the parity. Target zone can be seen as a general regime for all situations where there is a band around the parity, or – and this is more typical – it can be understood as a regime having a wider band around the parity than is typical in pegged regimes. There could be different variants of the target zone regime in which either the parity changes or the width of the band changes.

A target zone exchange rate regime differs from a fixed exchange rate regime in allowing a movement of the exchange rate around central parity and within given bands. The appeal of target zones compared to stricter pegged regimes is that it allows some flexibility, i.e. it gives more space for the central bank. The exchange rate floats within the band; when the edge of the band is reached further movement is blocked by central bank intervention.

Krugman (1991) established the theoretical comparison of the pure float with a target zone regime. *Krugman (1991)* criticized the view that in the target zone the exchange rate behaves as in the fully flexible regime until the currency is close to or hits the edge of the band, whereupon the regime switches to a version of a fixed regime. This view seems to be intuitive, and it was Krugman's contribution to show that the very existence of a band around the parity has an effect on the behavior of the exchange rate even if the central bank is not defending the currency and even if the currency is inside the band, i.e. far from the edge of the band. In the following we briefly outline Krugman's argument.

The exchange rate as an asset price depends on some fundamentals and expectations of future values of the exchange rate. Assume the log exchange rate at time t , s_t , depends linearly on an aggregate 'fundamental' at time t , f_t , and the expected depreciation. $\frac{ds}{dt}$

$$s_t = f_t + \gamma E(ds) / dt$$

where E is the expectation operator and (ds/dt) is the change in time of the exchange rate, and γ is a parameter, and subscript t describes the time period.

The fundamentals are assumed to consist of two components, v , a stochastic shock, and a variable, m , which represents any variable influenced by the central bank policy. Thus, the exchange rate equation changes to:

$$s_t = v_t + m_t + \gamma E(ds)/dt$$

Assume that

$$dv = \sigma dz$$

where dz is a continuous random walk, dv describes the continuous change in the stochastic shock and σ is a parameter. In a target zone, the central bank controls the money supply to keep the exchange rate within a specified band around a central parity.

$s_- < s_t < s'$ where s_- and s' are the lower and upper edges of the exchange rate band.

Krugman's target zone model has two critical assumptions: the exchange rate target is perfectly credible, and no intervention occurs when the currency is in the interior of the exchange rate band. When the exchange rate reaches the weak edge of the band, the money supply is reduced to prevent the currency from weakening further, and vice versa.

Krugman criticizes what he calls the naïve view, i.e. the view which would derive from the fact that v follows a random walk and thus there is no predictable change in the exchange rate, i.e. $E(ds)/dt = 0$. Thus, the exchange rate might simply be expected to equal $v+m$ inside the band. *Krugman (1991)* argues that when the currency is very close to the top of the band, a fall in v will reduce s more than a rise in v will increase s . As a result $E(ds)/dt < 0$ inside the band. Expectations will be changed and the relationship between the $(v+m)$ and s will be S-shaped.

The main result in the Krugman model is the *honeymoon effect*, i.e. that a perfectly credible target zone is inherently stabilizing: the expectations of future interventions to stabilize the exchange rate make the exchange rate more stable than the underlying fundamentals. The second important result of *Krugman (1991)*, although a much more technical one, is the so-called smooth-pasting property. This means that at the boundary of the exchange rate band, the exchange rate is not sensitive to the fundamental.

A pegged but adjustable regime is another type of regime which we classify with the intermediate exchange rate regimes. In this exchange rate regime the currency is pegged to an 'anchor' currency or to a basket of currencies. A pegged but adjustable exchange rate regime was practiced under the Bretton Woods system. As *Niehans (1984:296)* writes "the curse of the adjustable peg is currency speculation." As many other authors also emphasized, in this regime, speculation, – once it happens – is typically a 'one way street'. It is not typical that agents wait to see whether the currency will revalue or devalue, rather once the atmosphere is created a one way attack occurs.

Rigid Exchange Rate Regimes

Typically in rigid regimes we include monetary hard peg, currency board, official dollarization and monetary (currency) union.

Hard peg is an exchange rate regime in which the value of the domestic currency in terms of some reference currency or commodity "does not vary, or varies only within narrow, predefined limits." In this regime the exchange rate does not move, or moves very little, while international reserves of the central bank or monetary authority are allowed to fluctuate.

Ghosh, Gulde Wolf (2002:39) write that in any hard peg regime there is still some flexibility. The credibility of the hard peg never can be absolute, i.e. there is always a

possibility of devaluation. Also there are always margins between the buying and selling price of the currency. In this regime the central bank or more broadly the representative agent of the government has a formal commitment to sustain the parity with clear implications for domestic monetary policy. In other words, the hard peg narrows the scope for domestic monetary policy since the interest rate is to a large extent determined by the monetary policy of the foreign (anchor) country to which the domestic currency is pegged.

Note that *Bubula and Otker-Robe (2002:4)* classify with the rigid exchange rate regimes only regimes with another currency as legal tender, currency unions and currency boards. In other words, in their classification hard peg belongs to the intermediate exchange rate regimes.

When considering currency boards we need to distinguish between two main forms of currency board: the currency board proper, as was in use in former colonial empires, and its modern version as is currently used in various countries across the globe.

The main characteristic of the proper (orthodox) currency board system is that the board stands ready to exchange local currency for the foreign reserve currency at a precise and fixed rate. A currency board has no responsibility for ensuring that bank deposits are convertible into currency board notes; this is the responsibility of commercial banks, as *Walters (1989)* emphasizes. So the proper currency board converts domestic (anchor) currency for anchor (domestic) currency but does not convert deposits or assets for currency. In other words, if a bank deposit in domestic currency is converted into the anchor currency then first the deposit needs to be converted into local currency and only then is this currency presented to the currency board for conversion.

Historically, the true currency board regimes emerged as a reaction to the needs of travelers in the former colonies, who by leaving the colonial power exposed themselves to the risk of loss of the imperial currency, and furthermore their holdings of imperial currency in colonies typically earned no returns. Introducing the currency board allowed colonies to issue their own currency while keeping the imperial currency at the currency board. The currency board earned seigniorage for colonies. In addition, the currency board depoliticized the colonial monetary system, i.e. it took away from the local authorities the printing of money to finance government bills and possible deficits.

In a modern environment introduction of the currency board regime typically serves to enhance the credibility of domestic policy makers. Since 1991, a few countries have established currency board-like systems and some other countries (former colonies) continuously rely on this exchange rate arrangement. The modern currency board regime may rather be termed a currency board-like regime. In this regime the central bank - while constrained by currency board rules regarding the exchange rate and reserves - still exercises considerable discretionary power. As reserves, a currency board holds interest-bearing assets denominated in the anchor currency. A currency board generates seigniorage from the difference between the interest earned on its reserve assets and the expense of maintaining its liabilities in circulation. Also a modern currency board makes managing capital flows much harder since the central bank is not allowed to sterilize the effects of these flows on the monetary base, which in the case of excessive monetary growth may lead to inflation.

One should note that a modern currency board cannot prevent an attack on the domestic currency in which residents and non-residents get rid of domestic and buy foreign assets. A currency board is not able to prevent such an attack since the value of domestic financial assets that may be used to buy foreign currency is higher than the monetary base, which is backed by anchor currency reserves. Thus a currency board would not be able to prevent a speculative attack from succeeding because all liquid money assets are of an order of magnitude larger than foreign (anchor) currency reserves.

Currency boards were symbols – at least for some - of imperial oppression, for example there was the West African Currency Board, the East African Currency Board and there was even a currency board in Ireland from 1928 till 1943. From the 1960s onward, when developing countries gained political independence, the prevailing opinion was that continued monetary dependence might be inconsistent with newly won political independence. After decolonization the model of ‘one nation, one money’ reigned supreme. In those days – to the best of my knowledge - only Singapore, Brunei and Djibouti had currency boards. The modern revival of this type of currency regime is connected with Argentina, which introduced a currency board in 1991. Argentina was later followed by Estonia, and Bulgaria. Bulgaria introduced a currency board in 1997 at an exchange rate of 1,000 leva equaling one deutschmark. From 1997 Bosnia has a currency board-like system also linked to the deutschmark. More or less orthodox currency boards remain in British territories of Bermuda, the Cayman Islands, the Falkland Islands, and Gibraltar, and a non-orthodox currency board system was introduced in Hong Kong.

Under the currency board regime the domestic country still keeps its own currency and thus to a certain extent still conforms to some national sentiments. Dollarization (more precisely official dollarization) is an exchange rate regime in which the sovereign country does not have its own legal tender. Under official dollarization the domestic country adopts another country’s currency as a legal tender.

The term dollarization is also used to describe a portfolio shift away from domestic currency to foreign currency, which may occur as a reaction to unstable macroeconomic conditions, but also as a rational tendency to diversify assets. This is the reason we need to distinguish this type of dollarization, an “unofficial” dollarization, which reflects a shift in preferences from “official” dollarization, when a country adopts foreign currency as a legal tender.

An officially dollarized country collects no seignorage and monetary policy is under control of the foreign country. Official dollarization can be bilaterally negotiated or done unilaterally.

Only a relatively small number of countries (independent nations and dependencies) have officially adopted a foreign currency as legal tender. Much like countries operating currency board regimes, officially dollarized economies do not exercise independent monetary policies. Under both regimes, the economy adjusts to external shocks through factor and product markets with the help of the financial system. Changes in world interest rates and capital inflows or outflows are quickly reflected in the banking system.

As of the beginning of 1999 *Bogetic (2000)* identified 28 countries and territories with officially dollarized economies; all are small, and many are islands, often with only a few thousand inhabitants. Six are members of the International Monetary Fund: Kiribati,

the Marshall Islands, Micronesia, Palau, Panama, and San Marino. Most dollarized countries give the full legal tender status only to one foreign currency, but Andorra gives it to both the French franc and the Spanish peseta.

Monetary union is the hardest way to peg the exchange rate, in which a group of countries uses a common currency issued by a common regional central bank. Thus, the monetary union has permanently fixed exchange rates within the union and a single central bank sets the interest rate for the union. In such arrangements a sovereign country gives up its domestic currency and uses the common currency as a legal tender.

What we have provided so far is a more or less typical classification. The table below gives an historical overview of the International Monetary Fund classification of the exchange rate regimes in the period since 1950.

The IMF classification fails to capture whether the actual exchange rate policies are consistent with the official declaration of the member country, and thus this classification is challenged by an argument that the proclaimed de jure exchange rate regimes do not always correspond to the de facto regimes. While systematic treatment of this issue is relatively new, the difference between de jure and de facto regimes was observed long ago. For example *Heller (1978:308)* writes “it is well known that some countries with ostensibly floating exchange rates intervene regularly in the foreign exchange market to stabilize the rate, whereas others with pegged exchange rates avail themselves of such wide intervention margins that the currency’s value is determined within very wide limits by market forces.”

There may be different reasons which lead to difference between de jure and de facto regimes. Potential political costs may be one of the sources of this difference. Then it may happen that the pre-announced (de jure) band is much wider than the de facto band in which the currency moves. Stable behavior of the exchange rate may be a result of the credible and working de jure exchange rate regime and intentional policy action, but the currency may be stable also because there are no shocks affecting it. Also, it may happen that the country declares it has a flexible exchange rate regime but in reality it intervenes so heavily that the currency behaves as if a fixed exchange rate regime was in use.

Consequently, researchers introduce their own(?) classifications of exchange rate regimes, as for example *Frankel (1999)* classifies nine exchange rate regimes: currency union, currency board, ‘truly fixed’ exchange rates, adjustable peg, crawling peg, basket peg, target zone or band, managed float and free float. Other researchers look for an algorithm or measurements which may establish the discrepancy between de jure and de facto regimes and thus reclassify the exchange rate regimes differently from the official government classifications. Some studies attempted to extend the official classification into a more meaningful one, as for example *Ghosh, Gulde, Ostry and Wolf (1997)*, *Babula and Otker-Robe (2002)*, and *Reinhard and Rogoff (2003)*. Some others rely on purely statistical methods in order to re-classify exchange rate regimes as *Levy-Yeyati and Sturzenegger (2003)*. *Von Hagen and Zhou (2002)* rightly point to the fact that the difference between de jure and de facto exchange rate regimes does not mean that the de jure classification is irrelevant since proclaimed de-jure regimes are likely to guide financial market expectations about exchange rate developments.

Levy-Yeyati and Sturzenegger (2003) classify de facto exchange rate regimes purely in the statistical terms. The table below shows the basis of their approach.

Table 1

Evolution of the IMF Annual Classification of Exchange Rate Regimes

<p>Volumes 1950-1973</p> <ol style="list-style-type: none"> 1. Par value or central rate exists – Par value of central rate applied 2. Effective rate other than par value or central rate applicable to all or most transactions: fixed rate or fluctuating rate
<p>Volumes 1974, (no mention of par values)</p> <ol style="list-style-type: none"> 1. Exchange rate maintained within relatively narrow margins in terms of: US Dollar, Sterling, French Franc, group of currencies, and average of exchange rates of main trading partners 2. Exchange rate not maintained within relatively narrow margins
<p>Volumes 1975-1978</p> <ol style="list-style-type: none"> 1. Exchange rate maintained within relatively narrow margins in terms of: US Dollar, Sterling, French Franc, South African Rand or Spanish Peseta, group of currencies (under mutual intervention arrangements), and composite currencies 2. Exchange rate not maintained within narrow margins
<p>Volumes 1979-1982</p> <ol style="list-style-type: none"> 1. Exchange rate maintained within relatively narrow margins in terms of US Dollar, Sterling, French Franc, Australian Dollar, Portuguese Escudo, South African Rand or Spanish peseta, a group of currencies (under mutual intervention arrangements), a composite of currencies, and a set of indicators 2. Exchange rate not maintained within relatively narrow margins
<p>Volumes 1983-1996</p> <p>Exchange rate determined on the basis of:</p> <ol style="list-style-type: none"> 1. a peg to: the US Dollar, Sterling, the French Franc, other currencies and composite of currencies 2. limited flexibility with respect to: a single currency, cooperative arrangement 3. more flexible arrangement: adjusted according to a set of indicators, other managed floating, 4. independently floating
<p>Volumes 1997-1998</p> <ol style="list-style-type: none"> 1. Pegged to: single currency, composite of currencies 2. Flexibility limited 3. Managed floating 4. Independent floating
<p>Volumes 1999-2001</p> <ol style="list-style-type: none"> 1. Exchange arrangements with no separate legal tender 2. Currency board arrangement 3. Conventional pegged arrangement 4. Pegged exchange rate within horizontal bands 5. Crawling peg 6. Crawling band 7. Managed floating with no pre-announced path for the exchange rate 8. Independently floating

Source: Reinhart and Rogoff (2002:9).

Table 2

Exchange Rate Regime Classification by Levy-Yeyati and Sturzenegger

Exchange Rate Regime	Exchange rate volatility	Volatility of exchange rate changes	Volatility of international reserves
Inconclusive	Low	Low	Low
Flexible	High	High	Low
Dirty Float	High	High	High
Crawling Peg	High	Low	High
Fixed	Low	Low	High

Source: Levy-Yeyati and Sturzenegger (2003:5).

Exchange rate volatility – average of the absolute monthly percentage changes in the nominal exchange rate to the reference currency during a calendar year

Volatility of exchange rate changes – standard deviation of the monthly percentage changes in the exchange rate

Volatility of International reserves – average of the absolute monthly changes in net dollar international reserves relative to monetary base in the previous month.

Babula and Otker-Robe (2002) introduce a new exchange rate regime classification which takes into consideration the combination of the de jure and de facto characteristics of the exchange rate regimes. Their classification is a step forward to the classification of *Levy-Yeyati and Sturzenegger (2003)* since Levy-Yeyati and Sturzenegger ignore the official classification on the whole. Thus – as *Babula and Otker-Robe (2002:9)* mention – it may happen in their classification system that countries without significant variability in their exchange rate are considered inconclusive when in some cases their exchange rate regime is simply obvious. *Babula and Otker-Robe (2002)* mention the reliance of Levy-Yeyati and Sturzenegger on the cluster analysis. “The regime classifications generated by this approach are not robust to the choice of the number of countries in the sample and the number of clusters specified ex-ante by the user.” *Babula and Otker-Robe (2002:9)*

Consequently, Babula and Otker-Robe use a combination of quantitative and qualitative analysis, i.e. when establishing their de facto classification they do not depend only on quantitative analysis but also use adjustments based on consultation with member countries and IMF country desk economists. As a result they introduce the following thirteen categories of exchange rate regimes, which they classify into hard pegs (categories 1-3), intermediate regimes (categories 4-11) and floating regimes (categories 12-13).

1. exchange rate regime with another currency as legal tender (formal ‘dollarization’)
2. exchange regimes with no separate legal tender (currency unions)
3. currency board arrangements
4. conventional fixed peg arrangements: vis-à-vis a single currency
5. conventional fixed peg arrangement: vis-à-vis a currency composite
6. crawling peg: forward looking
7. crawling peg: backward looking
8. pegged exchange rates within a horizontal band

9. pegged exchange rates within crawling bands: forward looking
10. pegged exchange rates within crawling bands: backward looking
11. tightly managed floats
12. other managed floats with no predetermined path for the exchange rate
13. independently floating

Source: *Babula and Otker-Robe (2002:15)*

Reinhart and Rogoff (2003) provide a classification of exchange rate regimes which takes into consideration the existence of black or parallel exchange rate markets. They distinguish fourteen categories of exchange rate regimes:

1. no separate legal tender
2. pre-announced peg or currency board arrangement
3. pre-announced horizontal band that is narrower than, or equal to, $\pm 2\%$
4. de facto peg
5. pre-announced crawling peg
6. pre-announced crawling band that is narrower than, or equal to, $\pm 2\%$, de facto crawling peg
7. de facto crawling peg
8. de facto crawling band that is narrower than, or equal to, $\pm 2\%$
9. pre-announced crawling band that is wider than, or equal to, $\pm 2\%$
10. de facto crawling band that is narrower than, or equal to, $\pm 5\%$
11. moving band that is narrower than, or equal to, $\pm 2\%$ (i.e. allows for both appreciation and depreciation over time)
12. managed floating
13. freely floating
14. freely falling

Reinhart and Rogoff (2003) find for the period 1970-2001 that almost half of the observations officially labeled as a 'peg' should have been classified as limited flexibility, floating or 'freely falling'. Furthermore, for the Post-Bretton-Woods period they find that exchange rate regimes labeled as managed floats were in more than half of the cases de facto pegs or crawling pegs.

Baxter and Stockman (1989) studying developed countries find little evidence of systematic differences in the behavior of most macroeconomic aggregates under different exchange rate regimes. These results were obtained using the IMF de jure exchange classifications. The question then naturally emerges whether the absence of relationship between regimes and performance would still be supported if this analysis is based on de facto exchange rate regimes.

Reinhart and Rogoff (2003) show that the performance of inflation rate and growth depends on whether in a given country a unified or a dual (multiple) exchange rate prevailed. For example, under unified exchange rate regimes the average inflation is considerably lower than under dual (multiple) exchange rates. It seems that the pure existence of dual or multiple exchange rates have negative consequences for domestic country inflation. The difference, while smaller, is also seen when the income per capita growth is compared.

Table 3

Inflation and Real Per Capita GDP Growth

A Comparison of Dual (or multiple) and Unified Exchange Rate Systems: 1970-2001

Exchange Rate Regime	Average Annual Inflation Rate	Average Per Capita GDP Growth
Unified Exchange Rate	19.8	1.8
Dual (or multiple) Exchange Rates	162.5	0.8

Source: *Reinhart and Rogoff (2003:39)*.

There are significant differences between the IMF and Reinhart and Rogoff (2003) classifications for the period 1970 to 2001. *Reinhart and Rogoff (2003)* document that while – as typically believed – the IMF official distinction suggests that the inflation rate is substantially lower under peg than under free float, then under ‘natural’ classification free float brings lower inflation than the peg, and it is the freely falling exchange rate regime where most of the inflation is created. Actually, under the ‘natural’ classification even the average annual per capita income growth is higher under the free float than under the peg.

Vanishing Intermediate Exchange Rate Regimes

During the 1990s currency crises hit countries where pegged exchange rate regimes prevailed. This happened during the 1992-1993 crisis in the European Exchange Rate Mechanism (ERM), in Mexico in 1994-1995, in South-East Asia in 1997, in Russia in 1998, in Ecuador in 1999, in Brazil in 1999, in Turkey in 2001 and even in Argentina in early 2002.

As a result some economists began to argue that either increased flexibility is needed to prevent speculative attacks or countries should adopt truly rigid exchange rate regimes. Specifically, *Eichengreen (1994)* puts forward the hypothesis of the vanishing intermediate exchange rate regime. This hypothesis is also sometimes called the ‘bipolar view’ or ‘corner solutions view’. The claim is that countries are being pushed to choose between extremes of rigid regimes and fully floating regimes. *Frankel, Fajnzylber, Schmukler and Serven (2001)* write that the proposition is that “emerging market countries are, or should be, abandoning basket pegs, crawling pegs, bands, adjustable pegs, and various combinations of these.” (352).

The hypothesis of the vanishing intermediate exchange rate regime appears to be a corollary of the impossible trinity hypothesis, which says that a country must give up one of three goals: exchange rate stability, monetary independence and financial market integration. *Eichengreen (1994)* argues that it will not be viable in the future for the governments to adopt such policy rules, which intend to achieve an explicitly stated exchange rate level. The implication is that countries that have traditionally pegged their currencies will be forced to choose between a fully flexible regime and monetary unification. Changes in technology will work to increase international capital mobility, limiting the capacity of governments to contain market pressures at an acceptable political cost. Together these changes will undermine the viability of rules under which

governments commit to preventing exchange rates from breaching certain limits under all but exceptional circumstances.

Frankel (1999) argues that if today financial markets are becoming integrated, then the choice is between exchange rate stability and monetary independence. However, he argues that there is nothing in existing theory that prevents a country from pursuing a managed float in which half of every fluctuation in demand for its currency is accommodated by intervention and half is allowed to be reflected in the exchange rate. The only recommendation one can give most central bankers in vulnerable countries is to stay on their toes. A blanket recommendation to avoid the middle regimes would not be appropriate, says Frankel (1999).

To evaluate the vanishing intermediate exchange rate proposition we look at the percentage representations of different exchange rate regimes across countries, using the data from Babula and Otker-Robe (2002).

Table 4

Distribution of Different Exchange Rate Regimes in 1990-2001

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Hard pegs	15.7	16.1	19.4	15.9	16.2	16.2	16.2	18.3	18.3	24.2	24.7	25.8
Intermediate regimes	69.2	66.5	56.1	58.8	56.8	58.9	58.4	53.2	48.9	40.9	41.4	38.7
Floating regimes	15.1	17.4	24.4	25.3	27.0	24.9	25.4	28.5	32.8	34.9	33.9	35.5
Total	100	100	100	100	100	100	100	100	100	100	100	100

Source: Babula and Otker-Robe (2002:16).

Note hard pegs (categories 1-3), intermediate regimes (categories 4-11) and floating regimes (categories 12-13) of their classification.

This table implies a growth in floating regimes as well as in hard pegs, thus it suggests that there is a movement toward corner solutions worldwide. This tendency is the most pronounced among the developed countries and emerging market countries and less among the developing countries as the table below documents.

Table 5

Distribution of Exchange Rate Regimes across Different Countries

	Developed Countries			Developing Countries			Emerging Market Countries		
	Hard	Int.	Float	Hard	Int.	Float	Hard	Int.	Float
1990	0.0	73.9	26.1	18.4	68.4	13.2	6.7	76.7	16.7
1995	4.2	54.2	41.7	18.0	59.6	22.4	9.4	81.3	9.4
2001	54.2	4.2	41.7	21.6	43.8	34.6	32.1	21.4	46.4

Source: Babula and Otker-Robe (2002:16). Note hard pegs (categories 1-3), intermediate regimes (categories 4-11) and floating regimes (categories 12-13) of their classification.

Frankel, Fajnzylber, Schmukler and Serven (2001) write that while this proposition became quite fashionable there is no analytical rationale for the proposition itself. They introduce the notion of verifiability and thus provide an analytical rationale for the proposition. They write that a simple regime (rigid or flexible) may be more verifiable by market

participants than a complicated intermediate exchange rate regime and thus decreases the uncertainty in the exchange rate markets. "If we are right that it is hard for a central bank to establish credibility for its proclaimed monetary regime without verifiability, then our results confirm that complicated combinations of baskets, crawls, and bands are less likely to satisfy skeptical investors than are simpler regimes." (p. 384).

2. How to Choose an Optimal Exchange Rate Regime?

There are costs and benefits associated with any type of exchange rate regime. Generally, there are no simple answers to the question whether fully flexible, intermediate or very rigid exchange rate regimes are better. It seems that the optimal regime may vary from case to case and from country to country.

Avoid Some Basic Fallacies

McCallum (1996) advises avoiding fallacies when discussing theoretical and empirical consideration of exchange rate regimes. *McCallum's* first advice is not to associate float with periods of great turmoil and as a result suggest that floating rates were responsible for the turmoil. As *McCallum (1996)* writes it is possible that periods of extraordinary instability are those in which the shocks happen to be very large. These large shocks are then likely to set off turbulence under which it is difficult to keep exchange rates stable.

His second piece of advice is the following: in principle there is a ground for a belief that unregulated markets work better than regulated markets, and thus there are some arguments against price controls. However, one should not apply this reasoning to the exchange rates markets in such a way that would create a very close analogy between fixed exchange rates and price controls. *Niehans (1984)* argues that *Johnson (1973)* is guilty of this fallacy. *Niehans* writes that it is fallacious to think that efficiency would require clearing of the foreign exchange market by a flexible exchange rate regime, "it is fallacious because market-clearing exchange rates can also be achieved under fixed rates by supplying the appropriate amount of money." (286).

Currency is not a typical commodity. If the money prices of all goods were perfectly flexible, then all markets would clear under peg as well as under float. In reality, prices of many goods are not flexible; however that does not imply that fixed rates themselves prevent the occurrence of market clearing. The analogy between floating rates and free markets does not hold. There are different reasons for this; for example that the exchange rate is considered rather as an asset than a good; there are currency externalities, and others.

Approaches to Choosing an Exchange Rate Regime

The literature on exchange rate regimes distinguishes different approaches to the question of how to choose a proper exchange rate regime.

The first approach takes a macroeconomic model and then evaluates which exchange rate regime could ease the response of the economy to different disturbances. Following *Poole (1970)*, this literature includes among others *Fischer (1977)*, *Flood (1979)* and *Frenkel and Aizenman (1982)*. For a survey see *Argy (1990)*.

In summary a country exposed to external nominal shocks should use flexible rates to insulate the domestic economy. On the other hand, a fixed regime can be useful

when dealing with domestic nominal shocks, while domestic real shocks are best handled under a flexible regime. Domestic money demand and money supply shocks, i.e. domestic nominal shocks, can potentially lead to inflation and currency depreciation and a fixed exchange rate can accommodate these changes with less output volatility. On the other hand, real shocks, such as shocks to productivity, can be best accommodated – in terms of output stability - under flexible regimes.

This approach has relatively little practical application since most of the economies face various combinations of real, nominal, domestic and external shocks. It seems that it is not practical to select an exchange rate regime based on this approach, even if the results have serious conceptual validity.

The second approach deals with the problem of the exchange rate regime in the context of stabilization plans. See for example *Dornbusch (1986)*, *Dornbusch et al. (1990)*, *Bruno (1991)*, and *Blanchard et al. (1991)*. It considers a country with high inflation that wishes to stabilize while minimizing the costs of adjustment. The stabilizing country first needs to correct the source of its imbalances (usually some deficit). However, a correction of fundamentals would usually not suffice. *Bruno (1991)* shows that the corrected system can be consistent with different inflation rates. For this reason a clear signal of a shift in policy is needed, which is usually provided by a firm nominal anchor.

The third approach is empirical and combines features of other approaches. *Heller (1978)* and *Melvin (1985)* are early attempts within this approach while *Edwards (1996)*, *Berger, Sturm and de Haan (2002)* and *von Hagen and Zhou (2002)* are more recent contributions.

For example *von Hagen and Zhou (2002)* distinguish three groups of factors affecting a country's exchange rate regime choice: economic fundamentals, variables relating to macroeconomic stabilization and variables relating to the risk of a currency crisis.

The fourth approach looks at the credibility-flexibility trade-off and is the most modern approach. It follows the literature on time inconsistency. Credibility of monetary institutions and especially of central banks is crucial for attaining the goal of price stability, which is the primary goal for monetary policy across most of the countries of the world. If inflation is a monetary phenomenon than it has long run policy implications: long-run price stability can be achieved by limiting the rate of monetary growth to the long-run real rate of growth of output.

A very useful framework in which the government inclination to create inflation is explained is the time inconsistency framework. One can consider policy consistency as a situation in which plans made in the present for future periods are not revised as the time goes by. Inconsistency then occurs when the best policy planned currently for a future period is no longer the best policy when that period arrives.

In this framework inflation is created as a result of the game between government and labor, which in equilibrium produces positive inflation. In this world the contract nominal wage is given, and labor deduces what will be the rate of inflation created by the government after the nominal wage is settled. The policy makers' attempt to push employment above its natural level does not succeed, but this (known) attempt leads to an equilibrium positive inflation. A lower rate of inflation could have been achieved if, prior to the signing of nominal contracts, the government had credibly committed itself to a lower (zero) rate of inflation. So when government has the discretion to pick inflation

after the settlements of contracts, a positive inflation arises. However, the presence of pre-commitments and rules eliminates this bias. This is then an argument in favor of rules against discretion. The basic literature in this respect is *Barro-Gordon (1983)* and then for example *Berger, Jensen and Schjelderup (2001)* who apply this approach to the exchange rate.

The fifth approach is rooted in the theory of optimal currency areas. This approach investigates the structural characteristics that determine whether maintaining internal and external balance is better achieved with fixed or floating rates. We discuss this theory in the next section.

3. Optimum Currency Areas

Since I deal in detail with optimum currency area theory in my habilitation thesis, in the lecture I will just highlight some interesting points.

A currency area is an area in which exchange rates are fixed, or which has a common currency. Under the modern concept of “one country, one currency,” practically any country can be considered a currency area. A currency area thus corresponds to the optimum currency area to the extent that the political considerations for the creation of the country correspond to the economic considerations of currency optimality. This brings up the Mundell’s great question as to what is the appropriate domain of a currency area: How large should the territory using a single currency be?

The Mundellian question is traditionally framed in two ways. First, is a country, say x , an optimum currency area? Does x possess such characteristics that allow it to use its currency optimally throughout the country or would separate parts (regions) of x be better off with their own regional currencies? Second, there is the supranational perspective. Would x be better off as part of a larger currency area and without a separate currency?

One can also approach the Mundellian problem from another angle. It is commonly accepted that monetary exchange is more advantageous than barter, so if it is advantageous to use monetary exchange (currency) in a small territory, why not to enlarge this territory to gain the advantages of money over barter in a larger space. How far is this territorial enlargement of a currency appropriate?

Mundell (1961) has argued that the stabilization argument for flexible exchange rates is valid only if it is based on regional currency areas. In other words his main argument was that if any unit can be divided into regions within which there is factor mobility and between which there is factor immobility, then each of these regions should have a separate currency. These separate currencies then should fluctuate relative to each other. *McKinnon (1963)* considers the openness of the economy and argues that small open economies may find it beneficial to join larger currency areas. *Kenen (1969)* suggests production diversification as a characteristic for optimum currency areas. He writes that a well-diversified economy will rarely confront changes in demand for its export products. In well-diversified economies, the importance of asymmetric shocks would be of lesser significance than in less-diversified economies.

Later discussion moved towards more policy-oriented criteria. *Ishiyama (1975)* reviews these criteria thoroughly. These criteria include, among others, similarity of rates of inflation, degree of policy integration, degree of price and wage flexibility, and real exchange rate variability.

There was also discussion of the importance of political commitment to exchange rate decisions. A part of the optimum currency area literature posits that an optimum currency area may be more about long-term political commitment than economic criteria. *Ingram (1969)* claims that economic considerations take a back seat in choosing exchange rate arrangements, so it is somewhat futile to stress definitions of optimal currency area characteristics. What matters is a government's commitment to such a decision. *Mintz (1970)* also emphasizes the political willingness of the central authorities to pursue monetary unions as the most important factor for forming currency areas. Along similar lines, *Machlup (1977:71)* argues: "What ultimately counts, however is that all members are willing to give up their independence in matters of money, credit, and interest. Pragmatically, therefore, an optimum currency area is a region no part of which insists on creating money and having a monetary policy of its own." This also seems to be the opinion of some authors in the 1990s. *Goodhart (1990)* argues that any currency union formation is primarily governed by political concerns.

International macroeconomics has gone through substantial changes in the last two decades. These changes are reflected in the discussion on optimum currency area theory and in discussions on choosing an optimal exchange rate regime. A crucial change has occurred since the early 1960s in the understanding of the inflation-unemployment trade-off as confidence in permanent trade-off has broken down. *Tavlas (1993)* says OCA theory has largely been modified as the discussion has turned to expectation formation, credibility, and time inconsistency. For example, time inconsistency suggests that inflation may increase if policy-makers and wage-setters engage in a game. The costs of decreasing inflation are also lowered as the credibility of the central bank increases. A traditionally high inflation country can gain credibility by "tying its hands," i.e. pegging its exchange rate to a low inflation country. Thus, joining a currency union provides an important benefit to a potential member-country.

In a pure theory the question concerning optimum currency areas appears in the modeling of currency areas. For example *Helpman and Razin (1982)* in a two-period general equilibrium model show that the incompleteness of financial markets is complemented by channels through which nominal variables have real effects, which allow them to provide a set of sufficient conditions under which a floating regime is preferred to a fixed regime. In their model, a floating exchange rate regime dominates a fixed regime, since the latter reduces the number of assets in the economy.

Bayoumi (1994) presents a model with regionally differentiated goods in which wages are downwardly rigid. Each region can choose to have its own currency or join a union. He presents a framework that allows him to incorporate several typical OCA factors, such as the size and correlation of the disturbances, the costs of transactions between different currencies, the level of factor mobility across regions and the inter-relationship of demand among regions.

Ricci (1997) presents a model of optimum currency areas in a two-country trade regime with nominal rigidities that allows for consideration of monetary and real variables. Preferences differ in the two countries, which makes it possible to analyze the degree-of-openness effect and symmetry of shocks in the creation of currency unions. In his model, the net benefits from participation in a currency union increase with the following variables: the correlation of real shocks between countries, the degree of adjustment of labor and fiscal policy instruments, the difference between the inflationary

bias of the domestic monetary authority and that of the currency union, the variability of domestic monetary shocks (which, in part, are transmitted to other countries inside the currency union), and the size of efficiency losses eliminated through the adoption of a common currency. Those factors that tend to diminish the benefits of monetary union include the variability of real and foreign monetary shocks and the correlation of monetary shocks between countries. In contrast to prevailing OCA opinion, *Ricci (1997)* shows ambiguous effects for the degree of openness when both real and monetary shocks are taken into account.

Canzoneri and Rogers (1990) develop a two-country model similar to the cash-in-advance model of *Lucas and Stokey (1987)*. In this model, they consider the issue of the optimum currency area from the perspective of public finance. The optimal spreading of tax distortions may require different inflation in different regions, so each region would need its own currency to have its own inflation. They provide a formal definition of the optimum currency area problem: the policy-maker must choose the optimal number of currencies to maximize the weighted sum of the utilities of households of the two countries.

In a general equilibrium model with incomplete asset markets, nominal securities and mean-variance preferences, *Neumeyer (1998)* shows that 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. *Neumeyer (1998)* differentiates between the economic and political shocks. While the fluctuation in exchange rates that reflect economic shocks may seem excessive, they help allocate resources efficiently. On the other hand, exchange rate volatility caused by non-economic (political) shocks reduces the efficiency of financial markets. He argues interestingly that “currency unions and permanently fixed exchange rate regimes can be viewed as monetary rules that attempt to improve welfare by insulating money from domestic politics.” The main result of *Neumeyer (1998)* is that adoption of a common currency increases welfare when the gain from “eliminating excess monetary volatility exceeds the cost of reducing the number of financial instruments in the economy.”

Frankel and Rose (1997) build an argument that the international trade pattern and international business-cycle correlation is endogenous, i.e. countries with closer trade links tend to have more tightly correlated business cycles. In their opinion, joining a currency union moves countries closer to meeting the optimum currency area criteria. In other words, “a naïve examination of historical data gives a misleading picture of a country’s suitability for entry into a currency union, since the OCA [optimum currency area] criteria are endogenous.” (p. 2) Entering a monetary union increases the symmetry in the business cycle of the prospective member-country due to common monetary policy and closer international trade ties.

Corsetti and Pesenti (2002) take the endogeneity argument a step further. They use a general-equilibrium two-country, choice-theoretic, stochastic setting with imperfect competition in production, nominal rigidities in the goods markets and forward-looking price-setting by firms. They show that common monetary policy can be self-validating, “when the private sector chooses pricing strategies that are optimal in a monetary union, such strategies make a currency area the optimal monetary regime from the vantage point of the national policymakers as well. In other words, there is no incentive for monetary authorities to pursue independent strategies of national output stabilization.

As a result, even if there is no structural change in fundamentals (e.g. no increase in intra-industry trade), national outputs become more correlated.”(2). All in all, “the best institutional device to guarantee a credible policy commitment to a monetary union is to have the monetary union itself in place.” (22).

Summary

In this habilitation lecture I have provided, in addition to my habilitation thesis, a review of the literature on exchange rate regime classification and exchange rate regime choice. The latter topic was expanded by considering the views concerning the more recent developments which might be broadly included into the optimum currency area literature.

The message of the optimum currency area theory can be summarized in the words of *Willett and Wihlborg (1999:61)* as follows: “There are costs and benefits to both fixed and flexible exchange rate regimes and [that] these may vary substantially across countries based on a number of characteristics.”

Fixed exchange rates or a single currency may be more efficient than a flexible exchange rate arrangement for a small, open country with a diversified production structure and integrated within a given geographic area in factor mobility. The criteria suggested in the OCA literature give no clear-cut guidance for choosing an exchange rate regime. Moreover, political factors seem to play an important role in such decisions. The theoretical considerations stemming from OCA theory are not easily translated into practical procedures. *Masson and Taylor (1993:17-18)* also write, “there is no single overriding criterion that could be used to assess the desirability or viability of a currency union.”

Nevertheless, this theory and its modifications form the intellectual foundation of any discussion on currency unions.

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