

# Dollarization, Euroization and Accession to the Euro

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## INTRODUCTION

The twentieth century brought with it a transformation of the global economy. Among all other changes, that century saw the creation of the Bretton Woods system which was one of the most structured and coherent currency regimes in economic history in terms of the rules and regulations as well as the rate of adoption by member nations.

The latter half of that century also saw the breakdown of this cohesive system. With this breakdown, the verdict is still out as to which monetary/exchange rate regime is most effective with some academics even referring to the present situation as being a state of nonsystem. This is because no other system has come close to being a universal system with a coherent set of rules and regulations and as widely adopted as the Bretton Woods.

In the search for the “optimum” currency regime, then the year 1998 saw eleven of fifteen European Union (EU) member countries joined together and formed an economic and monetary union whereby they surrendered their monetary policy autonomy to the supranational authority of the European Central Bank. These nations also eventually abandoned their individual currencies and adopted the euro.

Since the first round of European nations accessed to the euro, then there have been other countries which have shown interest, actively worked towards and finally accessed into the monetary/economic union. This formal process of adoption of a “foreign” currency has been referred to as euroization and that is what we look at exploring in this paper.

While this paper does not claim to be a comprehensive study encompassing all the aspects of dollarization/euroization, it does attempt to give an idea of the intricacies involved in the official process of adoption. To do so, we start out by setting the theoretical framework in the first seven sections – from what factors affect the decision to adopt one monetary regime over another to what constitutes an optimum currency area and everything in between. The final section of the paper then applies the theory to the case of five Central European Countries (Czech Republic, Hungary, Poland, Slovakia and Slovenia) which are currently in the process of accessing into the euro union. Finally, we draw conclusions about where these nations stand with respect to their final accession.

## I: FACTORS INFLUENCING EXCHANGE RATE POLICY DECISIONS

No single factor can be said to precisely explain what would cause a nation to pick a fully floating currency regime over a rigidly fixed exchange rate regime, epitomized by the case of dollarization (where the nation in question is required to relinquish its sovereign currency in favour of a foreign currency). Nevertheless even seeing as no two cases are exactly the same, economists have managed to agree upon some key factors that they feel have significant influence on the final decision to adopt one exchange rate/currency regime over another.

For the sake of clarity, a minor technicality needs to be dealt with at this point. For the duration of this paper, the terms monetary policy and exchange rate policy will be used interchangeably. This is to comply with arguments put forth by economists such as Dehejia who have suggested that when attempting to analyze the exchange rate regimes, then "it is important to insist on referring to 'monetary/exchange rate policy' since...monetary policy and exchange rate policy cannot sensibly be disentangled, so that it is misleading to refer to monetary policy without referring to exchange rate policy or vice versa"<sup>1</sup>. This argument stands to reason based on the evidence presented herein.

This first section of the paper looks to construct the theoretical framework upon which further discussions of exchange rates and the various currency regimes will rest. We will start off by discussing the role that credibility plays in determining the 'optimal' currency regime for a nation. We then tackle the relationship between exchange rates and monetary policy independence in the context of the impossible trinity. Together, these two factorsl pave the way for further discussion into the arena of exchange rates and which is finally followed by a debate on the various exchange rate regimes that are prevalent in the world today.

### *Agent Expectations and Credibility*

Researchers such as Obstfeld and Rogoff have hit the mark when they state that "...a fixed exchange rate is very costly for a government to maintain when its promises not to devalue lack credibility. At the same time, developing and maintaining credibility has become increasingly difficult."<sup>2</sup>

We may talk *ad nauseum* about whether the exchange rate regime a nation is subscribed to is working in its best interests or not, but this debate is futile unless we first understand the dynamics that influence the initial decision to adopt that particular 'optimal' currency regime. In this portion of the essay we introduce the concept of rational expectations and how it feeds into the exchange rate policy credibility. We start off by discussing the imperative role the expectations play in the determination of an exchange rate regime best suited to an economy's policy needs as well as how

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<sup>1</sup> Dehejia, V. H., *Currency Options for Emerging Economies: Concepts and Arguments*, Ottawa, 2004, p 3

<sup>2</sup> Obstfeld, M. and K. Rogoff, "The Mirage of Fixed Exchange Rates", *Journal of Economic Perspectives*, Vol 9, # 4, 1995, p 74

these expectations are shaped and nurtured by the policymakers to assist in cushioning a nation from economic shocks.

The concept that expectations of the domestic agents play a crucial role in successful transmittal of public policy is fairly recent. It was not until 1961 that the *rational expectations hypothesis* was first proposed by John Muth and later expanded upon by Robert Lucas. According to this theory, the agents within an economy not only think about the future but over time, their average expectations are best guesses of the future and hence are almost accurate or ‘optimally forecast’. This accuracy is generally the combined result of the facts that agents form their expectations on a rational basis using all available information optimally, and also because, so the theory goes, they learn from their past mistakes. Since its inception, this theory has gained considerable popularity with the economists. General consensus amongst economists has been that under the rules of this theory, if aptly nurtured, then authorities can greatly influence the agents’ expectations. Having said that, then the expectations that the agents form can have considerable implications for the monetary authorities and the policies they wish to carry out. For example, policymakers of most nations today target the domestic inflation level when setting out their monetary policies. If the wage earners and price setters do not expect the authorities to abide by their commitment to maintain a low level of inflation, then they would make wage demands and set prices at a level which would safeguard their real incomes from the harmful effects of a sudden rise in inflation. If, true to their claims, the inflation is maintained at stated levels but nothing is done to counter the higher wage level in the economy, then that would result in a real currency appreciation, that in turn could have detrimental spillover effects in the exports sector of the economy.

Having discussed the importance of expectations, we now turn to the related concept of credibility. The emerging forces of greater financial integration and globalization within the world economy and the closer trade ties between the nations have caused there to be a renewal of interest amongst the academics about the role of credibility. More importantly, it is the role that credibility plays in the implementation of macroeconomic policies, and as would relate to the general topic of this paper, its assistance in lowering the impact of the shocks, real and fiscal, upon accession to a dollarized regime (see Section IV).

While it has always been stressed that “credibility is usually an unquestioned criterion of good public policy”<sup>3</sup>, this idea gains added significance when it is reviewed under the light of its lasting effect on the economic conditions of a nation via agent expectations. The degree of credibility that domestic agents attach to future policies proposed by authorities may be responsible for directly reducing the costs attached with that change. For example, in preparing for accession into a currency union, if monetary authorities propose to target domestic inflation, then their announcement has the possibility to reduce the cost of disinflation by changing inflationary expectations of the agents. This is because inflation has been shown to have significant influence on current wage and price decisions. If the policymakers are acknowledged as being credible, then that can influence agents’ future expectations

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<sup>3</sup> Taylor, J. B., “Anti-Inflation Policies and the Problem of Credibility – Establishing Credibility: A Rational Expectations Viewpoint”, *The American Economic Review* Vol 72, No 2, 1982, p 81

(of inflation) and this can reduce the overall costs in the long-run. As well, over time, these can result in a reduction in actual inflation in the domestic economy.

To delve into a more detailed analysis of credibility, researchers such as Taylor (1982) expound upon the fact that a simple announcement on the policymakers' part is certainly not enough to establish credibility. Credibility is a privilege that must in fact be worked at and earned. According to economists, authorities must initially establish their reputation which must signal and convey to the domestic and foreign agents that the policy decisions they announce will in fact be followed through with. A related criterion that rational agents are known to measure credibility with is whether the new policy being introduced would lead to significant improvements within the economy as compared to conditions under the policy it looks to replace and in fact improve the economic performance of the nation.

As we shall see further along in the paper, the degree of accommodation or leeway and exceptions inherent in the new policy can sometimes undermine the monetary authorities' credibility. This is often a reason why a move towards a more rigid monetary policy, such as currency board or dollarization, can engender more credibility for the authorities.

As relates to the general topic of this paper and as will be illustrated further along in the paper, the degree of accommodation or leeway and exceptions inherent in the new policy can sometimes undermine the monetary authorities' credibility. This is often a reason why a move towards a more rigid monetary policy, such as currency board or dollarization, can engender more credibility for the authorities. This is better explained with the use of an example: if a nation subscribes to a currency board regime, then much has been committed in the implementation of the system. In this case, prior to conversion, all domestic currency is backed by the anchor currency (discussed further in Sections III). If upon accession there is an onset of a fiscal shock and the authorities contemplate going back to the former regime where they had the option to print currency to finance the deficit then this contemplation would never come to fruition. The reason behind this is that in actuality net benefits of renegeing would greatly fall short of the net costs in terms of both real money as well as the loss of credibility. This then feeds into agent expectations that the policymakers will stick to their prior policy commitments and it is naturally followed by an increase in the credibility attached to those same policymakers.

A number of other factors such as the subscription of more economies to some form of bipolar exchange rate regime as well as recent financial market liberalizations are also driving home the importance of credibility. This is due to the fact that as capital movement becomes more liberalized, then the nation becomes more susceptible and a lack of credibility of the policies/policymakers can magnify the results of a negative shock. Speculative attacks are characterized by massive selling of domestic currency assets by both domestic and foreign investors. While ordinarily this would pose a severe threat, it is the magnification of the situation due to herd mentality that can be quite destabilizing. As well, history has shown time and again how attacks of this calibre can completely unravel and undermine authorities' policies and worse, their credibility, in the global arena.

To understand this concept more clearly, consider a country that subscribes to a pegged currency regime. If there is an exogenous shock after which the agents of the nation feel that even despite sound macroeconomic fundamentals, the authorities might abandon the peg and the currency might devalue, then if majority of the market sentiment changes to the same expectation of devaluation (herd behaviour), then this can trigger a speculative attack on the domestic currency. On the other hand, if economic agents feel that the authorities might abandon the peg, but if their track record indicates that they follow through with their policy announcements and hence the credibility attached prevails, then that might be enough to ward off the onset of the attack.

In concluding our discussion on the importance of agent expectations and credibility of the authorities, while it cannot be argued that establishment of credible reputation entails significant start up costs, the benefits reaped in the long-run can be immeasurable, and these we discuss further in the paper.

#### ***Monetary and Exchange Rate Policy Tools to Alleviate Shocks:***

Having discussed the role that expectations and credibility play in the determination of the 'optimal' currency regime for a nation, we now turn to a discussion of the role of monetary/exchange rate policy tool in the same. Once we have accomplished this, then it is important that we pull these elements together to see how they are used by the authorities in conjunction with each other to avoid or at the very least alleviate shocks that might arise within an economy. This section will also form the basis of discussion further along in the essay when we will refer to how elements of monetary policy and credibility are used under different currency/exchange rate regimes in the alleviation of macroeconomic shocks.

For most central banks or monetary authorities, there are usually three policy objectives they wish to attain to ensure healthy and sustainable growth for their respective economies: full financial integration with their trading partners, true monetary policy independence and last, but not least, exchange rate stability. Unfortunately, the adage "no such thing as a free lunch" comes to mind because economists have debated long and hard, and past experience has shown, that achieving all three simultaneously is well nigh impossible. Shown diagrammatically below, and as borrowed from Habib (2000)<sup>4</sup>, each side of the triangle represents the policy objectives available to the authorities. The figure clearly illustrates the conundrum that while any position may be taken up within the triangle where elements of all three are present, to attain a corner solution, the authorities must at best, favour two elements of the trinity at the expense of the third. This phenomenon has been referred to as the '*impossible trinity*' by the economists and that exemplifies the monumental task that is faced by the monetary authorities of any economy.

**Figure 1: The Impossible Trinity**

MONETARY  
UNION

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<sup>4</sup> Habib, M., "The Case for Euroisation in Central and Eastern European Countries", London, 2000, p 7 online available: <http://www.met-network.org.uk/papers/mhabib.pdf>



Source: Habib, Maurizio, *The Case for Euroisation in Central and Eastern European Countries*, University College London, online available: <http://www.met-network.org.uk/papers/mhabib.pdf>, London, 2000, p 7

In terms of how this relates to our discussion about the choice of currency regimes, we can understand this as follows: if the authorities of a nation determine that they wish to regulate their markets, and at the same time retain full monetary policy independence, then they would be required to surrender the benefits reaped from full financial integration with their trading partners in the global marketplace, and this would give rise to a pegged currency regime. Alternatively, if the authorities feel that they would rather achieve full financial integration and exchange rate stability at the expense of an independent monetary policy, then that would result in a system similar to a monetary union. For the naissance of a free-floating currency regime, the two objectives that would take precedence are full integration in the global market and monetary policy independence, but again, this is feasible but at the loss of exchange rate stability.

While the full import of absolute financial cohesion with an economy's trading partners and exchange rate stability cannot be expounded upon enough, for now we deviate to discuss the significance of an independent monetary (exchange rate management) policy in the alleviation of shocks that might affect an economy. Once we have accomplished that, then we will have laid the foundation for subsequent sections that will introduce us to exchange rates as well as the prevalent currency regimes of the world.

The monetary and exchange rate policy tool is available to the policymakers/central bank of independent nations whereby they can achieve particular goals such as keeping inflation under check, maintaining an exchange rate, achieving full employment, supporting economic growth or any combination of the above by managing their money supply. While there are any number of ways to manage the money supply, the key modes include working with the domestic interest rates, through open market operations (which can increase or reduce the monetary base), setting up reserve requirements for the economy, and by trading in foreign exchange markets .

At any given time, the amount of goods and services an economy produces and the domestic level of employment depends on factors other than the monetary policy of the authorities. Having said that, in short-run the levels of domestic output and employment tend to deviate from their long-run or optimal levels and that is where

monetary policy transmission comes into play. The deviations from the optimum levels are generally the result of the onset of a shock to the economy. Shocks such as these typically fall under one of two categories: i) nominal shocks, where a change to one component of the economy is offset by a complementary shift in another and these together can help bring the economy back into equilibrium or ii) real shocks where complete adjustment of the economy is delayed or impeded, usually because of the presence of (temporary) sticky prices in the economy.

### Box 1: Classifications and Identification of Shocks in Mundell-Flemming Model

Clarida and Gali (1994) derive a stochastic version of the Obstfeld (1985) open economy macro model with output, prices, and the real exchange rate as endogenous variables. The model exhibits the standard MF results: sticky price and output adjustment, and national outputs that are imperfect substitutes in consumption in the short run, while embodying long-run properties characterizing equilibrium after full price adjustment. Following Blanchard and Quah (1989), in the estimation of the structural VAR, these long-run properties are used as restrictions to identify relative supply (AS), demand (IS), and monetary/financial market (LM) shocks: relative AS shocks are those that have a permanent effect on relative output; and relative IS shocks are those that have a permanent effect on the real exchange rate but not on output; and relative nominal shocks have no permanent effect on relative output or the real exchange rate.<sup>1</sup> Conceptually, monetary/financial shocks include changes in relative money supply and liquidity preferences, velocity shifts, varying risk premia, effects of financial liberalization, and speculative currency attacks.

Having identified the shocks by their long-run properties, the short- and medium-run structural dynamics are freely estimated. The contribution of each shock to

<sup>1</sup>IS and LM shocks can be classified together as neutral shocks.

the variability in each variable can be assessed (with variance decomposition), and impulse response functions IRFs can be generated. If correctly identified, these should show the following:

- A positive relative supply shock increases relative output. The short-run impact on the real and nominal exchange rates is ambiguous, but eventually prices should fall. In the long run, relative output rises, while the effect on the real exchange rate is ambiguous (Buiter, 1995).
- A positive relative demand shock increases relative demand. In the short run, the nominal and, due to sticky prices, real exchange rates appreciate, and relative output increases. Eventually, prices increase, and in the long run relative output returns to its old level, while the real exchange rate appreciates if the shock is permanent.
- A positive relative monetary/financial shock lowers the countries' interest rate, relative to foreign rates. In the short run, both real and nominal exchange rates depreciate—amplifying the impact of the shock—and relative output increases. In the long run, relative output returns to its old level, and there is no effect on the real exchange rate.

Source: Schadler, S., et al., *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, International Monetary Fund Occasional Paper 234, Washington, 2005, p 31

When a nation is hit by a shock, action on the part of policymakers is required almost immediately to help limit the amount of damage that the economy might suffer. Action in this sense can include the use of fiscal and/or monetary policy but when we account for the fact that there is (usually) a lag before any policy stance attains the desired outcome, then transmittal of monetary policy appears to be the winner. Importance of this tool stems from the fact that of all the tools at their disposal, there is none whose conduct is more transparent to the economic agents than monetary policy. To understand this, if we were to take the example of a nation which was overheating due to say, unsustainable growth, then the authorities might consider raising the overnight interest rate. This would clearly signal to the agents that onset of inflationary pressures was being felt by the policymakers. As well, by raising the rates they are able to influence the agents' demand for capital (effectively cause a drop in money demand). Demand for capital would affect demand (and supply) of goods and services, which lends itself to modifying the level of output and employment and finally the inflation in the domestic economy.

Having discussed the nominal and real shocks, then before delving any further, we also need to understand the main *instigators* of shocks that can unsettle an economy. Shocks are identified as "[...] supply shocks if they do have a long-run

impact on output.<sup>5</sup> These are generally an exogenous event which can disrupt the price of a commodity or service within the economy. More often than not, it is caused by an unanticipated increase or decrease in the supply of a particular good, which in turn can change the equilibrium price and quantity. Alternatively, a demand shock is a sudden surprise event that causes an increase or decrease in consumer demand for a good or service but one which does not have any long-run impact on the economy's output. Shocks of this calibre are generally the result of a sudden change in the government's fiscal and/or monetary policy stance as these have the capacity to directly affect the level of disposable income available for the agents' use and hence their demand for goods. Following from the example above, we can deduce that in the face of an unforeseen shock, monetary policy could be vital in reducing the scope of damage that may be caused.

In terms of the scope of shocks, an important consideration is how a particular shock affects the domestic economy and also to gauge whether that shock simultaneously affects surrounding nations/trading partners of the nation. As well, researchers suggest that the policymakers study whether the affects of the shock are identical or similar in the domestic and foreign economies or if they differ greatly. This comparison of the effects of the shock assists in giving the authorities an idea of the level of economic integration between the two entities. If the shock has the capacity to influence the two in a similar manner, then that particular shock is referred to as a symmetric shock. Alternatively, when a shock does not affect the two nations simultaneously or if it has divergent effects, then this is referred to as an asymmetric shock. To pull in our discussion on monetary policy/exchange rate management here, it becomes apparent that an autonomous monetary policy becomes imperative if the nation in question is a small open economy but which is generally hit by asymmetric shocks that affect the domestic and partner economies differently. This is because when the nation is hit by an exogenous shock, then freedom to conduct an independent monetary policy can be vital in helping stabilize and cushion the nation from the impact of the shock.

Another vital debate regarding the importance of an independent monetary policy tool has been whether or not it is functional when the economy goes through business cycles in which output and employment deviate around their long-run optimal levels. Research into this has shown that while monetary policy can affect neither employment nor output in the long-run, it does have the capacity to influence them in short run: for example, if an economy is going through a recession, then authorities can stimulate the economy and temporarily help push it back toward its long-run output level by lowering the interest rates. In this way, monetary policy is used by authorities the world over to stabilize their respective economies.

In terms of modes of monetary policy transmittal, until quite recently the key form used to be the level of money supply in circulation within the economy (monetary targeting) but over time the changing vista of the economies has led to a shift in the determination and conduction of policy mainly via the interest rate channel (other channels are used but sporadically). Academics have pointed to two developments

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<sup>5</sup> Schadler, S., et al, *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, IMF Occasional Paper 234, Washington, 2005, p 19

which have especially expedited this shift and these are: "[first] the breakdown of traditional relationships between money and economic activity largely brought on by innovations in payment and transactions technologies [and] second, the increasing sophistication of financial markets and central banks regarding information about the future as embedded in financial instruments (including, for example, the emergence of derivatives and inflation-indexed debt)".<sup>6\*</sup>

In short, interest rates have been the tool of choice because they are seen as vital informational indicators. We can think of this in the sense that current agent expectations about future inflation often help determine how the economy will perform in later years (for example, expectations will be used to set out wage and price contracts as well as determine the rate of return investors will demand on their investments among other things). Therefore, if the central banks/authorities were interested in obtaining information about current expectations, then they could do so from the forward-looking financial markets and the prevailing rates there in order to help predict future paths of inflation and output.

The discussion and examples above go on to illustrate the importance of monetary policy to achieve any of the policy goals such as inflation targeting or maintaining exchange rates. That being said, a truly independent monetary policy can only be achieved when the nation subscribes to a free floating exchange rate regime. This is because if the exchange rate is pegged or managed in any way, then the central bank is required to conduct monetary policy via buying and selling of foreign exchange to maintain the peg (rate) and this has an effect on the money base similar to what would occur if an open market operation were carried out. As management of money is closely tied to the management of the currency exchange, then it follows that if there were turbulence in the foreign exchange market, then that would cause the central bank to lose control of the monetary policy and this would have spillover effects in the exchange rate management domain as well.

To cease this discussion of the role of monetary/exchange rate policy in helping alleviate shock, when a nation decides to adopt a fixed exchange rate regime, then it makes a conscious decision to sacrifice an essential policy tool. While this can not be an easy decision, the assumption is that the macroeconomic conditions and nature of the shocks that hit the nation must have been such that they required the discipline that can only come about via subscription to such a regime. Finally, to pull the theory of rational expectations and credibility together with monetary and exchange rate policy tool, it would suffice to say that it is extremely important that policymakers make credible announcements regarding their monetary policies. If agents are confident that the authorities are committed to their stated target goal(s), then they anticipate future government movements and make their decisions accordingly. These decisions then guide the output and employment levels and all of these together tend to generally have lasting effects on the macro environment of the nation.

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<sup>6</sup> The Federal Reserve Board. (2006). *Monetary Policy*. Online available: <http://www.federalreserve.gov/policy.htm>, as on February 23, 2006

Having discussed the factors which have significant influence on a nation's exchange rate policy decision, we now look at the actual concept of exchange rates and dynamics behind this phenomenon.

## II: EXCHANGE RATES

### *What are Exchange Rates?*

In its most primary form, the phrase *exchange rate* can be thought of as the "price of one currency in terms of another".<sup>7</sup>

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<sup>7</sup> Krugman, P. R. and M. Obstfeld "International Economics: Theory and Policy", Reading, 1997, p 331

### ***Types of Exchange Rates:***

At a superficial level, we encounter the terms nominal and real exchange rates almost on a daily basis, but with the growing trend towards globalization and closer financial integration, there is more to the concept than meets the eye.

#### ***Nominal Exchange Rate:***

A nominal measure of the exchange rate is the value of the domestic currency in terms of the other currencies. Since derivation of a nominal exchange rate involves conversion between two currencies, it implies that there are two ways to quote the exchange rate. The term *price quotation system* is used to define the exchange rate as the number of units of domestic currency per unit of foreign currency. The inverse of this quotation system is the *volume quotation system*, which defines the number of units of foreign currency per unit of domestic currency<sup>8</sup>.

#### ***Real Exchange Rate:***

As is the case with almost all macroeconomic variables that affect an economy, exchange rates are also measured in nominal and real terms. *Real exchange rates* are the nominal exchange rates, which have been adjusted for the inflation differential (the difference between the inflation rate in the domestic economy and the inflation rate of the main trading partner(s)) or alternatively, it is a measure of the international exchange rate.

If we designate our nominal exchange rate with the notation  $\eta$ , and we set out domestic prices as  $p^d$  and the international prices as  $p^f$ , then the derivation of our real exchange rate,  $\rho$ , becomes:  $\rho = \eta \cdot (p^d / p^f)$ . A key point to be noted is the fact that if the nominal exchange rate is kept fixed (as in a case of fixed currency regime) then appreciation or depreciation of the real exchange rate is dependant on the inflation differential, accounted for by the ratio  $(p^d/p^f)$ .

If the nominal exchange rate,  $\eta$ , is adjusted continuously with respect to the inflation differential, then the ratio  $(p^d/p^f)$  equals to one and in that case, the nominal exchange rate equals the real exchange rate. On the other hand, if the nominal rate is kept constant and if the inflation crawls but at a lower rate then that causes the exchange rate to be less than the actual inflation rate. This causes an overvaluation of the nation's real exchange rate, thereby causing interpretation problems.

An understanding of the exchange rate dynamics is important in that it can have significant effects on a nation's exports, imports as well as the capital flows. To understand the relationship between the exports and imports and the exchange rate, we can take the example of country, A, which has close bilateral trading ties with its neighbouring country, B. If the inflation in A is higher than B, then in the equation  $\rho_A = \eta_A \cdot (p^d / p^f)$ ,  $p^d$  is higher than  $p^f$ . This causes the inflation differential  $(p^d / p^f)$  to rise. In this situation, the nominal rate,  $\eta_A$ , would have to be adjusted downwards to equate the left and right sides. If  $\eta_A$  were to be held constant, then the real exchange rate,  $\rho_A$ , becomes overvalued (alternatively, this mean that currency A depreciated in value). This indicates that the purchasing power of currency A drops with respect to B, and this

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<sup>8</sup> Gandolfo, G. "International Finance and Open-Economy Macro-economics", Heidelberg, 2002, p 8

is reflected in the net export account as follows: domestic goods of economy A become less expensive for agents from country B (as their currency appreciated in value, hence stronger purchasing power). This will cause a rise in the export of domestic goods of A and a drop in the import of goods from B into country A.

With respect to the effect of exchange rate mis-alignment on capital flows, it has several negative connotations for the domestic economy. If, for example, the divergence is mostly due to rising inflation in the domestic economy, then that can cause a sudden (and sometimes significant) outflow of capital from the nation. As well, this deviation can raise the volatility and generate uncertainty about the real value of the currency and negatively impact the foreign direct investments in the nation. If this 'discrepancy' is not kept in check, it can lead to much bigger issues such as speculative attacks on the national economy which can undermine the credibility of authorities, as discussed in the previous section.

Due to the issues that can arise in the derivation of the nominal rates, real exchange rates are often used in economic analysis. Their importance stems from the fact that these can be used as indicators of the general competitiveness of the domestic economy within the world market arena. To gauge the competitiveness, comparison must be made on real terms (that is purchasing power of each unit of domestic economy vs. the foreign currency) rather than nominal terms and this can only be accomplished using real exchange rates. These rates are also reasonable indicators of the adequacy of the nominal exchange rates and the prevailing exchange rate policy of the economy. This conclusion is drawn based on the fact that if the authorities are able to maintain the real and nominal rates close to each other without having to actively intervene in a timely manner, then that implies that the exchange rate regime that they have subscribed to is efficient and effective for the nation.

Now that the basic framework has been set out using the definitions of nominal and real exchange rates, as well as their general dynamics and also having touched on the theory of credibility and the use of monetary policy to alleviate shocks within an economy, then we are equipped to tackle the issue of the theory behind the prevalent currency regimes in the global economy today.

### III: EXCHANGE RATE REGIMES

Every country, large or small, developed or developing, seeks an exchange rate regime that is best adapted to its needs. It is this differentiated need of each country which gives rise to a whole spectrum of exchange rate regimes. These range from the freely floating exchange rate regime at one end to the rigidly fixed exchange rate regimes at the other and many intermediate regimes in between.

The choice of an exchange rate regime is first and foremost a political process. The implementation of the regime and the management of the exchange rate is typically a function of the central bank, though in some countries it may be a function of the Ministry of Finance. As it would be impossible to explain all the regimes that exist in the world today, this discussion will focus on the description of the more prevalent

regimes following the classifications set out by Edwards and Savastano in their 1999 working paper<sup>9</sup> as well as the strengths and shortcomings of each (refer to Appendix A at the end).

### ***The Gold Standard and Bretton Woods Regime:***

Before getting into a full blown discussion of the exchange rate regimes prevalent in the global economy, an overview needs to be given of the Bretton Woods basic agreement that occurred after the end of World War II. In this sense, WWII can be marked as being that the point in history when the post-war exchange rate regimes were established.

Until WWII, the gold standard system was mainly used and under this regime, the basic unit of account was a fixed weight of gold. This meant that the exchange rate between any two currencies was rigidly and automatically fixed and calculated by the ratio of their gold content. Under this currency regime, monetary authorities of the participating nations guaranteed to redeem domestic currency notes for the equivalent amount of gold.

Now, seeing as under the gold standard, any new currency that was minted had to be backed by gold, then this meant that authorities could not print any unnecessary notes. According to the system's proponents, it was this factor that was crucial in making the system optimal and resilient to inflation. This same characteristic was quoted by the critics as being one of the harbingers of the Great Depression of the 1930s. The critics felt that because the amount of money circulating in the economy was wholly dependent on the accessible amount of gold reserves, then this made the money supply very rigid. When at the onset of the Great Depression people started to hoard money, then this caused a drastic drop in the money supply. While this might not generally have been a problem so long as wage and price levels dropped instantly to reflect the lower amount of money in circulation, during that recessionary period, money was clearly needed to give the economies a boost out of the trough. As the rules of the system did not allow new currency to be minted without the requisite gold reserves, then the much-needed relief did not come about and hence the onset of the crisis.

Defenders of gold standard have also maintained that this system was vital in establishment of trade ties amongst nations as it allowed all countries to convert gold at a fixed price and use that as a means to settle their international payments. This point has again garnered counter-arguments by the critics. They have felt that as there was a general expansion of world trade in addition to an overall increase in the size of the world economy, then the fact remained that there was simply not enough gold to underwrite the amount of money required to sustain world trade. Alternatively, the growth of the global economy was inextricably linked to a scarce commodity which in effect reined in/slowed down the actual growth instead of letting it reach its potential.

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<sup>9</sup> Edwards, S. and M. Savastano, *Exchange Rates in Emerging Economies: What do we know? What do we need to know?*, NBER Working Paper 7228, Cambridge, 1999, p 7

Having discussed the arguments and counter-arguments on the historical performance of the gold standard, the current day consensus on the system does not fare much better. While the system may have had its advantages when it was first implemented, most modern day economists argue that the disadvantages inherent in the gold standard far outweighed its benefits. The principal weakness of this system is quoted as being the severe limitations it put on the flexibility of the money supply within the economy. Seeing as any normal economy goes through phases of the business cycle, then such tight leash on the creation of money vastly limits the use of a vital anti-recessionary tool as often upon the onset of a recession, monetary authorities inject money/liquidity into the economy thereby giving the consumption a boost. This can help in reducing the impact and/or the severity of the recession. As well, while it is important that the monetary authorities not have unlimited power vested in them to create money, it is an established fact that there is a close relationship between the money supply and the growth and expansion of an economy. Another contention against the gold standard is that under it, domestic money is in fact commodity money (that is, the currency notes are based on a particular commodity, in this case, gold). The argument continues that under this regime, authorities tie the growth of an economy to a commodity which is in available in a limited supply thereby putting an upper limit to the growth of the nation.

A basic tenet of the gold standard is that it would work well only when all economic agents believed in the overall fiscal and monetary responsibilities of the participant governments and if the relative price of gold were fairly stable. During WWII, in order to finance their wartime expenses, most nations, notably the stronger economies like England, United States and France, commenced printing currency without having the requisite gold reserves to back their notes. This generated a lack of credibility in the fundamentals of the system and over time, the gold standard system fell apart and was replaced by the Bretton Woods system. This system was in place from 1947 up until it fell apart in the 1970s.

Post-WW II, after the fall of the gold standard, some nations suggested reverting back to it, but it was realized that one of the biggest obstacles would be setting out a value of gold to use to set the parity: the pre- or post- WW II value. That was the final nail on the coffin of the gold standard system and the stage was set for the conception and design of the *Bretton Woods* system. This system has been touted as being the first exchange rate regime where the monetary relations between independent nations were fully negotiated.

The exchange mechanics under of the Bretton Woods agreement were not dissimilar to the gold standard system but for one vital difference: under this currency arrangement, each participating economy had to maintain its exchange rate in terms of gold within a fixed band but this band was allowed to fluctuated within a  $\pm 1$  percent rate around the stated parity. It was this limited fluctuation possibility that made the Bretton Woods system fall under the common umbrella of limited flexibility regimes than under the fixed regime.

The architects of the Bretton Woods (among them J.M. Keynes) set up a system of fixed exchange rate governed and supervised by the International Monetary Fund using the US dollar as the reserve currency. This was because post-WW II going back to

gold standard was not feasible and therefore the only option available was to determine a strong enough currency that it could be used as an anchor currency by the other nations. Increased demand for international liquidity and the commitment of the US government to exchange gold at the parity price of US\$35 per ounce (set out by the designers of the system) were pivotal in making US currency the only viable option as an anchor currency.

Under the Bretton Woods system, participating nations decided on a parity of their own currencies in terms of gold and following that, subsequent bilateral parities were derived. In case of declining parities, member states were obligated to buy and sell foreign exchange. These nations could also enforce gold convertibility on the anchor, US, currency. Although gold convertibility enforcement was not required, it was allowed. Nations could forego converting dollars to gold, and instead hold dollars. Over time, some nations and their central banks began to prefer holding dollars over gold due to their interest earning ability and also due to the inherent flexibility. Rather than full convertibility, this option provided a fixed price for sales between central banks.

In theory, Bretton Woods was meant to provide macroeconomic discipline by maintaining price stability in line with foreign prices and at the same time maintain relatively low uncertainty. The system has also been credited with fostering international trade. In addition to all of the above, the built-in 'escape clause' that allowed the authorities to devalue should the need arise provided the system with some flexibility.

This currency regime was meant to secure the advantages of a fixed currency regime without the associated disadvantages. In reality, there was still an open gold market. For the Bretton Woods system to remain fully functional, it would either have required that the peg of the dollar to gold be altered, or it would have required maintaining the free market price for gold near the \$35 per ounce official price. The greater the gap between free market gold prices and central bank gold prices, the greater the temptation to deal with internal economic issues by buying gold at the Bretton Woods price and selling it on the open market.

A few factors eventually led to the break down of this system. In about 1971, the US government had drawn down a reserve deficit of US\$56 billion<sup>10</sup> and in order to fund its military expansion and other expenses, depleted most of its non-gold reserves and only had 22percent gold coverage of foreign reserves. At the same time the world experienced an almost exponential growth in international trade and consequently in international currency markets. In that context, a decline of American hegemony and an increasing US balance of trade deficit all resulted in the dollar being overvalued with respect to gold. Finally it was the decision adopted by the US government to sever the link between the dollar and gold that sounded the end of the Bretton Wood system.

Ever since the collapse of the Bretton Woods system, the global economies have been operating in a state that has been referred to as *nonsystem* by researchers such as Williamson (1976). It has been so called due to the fact that no universal, one-size-fits-all system with a coherent set of rules and a precise exchange rate regime has

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<sup>10</sup> Wikipedia.org (2006), *Dollarization*. Online available: <http://en.wikipedia.org/wiki/Dollarization>, as on February 23, 2006

been widely adopted. As we will see, the exchange rate regimes of the world nations currently span the exchange rate continuum from fully flexible to rigidly fixed systems.

What factors cause a nation to choose one system over another? This question has been at the root of countless debates amongst the researchers and no simple solution has yet been proposed. As was previously stated, the choice of an exchange rate regime is first and foremost a political process, that is the objective functions of the authorities, but some very close contenders for the position of key determinant of the regime are also the types of shock that affect the nation in question as well as the structural parameters of the economy.

As Gandolfo succinctly states, "The reason for the impossibility of declaring one regime definitely superior...lies in the fact that neither one has inferior costs and superior benefits..."<sup>11</sup> and that is what follows. Seeing as we have briefly touched upon the choice of a currency regime being a political process earlier in the context of the '*impossible trinity*', we look to examine that in further detail as well as the advantages and disadvantages of the prevalent regimes and their capacity to counter various economic shocks that affect the nations.

#### ***Free Float Exchange Rate Regime:***

For the floating, also known as 'flexible' or 'freely floating' exchange rate regime, the key is that there is freedom of movement for the nominal exchange rates. For this system, the value of the foreign exchange is freely determined in the international currency markets and in principle the monetary authorities do not intervene in the foreign exchange market. The rate is thus determined completely by the market forces, and the actual and expected changes in supply and demand of assets and goods are reflected in the exchange rate changes.

In terms of the *impossible trinity*, under a free float system, the authorities give preference to the policy goals of full financial integration and monetary policy independence. While these come at the expense of exchange rate stability, the gains in terms of shock absorption capacity can be substantial. As we saw in Section I, monetary policy tool is vital in helping nations achieve particular policy goals such as maintaining or boosting a nation's productivity, while simultaneously adjusting various components of the policy tool to reduce inflation and/or unemployment. Central bankers under this system have complete control in that, for example, if they were faced with rising unemployment, then at their discretion they can expand the money supply. While there would be offsetting currency depreciation, it would come with the benefit of higher employment level. Alternatively, an independent monetary policy under a free floating currency regime can be used by authorities to cool an overheated economy.

Another much-touted advantage credited to this currency regime is the automatic stabilizing/insulating nature of the exchange rates in the face of economic shocks. For example, if we take an economy that suffered an exogenous aggregate demand shock. Under a standard Mundell-Fleming model (small, open economy), the

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<sup>11</sup> Gandolfo, G. "International Finance and Open-Economy Macro-economics", Heidelberg, 2002, p 280

demand shock will cause a decrease in output and the domestic price level. Because there would be an increase in the real price level (due to the drop in general price level) and a decrease in the money demand, then because there is perfect capital mobility that will cause an outflow from the domestic economy. Exchange rate depreciation results due to the capital outflow and that in turn sustains the aggregate demand whereby the final drop in price level and output is lower than it would be under a fixed currency regime. In the debate for fixed versus flexible regimes, researchers have found flexible rate regimes to be much more effective in times of real shocks, when complete nominal adjustments are not possible, usually due to the presence of sticky wages.

Our example above shows how nominal exchange rate fluctuations under a free floating currency regime can cushion the domestic economy from both internal and external shocks but like any other regime, this system also has inherent weaknesses. For countries subscribed to this regime, one of the biggest shortcomings is the high volatility of nominal and real exchange rates. This volatility often results in demands for higher risk premia by both domestic and foreign economic agents, and has spillover effects in other components of the economy. Also, excessive movement of the exchange rates has been seen as a contributor to the macroeconomic instability, particularly in developing countries that do not have deep financial markets.

A point to be noted is that while dynamics of the global economy are such that they would not allow for an absolutely pure form of this system to exist, a 'variation' of the original does exist. At any given time, there is no currency whose value can be said to have been determined purely on the foreign exchange market. In some cases, such as when there is an extreme appreciation or depreciation of domestic currency, which are becoming more prevalent due to the deregulations in the capital markets, the central banks do intervene and carry out monetary policies to stabilize their currency value. Having said that, their decisions can have only so much impact as no matter how much reserves they may have at their disposal, it would generally not even be a fraction of what is available on the global market. This then implies that their actions do not carry as much weight and therefore, the currency value is still based on market demand and supply, that is free floating currency regime prevails.

This then concludes our discussion of the free floating regimes and leads us into the discussion of the managed float currency regime.

#### *Managed Float Exchange Rate Regime:*

As stated above, a key determinant of a currency value under a free floating regime is the supply and demand of a currency on the world market. This implies that there are sufficient transactions (both buying and selling) involving the currency so that all available information is already reflected in the market value. On the other hand, the currency of an economy may not be widely traded either because it is a small economy or a developing economy not yet fully integrated in the international markets. In such a case, all information may not be fully reflected in its value. Because of the limited trading and possibly restrictions on external capital flows (lack of full financial integration), the monetary authorities' intervention in the foreign currency markets bears

more weight. This then is the main characteristic of a managed floating currency regime.

In the context of the *impossible trinity*, under a managed float system, the policymakers choose to have complete monetary policy autonomy which they use to manage their exchange rates (hence exchange rate stability), both of which come at the cost of complete financial integration with the trade partners.

With respect to the modes and frequency of the interventions, these vary among the monetary authorities and are based on the objectives the authorities wish to achieve. Active methods of intervention by the authorities include both sterilized and non-sterilized interventions, with the result being that there is a change in the international reserves of the country.

Sterilized intervention is described as proactive intervention on the part of the central monetary authorities via a process which includes them supporting their exchange rate by: "a) selling foreign exchange reserves for domestic money; and then b) 'sterilizing'...the potential contractionary effect on the domestic monetary base through a simultaneous and equal purchase of domestic-currency bonds".<sup>12</sup> This process serves to neutralize any effect on the domestic monetary base, and at the same time it changes the relative supplies of both domestic and foreign bonds held by economic agents. Due to the nature of this type of intervention, it is important to note that it can only have modest, if any, effect on the domestic interest and exchange rates.

Non-sterilized (unsterilized) intervention is the term used to describe action on part of the monetary authorities to change the monetary base via a purchase of their own currency on the foreign exchange market. This process works in that if the authorities purchase their own currency, then in effect, they are removing a quantity of the currency from the market which in turn serves to strengthen the value of the currency.

Having talked about direct intervention above, then indirect intervention on the authorities' part includes the use of financial tools such as interest rates and liquidity to affect the currency value. Use of these is called indirect intervention because while it does affect the currency value, it does so without generally affecting the amount of the reserves of the country. To summarize, a managed float currency regime is the resultant when the policymakers and authorities make use of the monetary policy tool to manage their exchange rate.

Under the general heading of the managed float system falls the regime commonly quoted as 'dirty' float currency system, with the prime example being the currency regime that prevailed in the Peoples Republic of China (PRC). Under this system, the monetary authorities manipulated the exchange rate to attain a particular trade goal. For the Chinese authorities, they formerly pegged the renminbi to the US dollar. The principle behind this 'management' was to purposely keep the domestic

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<sup>12</sup> Obstfeld, M. and K. Rogoff, "The Mirage of Fixed Exchange Rates", *Journal of Economic Perspectives*, Vol 9, # 4, 1995, p 75

currency undervalued with respect to the dollar, which made Chinese exports more attractive to other economies, and especially the United States.

The managed float system is very similar in terms of its strengths to the free float currency regime because it also allows the movement of the exchange rates to cushion the economy from shocks. As well, it has the added benefit that due to the intervention clause for the monetary authorities, excessive exchange rate fluctuations can be contained, thereby reducing the high risk premia costs that are a key feature of free floating economies.

With regards to the shortcoming of this type of a currency regime, the most quoted would have to be the fact that due to the generally unforeseen intervention by the monetary authorities, there is a certain lack of transparency which translates into an element of uncertainty for the agents. In addition to the above, agents know that the effects of the interventions are short-lived and this can have a destabilizing effect on the domestic economy and together, the factors above can work to undermine the credibility of the authorities.

Managed float economies are also more susceptible to speculative attacks. Economists have stated time and again that exchange rate systems are vulnerable even in the presence of sound economic fundamentals. What this means is that the "...agents incorporate in their expectations the future response of policymakers in terms of economic policies to changes in the macroeconomic situation..."<sup>13</sup> If upon the policy announcement the agents feel that the policymakers might not follow through with their pronouncement, then that can have a negative impact on the transmittal of the policy. In the worst case scenario, if the economy is a small open economy, then the herd behaviour can take over and it can trigger a massive selling of domestic currency assets by both domestic and foreign agents, thereby resulting in a speculative attack.

As we stated in the discussion on the free floating exchange rates, there are very few, maybe six or seven, truly floating currency regimes in the world today as most authorities tend to intervene intermittently to stabilize or otherwise manage their respective economies. This then translates into the managed float exchange rate regime being the most prevalent in today's global arena. Most developed and emerging nations use some variation of this currency regime. Even those countries that state that they are followers of the free float system *de jure*, if looked at closely they would appear to have a managed float system, *de facto*.

#### ***Fixed Exchange Rate Regime:***

Getting past our discussion of the free float and the managed float currency regimes, we now turn to examine some of the many variations of the fixed exchange rate regime. This broad end of the spectrum includes at one end the 'soft peg' regimes while the opposite end is marked by the 'hard peg' regimes.

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<sup>13</sup> Krugman, P. R. and M. Obstfeld "International Economics: Theory and Policy", Reading, 1997, p 577

As Obstfeld and Rogoff (1995) ask, "Given the sacrifice of monetary freedom, why would any government ever want to peg its currency's value?"<sup>14</sup> While there is no simple answer to this question, lack of credibility in the authorities' ability to effectively run the economy has been cited as a fundamental reason why any independent nation would consider adopting any form of a fixed currency regime. For example, if a nation pegs its rate to a low-inflation currency (or maybe even an outright adoption of that currency, that is 'dollarization'), then that can help in the containment of domestic inflationary pressures. To understand this rationale, consider an economy that has a history of excessive government budget deficit. If the rate were not pegged to a foreign currency, then the monetary authorities might be tempted to print currency to finance their deficit. In the case of a fixed regime, such course of action would cause a currency depreciation due to the inflation that will be introduced into the market (recall:  $\rho = \eta \cdot (p^d / p^f)$ ). This then is an example of the 'discipline' argument in favour of fixed exchange rate regimes.

As stated above, fixed currency regime puts a stop to exchange rate movement via the fixing of the rate. Recall also from previous sections that one factor that can lead to a destabilizing speculative attack is agent expectations that a currency might devalue. If the currency is pegged to a stable currency then that clears that expectation and this in the long-term works to increase the investments in the domestic economy.

Another benefit of adoption of this type of a regime by a smaller open economy would be that it would minimize the exchange rate volatility which can be destabilizing in the highest extreme. This is because the fluctuation in the currency makes economic agents uncertain about the prices that they would be required to pay and receive in the future. As well, the unpredictability stemming from that single factor generates uncertainty in the goods and services market domestically as well as abroad, thereby dampening the international trades sector. Along the same lines, expectations of higher prices can result in inflation in the domestic economy, which can lead to higher required rates of returns and the spillover effects can weaken the investments in the domestic economy.

Seeing as the fixed and flexible regimes are almost exact opposites of each other, then that implies that the key advantages of one are the other's inherent weaknesses. The critics of fixed currency regimes have cited the restriction that pegging places on the use of monetary policy to stabilize the economy as its biggest weakness. According to the academics, while any economy hit by a shock would have problems adjusting due to the temporary rigidities in the nominal wages and prices, the effects are magnified when the government or authorities are not able to conduct public policies via the interest rate, credit or any other monetary channels. While alternatives such as fiscal and commercial policies are still available they respond sluggishly or they may entail dead-weight losses or efficiency costs and their conduct is not as transparent as say an interest rate movement on the authorities' part may be to the economic agents.

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<sup>14</sup> Obstfeld, M. and K. Rogoff, "The Mirage of Fixed Exchange Rates", *Journal of Economic Perspectives*, Vol 9, # 4, 1995, p 76

In terms of the shock absorption capacity of a nation under the fixed regime flag, consider again a small, open economy. If there is an unexpected exogenous rise in demand for money, then with the money supply staying constant in short-run, there is an increase in the domestic interest rate. In terms of the policy goals (*impossible trinity*) for a fixed currency regime, the authorities opt for full financial integration and exchange rate stability at the loss of monetary policy independence. Now, with the rise in the interest rates, then that causes a capital inflow into the economy which raises the supply of domestic money until the money supply and demand are once more in equilibrium. Hence, output and prices remain constant but the fixed regime stabilizes the economy. Was this same scenario to occur in an economy operating under a flexible currency regime, then the higher interest rates and the subsequent inflow of capital would have led to currency appreciation and that would generally lead to a drop in the demand for domestic exports among other effects.

Before we move on, a point to be noted is that as the nations move along the fixed currency regime continuum, the degree of rigidness inherent in their exchange rate policies gradually increases. While this translates into a greater lack of flexibility in terms of the use of the monetary policy tool (where at the extreme end of fixed regime, dollarization, the tool is absolutely compromised), it also means a steady increase in the credibility attached to its policies and the policymakers. Hence, it is a tradeoff between flexibility and credibility and it is for the authorities to decide which policy will take precedence. Having talked about the advantages and disadvantages of the fixed currency regime in general, we look at the whole series – from the soft peg to the hard peg varieties - of the fixed exchange rate regimes.

Starting at the less rigid end of the fixed currency regime spectrum, the 'soft peg' currency arrangements are those whereby a nation's authorities set a band around a fixed central parity, that is they declare that the exchange rate of the national currency will fluctuate within this band. Such a policy, once established, commits the authorities to intervene using all the tools at their disposal every time that their exchange rate exits the band. As stated earlier, the degree of leeway available to the authorities is negatively correlated to their credibility and hence for these systems to operate to their potential there must be enough economic agent faith vested in the authorities' commitment to maintain their stated pegs. In addition to this requirement, because nations subscribed to these arrangements are more susceptible to destabilizing speculative attacks, then they are also required to have sufficient reserves to defend their currency in the foreign exchange market should the need arise.

While there are many types of 'soft-peg' regimes, in our discussion we will look at the following:

Target Zone --floating within a band:

Under this type of an exchange rate regime, the nominal exchange rate of a country is allowed to fluctuate within a band. The width of this band varies but the center of the band is a rate pegged to either a currency or a basket of currencies. Also to be noticed is the fact that some band arrangements are the result of cooperative arrangements, say between a set of trading nations whereas others are unilateral, as in the case of the EU member states that have accessed to the union.

The biggest strength of this system is that it brings together some key benefits of flexibility within the free float systems along with some credibility that is vital to successfully implement fixed/pegged currency regime. Under this system, the changes in the nominal rate within the band act as shock absorbers for the domestic economy. As well, the key parameters of this regime such as the bands and mid points help guide the public's expectations.

One of the biggest weaknesses of this system is the fact that selection of the band is a difficult and complex matter. As such, in some cases -- especially when the band is too narrow and when domestic macro policies are not consistent with a "horizontal" band this system can be destabilizing and prone to speculative attacks, the likes of which have been seen in recent years in select emerging economies. In addition to the correct specification of the width of the band, another problem that plagues systems that allow for a possibility of realignment of the central parity of the bands is that it tends to weaken the same credibility which is stated above as strength of the regime.

*Sliding Band:*

For a country that adopted a regime of sliding band, there is no commitment on the part of the monetary authorities to maintain the central parity 'indefinitely'. The system is variation of the band system but is geared more towards those economies where there is generally higher inflation. Under it, it is apparent at the outset that the central parity will be adjusted periodically to meet macro needs of the economy such as maintaining competitiveness in the trades market.

The biggest strength of this system is that it allows countries whose domestic inflation rate is higher than world inflation to use a band without having to experience a severe real appreciation of their currency. Appreciation of the currency would generally result if the authorities were required to maintain a fixed exchange rate and which can give rise to capital in- and out-flows.

Like other band systems, sliding band also has the built in disadvantage of some incertitude about what the appropriate width of the band should be. Another system weakness lies in the fact that the timing and the size of the central parity adjustments are unknown at the outset and these in turn introduce considerable uncertainty into the economy which can lead to higher interest rate volatility.

*Crawling Peg:*

Under the crawling peg regime, the nominal exchange rate is periodically adjusted according to a set of indicators such as lagged inflation differentials and it is not allowed to fluctuate beyond a narrow range. Frequent use of this policy has been observed in smaller, emerging open economies where no matter what economic policies are adopted by the monetary authorities the domestic rate of inflation is steadily on a rise.

A sub-type of the crawling peg arrangement is the *crawling band* currency system. As the name suggests, under this system the central parity of the band is allowed to crawl over time. Different rules can be used to determine the 'rates' of

crawl, but the two most commonly found rules are the backward looking and the forward-looking crawls.

The crawling peg regime is often used as a policy tool to slowdown domestic inflation under a *nominal exchange rate anchor policy*. This policy entails "the rate of nominal devaluation and possibly its timetable [being] pre-announced at a rate below the prevailing rate of inflation"<sup>15</sup> that is, policymakers maintain a fixed nominal exchange but augment it by pre-announcing a schedule of mini-devaluations at a rate below the domestic rate of inflation. As with the conduct of monetary policy, then so too does nominal anchor policy depend heavily on the credibility attached to the authorities. Key reason behind this is that when the authorities pre-announce the mini-devaluations to "beat the inflation", so to speak, then if agents believe that policymakers will stick to their announcement, then they will incorporate the expectation of a lower inflation into the price and wage demands and all of these work together to contain domestic inflation.

A variation of the nominal anchor policy which has been employed on countless occasions, such as the case of some South American countries was where these nations adopted the 'tablita'. This was a system under which the authorities designated the future path of nominal exchange rates but where these rates were depreciated at a rate less than the prevailing rate of inflation (the nominal anchor policy). This policy was adopted by the officials in the hope that by anchoring the nominal rate and correcting it for effects of inflation on a continuous basis, then that would prevent having to perform an out-and-out devaluation of the domestic currency. Hopes were that in the long-run, and following from the credibility that the authorities would engender in the agents and the expectations they would garner then they could "bridg[e] the rate of inflation down."<sup>16</sup> Unfortunately, as historical evidence has shown, the results were unsuccessful in combating inflation, despite the imposition of stringent cuts in government deficits due to the price and wage rigidities in these chronic inflation economies.

Key benefit of a crawling peg system is that it allows countries with high inflation to avoid severe exchange rate overvaluations and under certain variations it can help guide the public's expectations and therefore buy a limited amount of credibility. As well, those countries that have a higher inflation rate stand to benefit the most from this system because it allows these countries to adopt a band system without having to undertake large stepwise adjustments (usually depreciation) of their central parity.

The key shortcoming of these systems is that if it is kept too rigid, then an inflationary inertia builds in the economy. This happens in particular when the peg is used in conjunction with the nominal anchor policy but when there is also a lack of confidence on the agents' part in the overall economic system and the policymakers' ability to follow through with their announcements. Another weakness which plagues this regime in particular is that not only are the authorities required to 'determine' the initial peg rate but also what the schedule of devaluations will be followed by them to

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<sup>15</sup> Kreuger, A. O., *Nominal Anchor Exchange Rate Policies as a Domestic Distortion*, NBER Working Paper 5968, Cambridge, 1997, p 9

<sup>16</sup> Kreuger, A. O., *Nominal Anchor Exchange Rate Policies as a Domestic Distortion*, NBER Working Paper 5968, Cambridge, 1997, p 4

guide the expectations of the nation and its trading allies. The repercussions of an incorrect initial peg or the schedule of devaluations can be quite costly for the nations.

Fixed-but-adjustable exchange rate:

Under this currency regime, the nominal exchange rate of the currency is fixed, but the way the system is set out, central banks do not commit themselves to maintaining the parity indefinitely. The Bretton Woods system, which was introduced at the beginning of the section on exchange rates, is the epitome of such a currency regime. Under this system constraints on the monetary and fiscal policies may be overruled when needed and they are 'allowed' to follow policies that might otherwise be deemed as being inconsistent with preservation of the parity. In fact, the adjustment of the parity on the part of the member country's monetary authorities is considered to be a powerful policy instrument.

The above concludes our discussion on the 'soft pegs' and now we now delve into a discussion on the 'hard peg' variety of fixed exchange rate regimes.

The easiest way to understand 'hard pegs' would be to realize that at this end of the fixed currency regime continuum, there is, in the domestic economy, the need to have enough foreign reserves to maintain the peg indefinitely (or in the extreme case of dollarization, an outright conversion to a foreign currency). This would mean that every issue of the domestic currency is backed by the foreign currency at the set out parity value. Also, a move on the part of the economy towards a more rigid/fixed currency regime signals to its trading partners as well as the general global economy that this country is actively targeting factors such as inflation, growth or any combination of these factors. At current time, there are only two or three "hard peg" regimes that are prevalent in the world, and these are currency board arrangements to an outright adoption of a foreign currency, that is dollarization, or alternatively, forming a currency union, as is the case for the adoption of the euro by a number of European nations.

Currency Board:

Under a currency board arrangement, -- Argentina being the prime and very recent example -- there is system in place where the central monetary institution issues base money exclusively in exchange for the foreign reserve currency at a fixed exchange rate.<sup>17</sup> While there are a number of features which distinguish a currency board from other fixed currency arrangements, there are four key features that explicitly set it apart from its counterparts. Under this system there is: i) full coverage of (usually) domestic base money by foreign exchange at a given rate; ii) a formal arrangement that regulates the functioning of the currency board; iii) inability of the monetary authorities to buy domestic assets; and iv) the presence of an automatic balance of payments adjustment mechanism.<sup>18</sup>

A currency board arrangement is a stone's throw away from the absolutely fixed exchange rate regime of dollarization. As we have been discussing along the way, the

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<sup>17</sup> Habib, M., "The Case for Euroisation in Central and Eastern European Countries", London, 2000, p 7 online available: <http://www.met-network.org.uk/papers/mhabib.pdf>

<sup>18</sup> Habib, M., p 8

greater the rigidity inherent in a currency regime, then the higher the level of credibility attached to its authorities. Also as we have stated above, this credibility must be earned by the authorities. When a country converts to the currency board arrangement, then by virtue of its acquirement of the foreign reserves (which can be quite costly in real terms), it emits a number of signals to its domestic economic agents as well as to its trading and investment partners abroad. The basic implication of this system is that no matter what form of domestic assets the residents and investors hold, their holdings are backed fully by the (certainly more credible) foreign currency. This in turn generates full and permanent convertibility which reinforces the credibility of the monetary authorities and helps foster stronger growth and stability of the domestic economy. An additional strength of this system is that it can rein in irresponsible behaviour of the resident government (if they had history of incurring budget deficits) as they are no longer able to buy domestic assets. Conversion to currency board system prevents authorities from financing the deficits in this way, and engenders responsible policy making on their part and all of these factors play into more agent confidence in the system.

While the currency board system ranks quite high on the credibility scale, it falls short on the flexibility scale and that is one of its key weaknesses. Seeing as the exchange rate is in effect fixed, then large external shocks to the economy cannot be accommodated via exchange rate changes anymore and hence have to be fully absorbed by changes in the real economic variables like real prices and wages. Theoretically, this would imply that the authorities approach and request the economic agents cooperate with them (this would generally require that they take price and wage freezes). While this seems plausible in theory, in actuality it can be quite difficult to implement as was seen in the case of Mexico in early 1990s. At that time, the Mexican authorities attempted to cap the growth of real incomes for the agents via the Pacto but this attempt to cap was credited with fostering the rise in unemployment and the decline in economic growth of the country.

Another shortcoming of a currency board arrangement is that when the nation adopts this regime, then its independent central bank ceases to exist. This means that there is no longer an institution which would have the capacity to print currency say in times of a financial crisis. At any such time when there would be a need for liquidity to counter a deficit and/or an imbalance, the authorities could no longer print domestic currency because they would need to acquire the prerequisite foreign reserves prior to printing domestic currency.

#### Dollarization:

A type of the absolute, most irrevocable kind of a fixed currency regime is dollarization. It has been called the hardest of hard pegs and this title is earned in that this system is considered the extreme form of a currency board arrangement. Under this regime, the domestic country completely surrenders its monetary independence by virtue of adopting another country's currency.

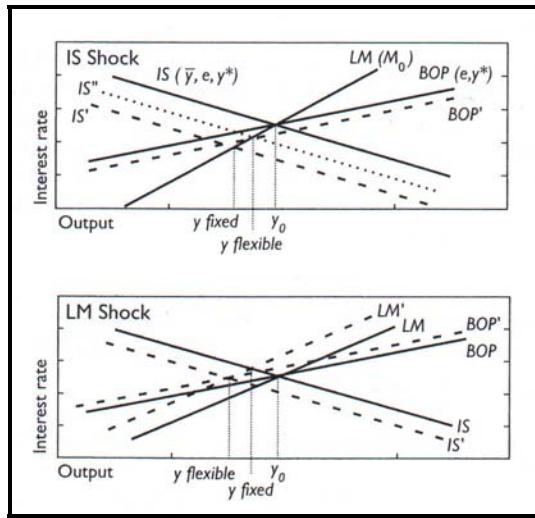
Seeing as the concept of dollarization forms the core of this paper, then a separate section is dedicated to this currency regime and it follows shortly.

#### *Traditional Fixed vs. Flexible Debate:*

As we have been mentioning throughout the paper, the greater the rigidity inherent in a currency system, the less flexibility there is for authorities to manoeuvre and operate an independent monetary policy. Hence, for any nation looking to adopt a new or modify an existing exchange rate regime, one of the biggest considerations must be the type and frequency of shocks that disturb the economy. To summarize this debate then, we can say that in order to minimize output fluctuations, fixed exchange rates are preferred if the main source of economic disturbances is nominal shocks. This is because fixed (and especially fully dollarized) regimes do not afford the level of insulation an economy needs to protect it from real shocks. On the other hand, if an economy experiences real shocks more often than nominal/monetary shocks, then flexible regimes are recommended as they provide better insulation for the economy due to the flexibility of exchange rate movements.

Now, to wrap up our discussion about the various currency regimes, we need to realize that the final adoption of one regime over another depends on the cost and benefit analysis which the authorities must conduct according to the social preferences of the nation as well as gauge the frequency and types of the shocks that affect the economy. The rise of the current nonsystem can widely be attributed to the fact that the economic and social preferences have varied from country to country, or even within the same country over time. As well, these same economies cannot make a decision based on present structural parameters as these might or might not be valid in the future as they are subject to change due to the dynamic nature of the economies and their environment.

Figure 2: IS and LM Shocks in an IS-LM Diagram



Source: Schadler, S., et al., *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, International Monetary Fund Occasional Paper 234, Washington, 2005, p 38

#### IV: DOLLARIZATION

With the breakdown of Bretton Woods system, the verdict is still out as to which currency regime/monetary policy system is most effective for the nations. As we have already discussed, the 'correct' answer to this question is different every time based on each nation's distinct needs which must be fulfilled for the system to be labelled optimal. Having said that, empirical studies have demonstrated time and again the "inherent vulnerability of intermediate exchange rate regimes and conventional pegs to sudden aggregates shocks in context of rapidly growing global financial integration."<sup>19</sup> These studies have given rise to a bi-polar view which states that the regimes at absolute opposite ends of the exchange rate regime continuum, that is, either fully floating or the hardest pegs are the more sustainable regimes in the long-run.

In this section of the essay, we look to explain the concept of dollarization in detail, the mechanics behind this currency regime form as well as the costs and benefits of subscribing to this system. With the number of recent crises that have occurred in emerging and developing countries for a number of reasons, then these have all fostered an interest in the to gains in popularity of the idea to replace the domestic currency with a more credible foreign currency. This relatively 'new' option to convert all domestic currency into a foreign currency, typically the U.S. dollar and more recently the euro, has been called a "powerful economic medicine that is mysterious and fascinating".<sup>20</sup>

<sup>19</sup> Levy-Yeyati, E. and F. Sturzenegger, "Dollarization: A Primer", *Dollarization*. Eds. E. Levy-Yeyati and F. Sturzenegger, London, 2002, p 1

<sup>20</sup> Chang, R., "Dollarization: A Scorecard", *Federal Reserve Bank of Atlanta Economic Review*, Third Quarter, 2000, p 2

Before further discussion, certain clarifications need to be made: for the purposes of this paper, the terms 'full dollarization' or 'de jure dollarization' are used to refer to the replacement of domestic currency by any foreign currency. As well, the term dollarization is something of a misnomer seeing as the adoption can be of any foreign currency and not just the US dollar but until the 1990s, the dollar was the main currency that the dollarizing economies converted to (in some instances, 'dollar' is used to refer to the foreign currency that has been adopted). With the emergence of the European Monetary System (EMS) and the European Monetary Union (EMU), and prior to that, some economies formed/joined a currency union and adopted the currency of the union/the euro as their legal tender. Economic literature refers to this process of accession as 'euroization'. While euroization bears marked resemblance to dollarization, there are differences between the two in terms of the costs and benefits involved as well as the conversion criteria, all of which will be discussed further along in the paper. For the moment, we return to our former discussion about the puzzle called dollarization.

Dollarization is the absolutely fixed exchange rate regime. We can stress once again that this, or any other fixed currency regime, can succeed in the way they are intended to only if the adopting country implements the proper economic policies and regulations and also undertakes proper procedural preparations before the adoption. If these pre-conditions are met then a country can stand to benefit from a dollarized regime in terms of lower costs of credit (which help foster investment and growth) but more importantly, increased credibility of the authorities and overall economy.

As history has shown, at the root of the problems of some of the emerging markets is no doubt the dubious history of their monetary authorities which translates into a lack of confidence in their currency and exchange rate regimes all of which work to throw barriers in the way of strong macroeconomic performance. Adoption of the dollarization regime has been used by the authorities in countries such as Ecuador to symbolize a nation's commitment to regain credibility that may have been lost for whatever reason. Another reason for dollarization has been to build/increase commercial links with closest trade allies as was the case of El Salvador. This nation recently dollarized not so much to increase credibility of its macroeconomic and monetary management but rather because of the high level of informal dollarization within the economy, as well as the huge inflow of dollar remittances by the agents and lastly because of the nation's close links to the US economy.

## ***Types of Dollarization***

There are basically two main types/stages of dollarization: unofficial and formal/official.

### **Unofficial dollarization:**

Unofficial dollarization is the term used to describe a situation where due to the uncertainty prevalent in the domestic economy, often because of fluctuating macroeconomic performance and/or high inflation, a foreign currency is used simultaneously with the domestic currency in fulfilling all the roles of money such as store of value, a means of payment and as a unit of account. That being said, it is useful to differentiate between the two motives for holding foreign currency. The first of these is classed as *currency substitution*. Under this type of substitution, foreign assets are “used as money, essentially as means of payment and unit of account, and it typically arises under conditions of high inflation...when the high cost of using domestic currency for transaction prompts the public to look for available alternatives”.<sup>21</sup> The second motivation for people to hold foreign assets is termed *asset substitution*. As the name suggests, this substitution occurs when domestic agents wish to hedge their returns against the macro risks such as price instability, which prevail in their local economy. As Berg and Borensztein (2000) state in their paper, asset substitution is generally prompted by the result of risk and return considerations on the part of the domestic agents<sup>22</sup>.

Unofficial dollarization became widespread in the Latin America and Caribbean (LAC) during the 1980s when countries started to experience high inflation. During this period, residents of these countries started to switch over to the dollar to protect their purchasing power. As well, over time the governments of these nations tolerated unofficial dollarization in that they allowed individuals to “open bank accounts denominated in dollars and by including dollars in circulation and dollar deposits in their own monetary statistics”.<sup>23</sup> The 1990s saw a number of currency crises, like the Mexican crisis, which was followed in the late 1990s by crises taking place in Asia, Russia, and Brazil, and a common factor was detected in all the crises. For all countries that were hit by these crises, one feature was common among all: they had all experienced dramatic and costly devaluations of their domestic currency. After the dust had settled in the wake of the chain of crises in the world, it was realized that there was desperate need to find a steady exchange rate regime and hence the birth of the dollarization regime.

Following the definition of official dollarization, we then briefly discuss the instigators of these economic crises and their relationship to dollarization.

### **Official/de jure dollarization:**

The term ‘official dollarization’ refers to a regime denoted by conceding of national currency – hence, independent monetary/exchange rate policy - in favour of outright adoption of a foreign currency. To ‘successfully’ convert over to a dollarized

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<sup>21</sup> Berg, A. and E. Borensztein, *Full Dollarization: The Pros and Cons*, IMF Economic Issue 24, Washington, 2000, p 2

<sup>22</sup> Berg, A. and E. Borensztein, p 3

<sup>23</sup> Chang, R., “Dollarization: A Scorecard”, *Federal Reserve Bank of Atlanta Economic Review*, Third Quarter, 2000, p 2

regime, suffice it to say that two major actions are required on the part of the adopting economy. The first step requires that all domestic monetary base (defined as all local currency-coins and notes in circulation- as well as all reserves of the banks at the central bank) be redeemed for the dollar at a predetermined rate. The second step entails all contracts, which were originally denominated in the local currency, be transformed into contracts denominated in the US dollars (including local bank deposits), again at the predetermined rate.

In terms of characteristics, there are three features of dollarization, which in some ways help distinguish dollarization from other currency regimes and as such require further discussion.

The first of these features is the fact that dollarization is generally a unilateral phenomenon. Unilateral adoption implies that for a country to adopt a foreign currency, it does not explicitly need to request permission to adopt the dollar. This is a key feature of dollarization in that under this system, the country does not try to negotiate a treaty of monetary association with the American monetary authorities, even though that would entitle the dollarizing country to some transfers from the US government as a compensation for the loss of their monetary independence, exchange rate instrument and seigniorage revenue. As well, a dollarization regime does not look towards the negotiation of a monetary union with the United States, under which scenario the adopting country would gain some control over monetary policy decisions and which is a key difference between the dollarization and euroization regimes (described in further detail under the OCA theory section of the paper). As stated by Chang (2000), “[i]t has become evident that neither a monetary association treaty nor a monetary union would be feasible without prolonged and complex negotiations between the US government and the developing countries involved”<sup>24</sup>. This then is one of the reasons why unilateral dollarization is becoming more prevalent as an extreme form of fixed exchange rate regime.

The second feature of dollarization is that in subscribing to dollarization, and as a consequence of this subscription, the domestic government gives up any rights and power to conduct an independent monetary and exchange rate policy. This point is discussed in detail below, but briefly this is because the dollars are issued by the foreign central bank and even upon adoption, the domestic government has no input in the amount issued or any such matters (recall unilateral adoption; if there were some input on the adopting nation’s part then that would be a case of monetary union), then that translates into the loss of a policy tool for the domestic authorities. A third vital feature of dollarization is that it entails that all local currency in the domestic economy be replaced fully by the dollar and not just a dollar equivalent, and this stipulation in itself can entail considerable initial costs. Here we have only touched upon these features of dollarization because we return to them when we talk about the costs and benefits of dollarization but for now we will return to a discussion of the crises that can result in the presence of (un)official dollarization in an economy.

It is vital that the authorities keep a close eye on the level of (un)official dollarization in the economy. If left unchecked, crises can result which can completely

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<sup>24</sup> Chang, R., “Dollarization: A Scorecard”, *Federal Reserve Bank of Atlanta Economic Review*, Third Quarter, 2000, p 2

destabilize the economy and unravel all that the policymakers worked hard to achieve. To give a brief overview, there are two main predicaments that can result if unofficial dollarization is rampant in the economy. The first of these is a currency crisis.

### Currency Crises

A currency crisis generally results from a speculative attack: "[a] situation in which an attack on the currency leads to a substantial reserve loss or to a sharp depreciation of the currency...or to both".<sup>25</sup> This type of a crisis can be thought of as a loop in which due to (sometimes self fulfilling) expectations, investors flee the domestic economy because they find government monetary and exchange rate policies lack credibility and they fear a devaluation.<sup>26</sup> What is ironic is that, when thought of in terms of herd behaviour, the sudden outflow of so much capital is usually what generates the pressure on the currency to devalue (with so much capital flight, authorities might either refuse to support the peg or they can support it for only so long but once the pact is broken, the domestic currency is left floating and results in a sharp depreciation). To summarize, "a currency crisis is generated by a massive flight of investors from a specific currency because of lack of credibility of the monetary authority, or contagion among investors, or both"<sup>27</sup> and it entails a sudden movement of the exchange rate and a sharp change in the capital flows of a country.

This type of a crisis has been seen in economies that have either partially or even fully dollarized (currency crises of the '90s are key examples). This is because chief instigator of this crisis is a lack of confidence in the authorities' policies and if under an unofficially dollarized regime the agents lose complete confidence in their own currency and start using foreign currency for all their needs, then there will come a point where the policymakers will not have enough (reserve) resources to defend their currency should there be a speculative attack.

### Financial Crises

The second type of crisis is the financial crisis and this refers to "a situation of a systemic insolvency in which actual or potential bank runs or failures induce banks to suspend the internal convertibility of their liabilities or which compels the government to prevent this by extending assistance on a large scale".<sup>28</sup> This crisis stream is usually triggered by individual or systematic illiquidity (defined as the inability of the agents to pay their debts as they become due because of excessive liabilities which overshadow the asset holdings), which can emerge within a financial system and is most prevalent in developing and emerging nations.

Emerging or developing nations are most vulnerable to this type of a crisis in the presence of (un)official dollarization because of a persistent mismatch between the two currencies. What this means is that if the domestic currency continuously devalues, then over time, its short-term liabilities denominated in foreign currency will exceed its short-term foreign assets. This in turn makes the economy internationally illiquid. What follows is a loss of confidence on the part of the investors and a chain reaction of

<sup>25</sup> Krugman, P. R. and M. Obstfeld "International Economics: Theory and Policy", Reading, 1997, p 578

<sup>26</sup> Obstfeld, M. and K. Rogoff, "The Mirage of Fixed Exchange Rates", *Journal of Economic Perspectives*, Vol 9, # 4, 1995, p 76

<sup>27</sup> Krugman, P. R. and M. Obstfeld, p 577

<sup>28</sup> Krugman, P. R. and M. Obstfeld "International Economics: Theory and Policy", Reading, 1997, p 578

events follows: contagion phenomenon triggers an economic recession, which leads to speculative attacks and in the end provoke devaluation. Researchers have indicated that "[e]xcessive short-term foreign liabilities typically lead to excessive credit creation, overheating of the economy, an asset price bubble, and even greater dependence on short-term foreign credit..."<sup>29</sup>

One final point before we conclude this discussion on the crises is that there have been instances where a currency and financial crisis will simultaneously. While this happens far in between, it has been known to occur and at that point the crises are referred to as the twin crises.

Having talked about the dollarization in general, we now turn to a discussion about the regimes costs and benefits.

#### *Costs or Disadvantages of Dollarization:*

Under this section we look to explain the costs of dollarization which the adopting country must carefully weigh before it can contemplate dollarization.

##### Start Up Cost

As stated in the section above, a key feature of dollarization is that by virtue of the definition of the regime, it requires that all domestic currency be replaced by a foreign currency, and not just a foreign currency equivalent. In terms of costs of conversions, this means that there is an initial, one-time start-up cost to replace all currency and this cost would equal the dollar value of the domestic currency in circulation. While this is a formidable initial cost, as we discuss in the benefits of dollarization, the destruction of all domestic currency, conversion of all domestic debt into foreign currency denominated debt and other menu costs, make it well nigh impossible to renege on the commitment (a phenomenon referred to as the irreversibility of dollarization).

##### Loss of seigniorage

As well, for any government, the right to issue the domestic currency is not only an (effective) way of conducting monetary policy, it is also a method to generate revenues for the public sector. This ongoing process whereby the monetary authorities print currency and generate revenue for the government on the spread between getting the newly printed currency into circulation and its face value is known as seigniorage. When an economy converts over to dollarized regime, any and all future additions to the money stock come from foreign issuing central bank as the local bank cannot print off the foreign currency. This in turn means that the domestic government can lose a vital source of income as it can no longer extract seigniorage revenues from the money printing.

This may or may not impact the decision of an economy to convert to dollarized regime, but the final quantifiable answer depends on what percentage of total government revenues were generated by the seigniorage. If the answer is that

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<sup>29</sup> Egavian, M. D., *Financial Systems, Crises and Remedies: An Overview of Vulnerabilities in the East Asian Crises*, Ottawa, 2006, p 22

seigniorage was a considerable source of government revenue, as may be the case for a developing country, then dollarization may not be the most feasible option for that economy. On the other hand, if seigniorage revenues only make up a small percentage of the total government revenues, then the benefits of converting over to dollarization may far outweigh the costs. Proponents of dollarization feel that restriction placed on the currency printing abilities of the monetary authorities of the dollarizing country is another key strength of the system. This, they feel, makes the authorities more responsible as they no longer have the option to print currency to finance their budget deficits which translates to more credibility being attached to the policy makers and which serves as the accomplishment of one goal that was initially set out: recall a vital reason for converting over to dollarized regime was end the lack of credibility of the domestic government.

*Loss of Lender of Last Resort function:*

A vital institution of a nation is a body, which serves its primary role as the lender of last resort. This function authorizes the institution to "stand ready to provide credit to banks in the event that they experience a sudden demand for liquidity"<sup>30</sup>, and this role has traditionally befallen the central bank due to its capacity to provide credit quickly and print domestic currency. Such an institution gains particular importance in economies where the systems of banks are such that regulations only require that they maintain partial reserves. Due to the structural design, this presence of the Bank (in)directly provides assurance for the depositors that in case of sudden bank run or demand for liquidity, all or part of their claims at the local banks will be honoured. It is this presence of the Bank in the background which assists in the stabilization of the key financial sector of the economy. When a country chooses to dollarize, then this institution or Bank of the nation loses all authority to inject liquidity into the system as it is no longer has vested power to print off domestic currency. Empirical results have indicated that when such an institution is missing from the make-up of the economy, then the inherent lack of confidence in the system causes an increase in the frequency of financial crises and the consequences also tend to be more magnified.

Having said that, no argument for or against dollarization would be complete without addressing those costs which are incurred upon subscription to dollarization. While dollarization does not automatically imply a loss of a last resort lender, it does imply that the central bank loses all its ability to print money and this function is in effect "delegated" to the central bank of the foreign country. So, to hedge against losses, the governments of dollarizing nations have been known to set aside funds from which they may lend to the local banks at the time of the crisis. The idea in theory is good but problems may arise when in actuality the amount within such funds may not be enough to cover all resulting losses because the exact amount of such a loss is indeterminate before the event. Another option, which has been proposed, to hedge against such losses has been to secure lines of credit with foreign banks but the annual premium costs for these credit lines can get costly (hypothetical figures have been calculated by Chang (2000).<sup>31</sup> An associated detriment is that there is no guarantee that these banks will come through and not default on their credit lines at the time of the crisis.

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<sup>30</sup> Chang, R., "Dollarization: A Scorecard", *Federal Reserve Bank of Atlanta Economic Review*, Third Quarter, 2000, p 5

<sup>31</sup> Chang, R., p 6

*Loss of Independent Monetary Policy as a Policy Tool:*

Control of the monetary policy via control of the monetary base (described as local currency held in circulation by individuals and firms plus bank reserves kept within a bank or on deposit at the central bank), is a powerful tool which resides in the hands of the central bank of an economy. The ability to control the monetary base not only enables the authorities to affect the domestic market for money but also have an impact on real activity and inflation within the economy. When a nation adopts dollarization as its currency regime, it loses a vital policy tool in that it loses all control on the monetary base and decisions regarding the amount of currency in circulation are now strongly dependant on policies adopted by the foreign monetary authorities.

While the results of empirical studies to measure whether the loss of monetary policy is costly or not have been ambiguous, Chang (2000) shows some methods which may be used to gain insight into the costs involved. He proposes that before anything, the cost of converting depends on which currency regime the cost of dollarization is being compared with. A key point to be noted is that if the loss of monetary policy under dollarization is being compared to the loss of monetary policy under a currency board regime, then it is obvious that the nation in question did not incur any additional losses as the monetary policy tool was redundant under the previous regime and would remain so under the new system.<sup>32</sup> This is because under a currency board arrangement, domestic currency cannot be printed without parallel increase in foreign reserve whereas under dollarization, no domestic currency is printed. In effect, under both regimes, the amount of foreign currency in domestic economy is extremely vital and that decision directly or indirectly strongly depends on the stance of the foreign monetary authorities and their policies. This then implies that cost of dollarization is only quantifiable if a comparison is made between a fully floating exchange rate regime and dollarization.

In terms of the importance of this policy tool, suffice to say that it is via this device that central banks generally control and smooth exchange rate fluctuations. More importantly, these are used to influence the interest rates and the corresponding exchange rate information that is carried within it which is a useful predictor of future goal variables like (un)employment and inflation.

In concluding this section, we can safely state that the net costs of the loss of monetary policy, seigniorage revenues and lender of last resort functions must carefully be weighed in with the benefits derived from converting over to a dollarized regime which are discussed in the subsequent section.

*Benefits or Advantages of Dollarization:*

Up to this point we have looked at what an economy must give up to gain entry into a dollarized regime. This following section then looks to define the benefits that are gained upon entry into this currency regime.

*Lower Cost of Credit:*

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<sup>32</sup> Chang, R., "Dollarization: A Scorecard", *Federal Reserve Bank of Atlanta Economic Review*, Third Quarter, 2000, p 7

For any open market economy, a number of risks feature as prominent threats to lenders and borrowers on returns and cost to their investments. These features affect the cost of credit to the domestic economy. Currency risk, which is due to fluctuations in exchange rates of the domestic currency, is one such risk. Fluctuations of such nature can lead to losses (or gains) in values of assets denominated in foreign currencies. An associated risk inherent in open economies is the devaluation risk. This risk can be understood to mean that if debt is issued in domestic currency then there is the possibility that that currency might devalue in comparison to its foreign counterparts. Like for currency risk, presence of devaluation risk generally entails the lenders requiring a higher return to compensate them for the probability that their debt might devalue at a future date; this means a higher cost for the borrower. A third type of risk, which is commonly found when there are open capital markets, is the default (sovereign) risk. This term is described by Chang (2000) as the spread between "the rate lenders would charge to that [domestic] borrower and the rate lenders would charge to otherwise similar American [foreign] borrowers."<sup>33</sup> In the past, this rate has often been used as an indication of the possibility of the domestic country defaulting on their foreign debt (if the spread is considerable, then the foreign loan becomes more expensive and the chances of defaulting increase), and needless to say, a rise in such possibility would certainly increase the cost of foreign borrowing for all domestic economy agents. These risks, in addition to other factors, can undermine the confidence in the domestic economy on the part of the depositors and therefore lead to higher cost of foreign borrowing.

Choice of dollarization in a country implies that the issuance of debt in domestic currency immediately ceases to exist. This means that there is no longer a risk of devaluation of the domestic currency per unit of the foreign currency. As a corollary of this adoption and following from the disappearance of the currency risk, the cost of foreign credit for the dollarizing country drops and this in turn stimulates investment and economic growth. Advocates of dollarization also feel that even if some of the many risks disappear upon converting to dollarized regime, then that goes a long way in helping to bring down the overall cost of borrowing in the foreign market.

#### Enhanced Credibility:

A second benefit of dollarization is the enhanced credibility of the nation and its potential economic performance that decides to dollarize their economy, a credibility which is gained rapidly for a number of reasons. For a nation that was formerly part of a freely floating currency regime to slowly move across the spectrum of currency regimes towards the more fixed currency regimes shows commitment on their part to establish credibility for their domestic currency. Due to the dynamics in the marketplace, it sometimes becomes inevitable that to defend the value of the national currency, the domestic authorities would manipulate the policy tools to give their economy a boost. In this sense, when a country commits to dollarizing its economy, this option to manipulate the macro variables to attain short-term goals is removed from their hands.

As well, at the time when dollarization takes effect, so much has already been committed in terms of preparing for the initiation of the new regime such as destruction

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<sup>33</sup> Chang, R., "Dollarization: A Scorecard", *Federal Reserve Bank of Atlanta Economic Review*, Third Quarter, 2000, p 8

of all domestic currency, conversion of all domestic debt into debt denominated in foreign currency and other menu costs, that it is well nigh impossible to renege on the commitment (a phenomenon referred to as the irreversibility of dollarization).

Lack of confidence in the stability of a domestic currency due to its volatile nature is also a factor responsible for the adoption of dollarization. When the national economy adopts a foreign currency, it in fact 'imports' the stability that is inherent in the foreign currency and supporters of this regime quote this as another big strength of the system.

To summarize, the joint benefits derived from the reduction in the cost of borrowing as well as increased credibility can be summarized into three key benefits, which work in their own ways to further the case for the adoption of dollarization. The first of these follows from the fact that when the risks of devaluation are eliminated, this then enhances the credibility as well as helps in the reduction of the interest rates. The second benefit of the irreversibility of dollarization is that the monetary policy tool is taken out of the hands of the monetary authorities. If the authorities previously had a reputation for a lax monetary policy whereby they did not fully commit to their policy announcements, then this subscription reinforces their commitment to regaining credibility for their economy. A third benefit is that irreversible dollarization equates to enhanced fiscal discipline. This means that if previously the government had used irresponsible currency creation to generate seigniorage revenues to cater to fiscal deficits, then by committing to dollarization, they are no longer able to print money and will either need to manage their expenses with more care.

## V: OPTIMUM CURRENCY AREAS

One of the key arguments for or against the fixed and flexible exchange rate regimes derives from which of the two are better suited to protect an economy against shocks. The essence of the debate for flexible regime, as discussed in earlier, is that it helps cushion the economy from shocks. The argument for a fixed currency regime revolves around the idea that under this regime type, there is less volatility within the economy and that in turn fosters investment and growth in the domestic economy. That being said, there is still disagreement on the range of suitability of each of the regimes especially in light of recent emergence of the European monetary union and other common currency areas. This section of the paper looks at the theory behind the formation of optimum currency areas.

As stated by Gandolfo, "[a]s in the case of commercial [trade] integration, also in the case of monetary integration, there are various degrees of integration, from the simple currency area to the full monetary union (with a single currency)".<sup>34</sup> Seeing as the second part of this paper will apply the case of euroization to a set of nations which are in the process of accessing into the European Monetary Union (EMU), then this section of the essay looks to describe and define the theory of the optimum currency area (OCA) as well as delve into what constitutes a monetary union.

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<sup>34</sup> Gandolfo, G. "International Finance and Open-Economy Macro-economics", Heidelberg, 2002, p 331

### *Classical (Traditional) OCA Theory:*

The theory of the optimum currency area was initially proposed in 1961 by Robert Mundell, who has since then been called the Father of the Euro. According to the theory he proposed, optimum currency areas were the natural evolution of the currency area concept in that he advocated the division of the world into "regions within each of which there is [high] factor mobility"<sup>35</sup> and in which currencies were to be defined by the geographical area within which the factor mobility was high rather than by national borders. In this way, Mundell was a proponent of the fixed exchange rate system for those economies that comprised the OCA but at the same time he endorsed that 'domestic' OCA currencies fluctuate relative to 'other' OCA currencies.

Under the traditional approach to the OCA theory, there are six main criterions set out which, if met, indicated that a distinct economy had all the features to successfully allow it to integrate into the OCA.

The first of these conditions is the presence of *international factor mobility*: the higher the level of factor (both labour and capital) mobility, more profitable it may be for an economy to join the currency area. This is because when a particular area within the currency area is facing lower economic growth, then if there is factor mobility as well as a fixed exchange rate, then there are almost no 'ill-effects' of a trade imbalance, which may be the case if there is flexible exchange rate regime.

The degree of openness of the economy is the second criterion that has been set out under the traditional approach to the OCA theory. The degree of openness in this situation is measured by "the relative importance of the sectors producing internationally traded goods or tradables...and the sectors producing non-traded goods".<sup>36</sup> When a country's output of traded goods comprises a higher proportion of the total domestic output, then that country is in much better shape to join a currency area than another which produces more non-tradables in terms of the total output produced.

The third element of the traditional theory is *product diversification*. For an economy to meet this condition, it would imply that this economy must have a higher diversification of domestic products that it exports. This works in the favour of joining a currency area in that if a country has a higher product diversification among its exports, then due to whatever shock/effects in the world economy, if demand for a particular 'sector' of exports drops, then that has less affect on the overall economy than if there were not enough diversification and the sector for which the demand dropped was that in which the economy 'specialized'. This diversification of products also works towards a more stable economy because if there is not enough diversification of the products then variations in the exports can influence the balance of payments and all else equal, these give rise to pressures on the exchange rate. This translates into the fact that if there is less volatility in the economy (that is greater diversification), then it is better suited to a fixed currency regime and hence joining a currency area.

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<sup>35</sup> Mundell, R. A., "A Theory of Optimum Currency Areas." *The American Economic Review*, 1961, p 663

<sup>36</sup> Gandolfo, G. "International Finance and Open-Economy Macro-economics", Heidelberg, 2002, p 334

The fourth element of the traditional OCA theory criteria is *degree of financial integration* of the economy. Upon implicit assumption, financial integration entails that all restrictions on international capital movements have been eliminated. While this may sound similar to the first criterion, this condition is concerned more with the capital flows whereas the first focused more on the labour mobility. It is a well-known fact that capital flows can play a vital role in equalizing payment imbalances. If the degree of financial integration is higher, then that would imply that there is less of a need of flexible exchange rates and the economy can forego that and join a currency area with a fixed exchange rate because even a slight change in interest rates provides the equilibrating balance to the capital flows.

The fifth element of the classical OCA theories rests upon the assumption that there is a *similarity in the rates of inflation* within the economies comprising the currency area. This is because if the inflation differential between two (or more) economies is high, then these cause trade imbalances, as well as giving rise to current account disequilibria and to balance these, the flexibility of exchange rates is necessary. If the inflation rates are similar then no effects are felt on the trade and therefore equilibrated flow of the current account takes place in the currency area.

The final element, which forms the basis of the traditional OCA theory, is the *degree of policy integration* among the member countries of the currency area. This policy integration ranges from "simple coordination of economic policies among partner countries to a situation in which these surrender their monetary and fiscal sovereignty to a single supranational monetary authority..."<sup>37</sup>

To gain an understanding of the essence of the traditional theory of the OCA, it can be stated that it "[e]mphasizes the need for an adjustment mechanism in case of asymmetric shocks and an unsatisfactory level of economic integration between dollarized/euroized country and its anchor".<sup>38</sup> That is, for an economy to successfully adopt a common currency, before it could even contemplate taking that step, it had to work on the convergence and integration prerequisites before eventually adopting the common currency. Mundell's theory clearly emphasized an obligation on the part of the adopting nation to meet the prerequisites prior to its joining the union. Seeing as the traditional OCA entailed forfeiting independent monetary policy, under the cost-benefit analysis of the same, "the pros and cons of dollarization/euroization are not assessed by analyzing the effectiveness of domestic monetary policy, but rather by evaluating the effectiveness of other adjustment mechanisms and the level of economic integration".<sup>39</sup> This then is the position taken by Mundell's critics that his theory does not focus on whether the economy was or was not using monetary policy effectively to cope with asymmetric shocks and unsynchronized business cycles but rather the economy focused on the question of whether there was even a need for the monetary policy tool.

To conclude the discussion on the traditional OCA theory, it would suffice to say that according to the argument proposed by Mundell, and by subsequent economists

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<sup>37</sup> Gandolfo, G. "International Finance and Open-Economy Macro-economics", Heidelberg, 2002, p 335

<sup>38</sup> Winkler, A., et al, *Official Dollarization/Euroization: Motives, Features & Policy Implications of Current Cases*, ECB Occasional Paper Series 11, Germany, 2004, p 7

<sup>39</sup> Winkler, A., et al, p 12

since, if two or more economies identify with the factors that have been outlined above, then they should consider giving up the existent system of flexible exchange rates amongst themselves and adopt and take full advantage of the fixed exchange rate arrangement. Hence, among other things, it was this stipulation of meeting these criteria prior to accession that caused the final divergence in opinions and gave birth to the new OCA theory.

### **New OCA Theory:**

As stated in the introduction of this section, since the inception of the traditional OCA theory, much has changed within the global economy. These changes in the general dynamics of the economies have since led to applicable revisions being made to the classical version of the theory and a newer 'version' of the theory has now been proposed.

The economists that looked to amend the classical OCA theory felt that Mundell's theory fell short in two key areas: i) that the economies under discussion were dynamic, and not stationary, entities and ii) the international capital markets had taken on a more prominent role than they had been given credit for in the in terms of determination of currency values and exchange rates.

To understand the importance of the first shortcoming, in the words of Habib (2000), "[e]conomists have often applied OCA criteria as if they were taking a snapshot of a motionless object..."<sup>40</sup> This is a key limitation of the original theory in that it has been proven time and again that economies are dynamic entities. They react, sometimes unpredictably, to any new information that comes about. Under the original theory, there is the implicit assumption that an announcement such as potential adoption of a common currency would be taken in stride by the domestic agents and thus no allowances have been made in the theory to correct for the effects. It is due to factors like this that the original OCA theory is said to take a static approach and that it fails to take into consideration the inherently dynamic and endogenous nature of the criteria.

Another shortcoming of the OCA theory proposed by the first generation is that it does not take into account the increasing role of international financial markets which have since become forces to be reckoned with in terms of determination of currency values and exchange rates. Considering the fact that one of the main reasons behind the adoption of a common currency is to reduce or ideally do away with the volatility that is associated with a flexible regime, then international mobility of financial capital has been underestimated time and again. Often times the flexible exchange rates are propagated for their 'stabilizing' effect, but some authors, such as Buiter (2000) "...view exchange rate flexibility as a source of shock and instability as well as (or even rather than) a mechanism for responding effectively to fundamental shocks originating elsewhere..."<sup>41</sup>

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<sup>40</sup> Habib, M., "The Case for Euroisation in Central and Eastern European Countries", London, 2000, p 5 online available: <http://www.met-network.org.uk/papers/mhabib.pdf>

<sup>41</sup> Buiter, W. H. *Optimal Currency Areas: Why Does the Exchange Rate Regime Matter?*, CEPR Discussion Paper, no. 2366, Centre for Economic Policy Research, London, 2000, p 16

Also, because typically it has been the smaller open markets which have joined currency areas, and since the proposal of original OCA theory, the financial markets have gained significance in terms of the momentum they can generate, then for smaller, open market economy, excessive in- or outflow of capital (result of international mobility of financial capital) can cause major appreciation or depreciation of the domestic currency<sup>42</sup> and this in turn can have significant (and sometimes disruptive) impact on the economy's balance of payments, imports and exports.

With regards to how this relates to our paper, then the theory of euroization is touted as being modelled after the new OCA theory and the EU is the 'living' example of this theory. Now, having explained the key difference between the two branches of the OCA theory, we now get to a discussion of what has been referred to as the *endogeneity of the (new) OCA criteria*.

#### Endogeneity of the OCA Criteria

Recall that under the traditional OCA theory, any economy looking the route of dollarizing or adopting a common currency had to meet the six criteria set out prior to actual adoption. This suggests that under the "traditional OCA theory, the criteria set out were exogenous to the exchange rate arrangement"<sup>43</sup>, that is, the factors originated outside the economy or that the economy did not have much control over them.

The fact that all these criteria were claimed to be exogenous did not sit well with all economists and since then, much research has been done within this area (with the groundbreaking work conducted by Frankel and Rose in 1998) to see whether these factors really are exogenous or if they could in fact be endogenous. The results of these and other studies conclude that if an economy is considering joining a currency union then it does not have to meet the six OCA criteria "ex ante, following a lengthy convergence process with the anchor country before adopting that country's currency".<sup>44</sup> These studies also indicate that even if the nation does not display high levels of trade integration and business cycle correlation but if the other four criteria are met, then by all means the domestic economy is 'ready' and should go ahead and join the union as the rest of the criteria would be fulfilled *ex post* once the currency has been adopted, that is, these two criteria could be fulfilled endogenously.

The reasoning behind this proposition lies in that once the domestic economy is closely converged with other union members, then that brings about greater cohesion and integration between the entities. This greater integration between the two in turn fosters higher synchronization of the business cycles: "greater integration...historically resulted in more highly synchronized cycles".<sup>45</sup> Studies have shown that even if an economy does not satisfy the two criteria of high levels of integration and synchronized business cycles, it could still successfully integrate into a monetary union. This is

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<sup>42</sup> Habib, M. p 6

<sup>43</sup> Winkler, A., et al, *Official Dollarization/Euroization: Motives, Features & Policy Implications of Current Cases*, ECB Occasional Paper Series 11, Germany, 2004, p 4

<sup>44</sup> Winkler, A., et al, p 5

<sup>45</sup> Habib, M., "The Case for Euroisation in Central and Eastern European Countries", London, 2000, p 5 online available: <http://www.met-network.org.uk/papers/mhabib.pdf>

because joining the union would not only reduce the transaction costs, it would also foster trade integration and that in turn leads to more synchronized business cycles.<sup>46</sup>

Based on the amended OCA criteria, with its focus on the issue of monetary policy stability, economists have suggested that there may be a substantial number of countries that could benefit on stability grounds from adopting a foreign currency, as is the case of the countries looking to access into the euro union and the convergence criteria that they are required to follow.

Finally, the literature on optimum currency areas has examined both short and long-term (permanent) benefits and costs of joining a currency area. Most benefits and costs cannot be judged statically as they can take different profiles over time – that is, in the early stages of joining a currency area vis-à-vis when the new single currency can fully display its benefits both domestically and internationally. As well, most benefits and costs also usually take on different profile across participating nations – for example, between small and large countries, or for countries with a track record of relatively high inflation in the past. For the purpose of this paper, we only reviewed the prerequisite criteria to join a currency union, but for a concise summary of the benefits and costs of a joining a currency area, see Appendix C.

We have now completed our discussion on the optimum currency areas and the OCA theory and laid out the groundwork for a discussion of the monetary unions which follows henceforth.

## VI: MONETARY UNION

We apply the theory we develop in these sections later on in the paper to the case of the nations accessing into the euro area. The EU is an economic as well as a monetary union and hence this section of the paper looks to give a brief explanation of what this means.

The phrase 'monetary union' and all that it entails was first officially described in the Werner Report of 1970<sup>47</sup> and according to this report, if certain conditions were met, then that economic area could look to form a union and the benefits derived from that union would be substantial. The initial criteria that were specified included that: "the currencies within the union area were fully and irreversibly convertible into one another; the par values for conversion are irrevocably fixed, there must be an elimination of fluctuation margins around the parities and last but not least, there must be free capital movements within the area."<sup>48</sup>

The conditions stated above were proposed as being necessary for the creation of a monetary union in the Report. In addition, this Report proposed conditions which were concerned with the centralization of the monetary policy and which included decisions about liquidity, interest rates, management of reserves, intervention of the

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<sup>46</sup> Habib, M., p 5

<sup>47</sup> Werner Report, 1970, *Report to the Council and the Commission regarding the Step-by-Step Establishment of the Community's Economic and Monetary Union*, Brussels: Commission of the European Communities, 8 October.

<sup>48</sup> Gandolfo, G. "International Finance and Open-Economy Macro-economics", Heidelberg, 2002, p 331

monetary authorities on the exchange market and also the vital role of fixing the parities with respect to the rest of the world (the responsibilities of the European Central Bank for the EU).

Having talked about these two important aspects of the creation and conservation of the union, as the final step towards making this currency area resilient, the Report proposed that the economies constituting the monetary union relinquish their national currencies and adopt a common currency. This would signal to the rest of the world the irreversibility of the action and therefore garners the union much more credibility.

A monetary union is considered by many to be a type of a corner solution to the question of which exchange rate arrangement would be most ideal with the increasing mobility of international capital. It ranks right next to currency boards and dollarization/euroization on the regime continuum, while the other end is marked by free floating currency regimes. In recent times, corner solutions have been expounded as being the viable, long-term solution to the problem of unsustainability of exchange rates in the presence of high international capital mobility.

Before an area can be identified as a monetary union, it goes through a phase referred to as a currency area. This 'phase' of development constitutes the adoption of the necessary conditions from the monetary union criteria, namely that if there are national currencies, then the exchange rate is permanently fixed or there is a common currency and that their exchange rate(s) vis-à-vis non-partner economies are flexible. Once a currency area has been established, then it is just one additional step to get into a discussion of what constitutes the optimum currency area: that is, which economy should join the currency area, which should remain out of it and which should exit if the benefits are not being reaped (refer to the section above on OCA).

Before accessing to a monetary union, there is an interim stage that any economy goes through where it must decide what policy tools it wants to retain. In terms of international economics, there are the three vital policy objectives that are available to any country's monetary authorities: full financial integration in terms of free capital movement, exchange rate stability and, last but not least, an independent monetary policy. As we have already discussed, these three constitute the impossible trinity whereby while these objectives may be available to the authorities at any given time, there has never been a case when a country has been able to have achieve to all three simultaneously. The situation is explained quite well by Paul Krugman in his 1999 tribute to Mundell:

*"[...] The point is that you can't have it all: A country must pick two out of three. It can fix its exchange rate without emasculating its central bank, but only by maintaining controls on capital flows (like China today); it can leave capital movement free but retain monetary autonomy, but only by letting the exchange rate fluctuate (like Britain-or Canada); or it can choose to leave capital free and stabilize the currency, but only by*

*abandoning any ability to adjust interest rates to fight inflation or recession (like Argentina today, or for that matter most of Europe).<sup>49</sup>*

This elucidates what has since been called the '*impossible trinity*' in the field of international economics about which policy objective to retain and which ones to give up and these have been discussed in much detail in earlier sections. It is this determination of which policy objective to give up that can sometimes lead an economy to be suited to join a monetary union. When an economy looks to join a monetary union, it chooses a corner solution whereby it has given preference to the twin forces of full financial integration with the other countries that form the union and exchange rate stability which in turn fosters growth and stability of the economy while at the same time surrendering its monetary and exchange rate policy independence.

Having said that, the verdict is still out on what measure is appropriate to actually quantify the benefits of joining a common currency area and where the line should be drawn so that that currency area can become an optimum currency area. It must also be stated that the whole debate on the OCA is valid only "insofar as the debate on fixed versus flexible exchange rates has proven to be inconclusive...if either...could be shown to be definitely superior, then there would be no need for a theory of (optimum) currency areas".<sup>50</sup> This is because if the fixed regime were more beneficial, then all the world economies would participate in the common currency 'area' whereas if flexible regime was found to be more advantageous, then that regime would prevail the world over.

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<sup>49</sup> Krugman, P., "O Canada: A Neglected Nation gets its Nobel," October 1999, online available:  
<http://www.slate.com/id/36764/> as on February 10, 2006

<sup>50</sup> Gandolfo, G. "International Finance and Open-Economy Macro-economics", Heidelberg, 2002, p 333

## VII: CRITERIA FOR ACCESSION INTO THE EURO UNION

As has already been touched upon in earlier sections of the paper, changing over to another currency regime requires much thought and contemplation on the part of the adopting nation(s). That then is the reason why this section of the essay is dedicated exclusively to explanation of the processes involved for accessing nations who are looking into surrendering their national currency and converting over to the euro.

The stage had been set for the establishment of a common currency area in Europe ever since the Bretton Woods system fell apart in 1971. This was because when United States decided to sever the link between gold and the US dollar, the nations that formed the European Economic Community (EEC) realized that measures would need to be taken to maintain stable exchange rates between themselves (stability was to be maintained by preventing fluctuations of more than  $\pm 2.25$  percent) in order to maximize on trade and growth benefits.

The accession over to the euro was a gradual process overseen by the European Council, and which was governed by a set of guidelines that were established to minimize the impact of such move on the accessing nation's economy. Prior to getting into a detailed discussion of what conditions are required to be met by the nation contemplating joining the EU, we must introduce the Maastricht Treaty. This Treaty was signed on February 7, 1992 (coming into effect November 1, 2003) between member states of the European community and it officially set out the convergence criteria to gradually phase the nation(s) into the monetary union.

The European area is comprised of an eclectic mix of strong nations such as Germany which had a proven track record for strong economic policies as well as economies that were renowned for their less stable policies. To bring such vastly different economies under one umbrella, that then required that measures be taken regarding factors such as fiscal policy (which must compensate for the inevitable loss of monetary policy independence when joining a currency union), inflation, debt, as well as the exchange rate adjustment tool else the stronger nations, most notably Germany, might shy away from joining as their economies might suffer from the (often careless) policies of the weaker and more volatile economies.

To prevent just such problems, the Maastricht Treaty established nominal convergence criteria that looked to control inflation and also to align the monetary policies of the participating countries with those of the existing members of the Union. The convergence criteria (criteria) that were proposed by the Treaty and which have since then has been vital in gauging the readiness of the participants can be summarized in four points: i) an inflation rate (as measured by the rate of increase of the consumer price index) that does not exceed by more than 1.5 percentage points the rate of inflation of the three best performing countries (that is, those having the three lowest inflation rates); ii) a long-term nominal interest rate...that does not exceed by more than 2 percentage points the average of the [three best performing countries]; iii) an exchange rate that has respected the normal fluctuation margins in the last two years [trade of a country's currency against the euro be without severe tensions within the normal fluctuation margins of the Exchange Rate Mechanism (ERM2)]; and iv) a

public deficit and debt [below 3 percent of GDP and 60 percent of GDP, respectively].<sup>51</sup> The aim of these criteria is to prevent "destabilization of the Union by the premature admission of countries whose economic fundamentals are not compatible with a permanently fixed exchange rate.<sup>52</sup> Having said that, it is important to note that the Treaty does set out a stipulation whereby exceptions can be made for nations that are near the goals set out and moving in the right direction.

Having stated the conditions for convergence into the European Union via the Maastricht Criteria, and seeing as the monetary policy tool is lost to the nation(s) upon accession, then there is the implicit assumption that the nation go beyond what is stated in the Treaty to ensure a continuously successful experience within the EMU. Policy analysts and economists have suggested modifications be made in terms of adopting nation's policies to ensure a smooth accession.

General consensus among the economists has shown that if the accessing nations focus on five key areas and if they meet these additional conditions, (namely, implementation of sound fiscal policy, price and wage flexibility, synchronization of business cycles, integration of financial markets and nurturing of competitiveness) then they are almost guaranteed a smooth transition<sup>53</sup>. Readers may recall these factors have previously been discussed in detail in the section of the paper pertaining to the traditional OCA theory but the first two conditions are discussed briefly henceforth.

The criterion of sound fiscal policy stems from the fact that upon joining the Union and the adoption of the Euro, domestic economy loses its monetary policy as well as the exchange rate adjustment tool. Both the tools, especially monetary policy, have been touted as having strong influence on the stability of growth and inflation. Flexibility in wage and prices in an economy is another factor which relates to this first. Recall that a nation's adaptability to asymmetric shocks once it has accessed to the Euro depends primarily on the wage and price flexibility and its ability to use fiscal policies counter-cyclically as the tool of monetary policy is no longer available. This is because flexibility in wages and prices are critical to engender adequate competitiveness in the economy while at the same time, it can help avoid rising unemployment (and which is a problem in some of the smaller open market economies that have been considering joining the Euro).

Having discussed those factors that are important for readying a nation for accession, then recall from the discussion on the OCA theory that among others, there are two indicators that suggest when a nation is ready to become part of a currency union. These indicators are a nation's susceptibility to asymmetric shocks (with respect to the already established common currency area) and also having mechanisms in place which are efficient enough that they can assist in adjustment of the economy to shocks in the absence of monetary policy. The first of these, susceptibility to asymmetric shocks, is generally thought to occur when a nation's structure of production/output is similar to that of the common area and there is a lack of product diversification. The greater the flexibility of a nation in terms of its wages and prices,

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<sup>51</sup> Gandolfo, G., "International Finance and Open-Economy Macro-economics", Heidelberg, 2002, p 356-7

<sup>52</sup> Gandolfo, G., p 360

<sup>53</sup> Schadler, S., et al, *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, IMF Occasional Paper 234, Washington, 2005, p 18-19

and the more mobile its labor force, then these two help in determining whether a country is well situated to adjust to asymmetric shocks in the absence of exchange rate adjustment mechanism or not.

The second factor which is used to measure the viability of whether a nation is or is not ready to join the Union is having in place mechanisms to 'replace' the monetary policy, or lack thereof. Some authors have suggested that monetary policy has been less important for those economies that are very open to international trade. This is because the effects of changes in monetary policy are more likely to be damped by demand spillovers into the tradable sector and with a small non-tradables sector, exchange rate changes are more likely to result in price rises, evoking a strong wage reaction.

Since initial literature was written about the OCA theory, some authors have suggested that while monetary policy tool is vital for the functioning of a nation's economy, in the case of a monetary union, when proper fiscal policies are in place, then the vitality of monetary policy becomes less clear. These authors see monetary policy as being more effective in the short run to counter temporary shocks in the presence of nominal rigidities and factor immobility but its long-run effects have not been clearly apparent.

## VIII: CASE STUDY – ADOPTION OF THE EURO BY THE CECs

Having discussed the rationale behind the process of either formally joining a currency union (euroization) or an outright adoption of a foreign currency (dollarization) and having set up the theoretical framework in the preceding sections of this paper, we now look to apply the theory to a group of countries which are in the process of adopting the euro. This segment of the paper will seek to demonstrate the economic and policy challenges that the accessing nations are faced with in the process of currency adoption using the example of five Central European Countries namely, the Czech Republic, Hungary, Poland, the Slovak Republic (Slovakia) and Slovenia.

With regards to the methodology, data and statistics used, this segment borrows heavily from three previous studies (Schadler et al, 2005, Angeloni et al, 2005 and Habib, 2000). In terms of the countries sampled under all three, the Schadler research paper studies the Central European Countries (the CECs) comprised of the Czech Republic, Hungary, Poland, Slovak Republic and Slovenia. The Angeloni study follows the process of accession of the New Member States (the NMS) and this sample comprised of the Czech Republic, Hungary, Poland, Slovakia, Slovenia, Estonia, Latvia, Cyprus, Lithuania and Malta. Finally, for the Habib paper, he looks at the euroization process for what he refers to as the five Central Eastern European Countries (CEEC-5) and those countries were Bulgaria, Czech Republic, Hungary, Poland and Romania. While we realize that the samples for the Angeloni and Habib studies are not strictly those of this paper, we have exploited the data and selected facts and figures that pertain to our sample nations.

To return to our analysis, while all of the CECs have signalled their intention to adopt the euro in the near future by joining the European Union (EU) in May of 2004, full policy convergence has not yet been achieved with the rest of the EU area. This section will look into what the CECs can do to make the accession to final euro adoption as smooth as possible. Accession into the EU entails complete monetary as well as economic integration for the adopting nations. Economic integration has been defined as the elimination of economic frontiers between two or more economies (in the case of accession into the Union, it includes successful participation in the single Euro market with free exchange of goods and services, free movement of capital and people and common rules in certain areas like competition, external trade, money and some financial aspects<sup>54</sup>). Monetary integration means foregoing the use of monetary and exchange rate policies for national purposes alone.

In this section, we will begin by discussing where the CECs stand in terms of their present level of integration with the other EU nations. We will borrow heavily from the section above on the optimum currency area theories, both old and new and relate them to our group of countries. Once we have discussed that then we will talk about the exchange rate regimes that are currently in place within these nations and also what it will mean for these nations to finally access to the euro in terms of the European Exchange Rate Mechanism (ERM II) criteria. Lastly, since the respective countries'

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<sup>54</sup> Angeloni, I., et al, *Economic and Monetary Integration of the New Member States: Helping to Chart the Route*, ECB Occasional Paper 36, Washington, 2005, p 6

authorities have already signalled their intentions to access to the common currency, then the final segment will discuss the vulnerabilities that may arise during the accession process.

### *The Stance of the Nations – An Application of the OCA Theories*

Recall from our previous discussion that since its inception, two theories have been put forth about what constitutes an optimum currency area. The traditional approach initially proposed by Mundell claimed that before nations could be considered a part of an optimum currency area, they must demonstrate integration with the rest of the ‘established’ optimum area on a number of fronts such as international factor mobility and degree of openness. Product diversification, cohesion in the financial markets, similar inflation rates and high degree of policy integration were also stipulated as vital prerequisites to accession. Mundell’s theory emphasized an obligation on the part of the adopting nations to meet the prerequisites prior to their unification into the union.

The key weakness of the original theory, and the area to which subsequent researchers made revisions, was the fact that the original theory did not account for the dynamic nature of the economic entities. The newer theory deviates from the original in that it argues that if an economy is contemplating joining a currency union, then it does not have to meet all the criteria prior to joining. The proponents of the new OCA theory state that if the accessing nations meet some of the criteria and are in the process of working towards the achievement of the rest of the conditions then by all means, the nations are ‘ready’ and can go ahead and join the union as the rest of the criteria would be fulfilled *ex post* upon accession.

For the purpose of our paper we will review the case of the euro area and the price to join that particular currency union. We have also already established that the convergence criteria that are set out for the euro adoption are clearly an extension of the newer model of the OCA theory. Once we have completed our analysis and if we determine that for our (small open economy) CECs have fiscal and structural policies compatible with those of the Euro area then we will be able to say that the countries will lose little by giving up their exchange rate instrument but they would gain monetary policy credibility and protection from fiscal market shocks.

Having said that, we are then ready to begin our analysis by looking at where these accessing nations stand in terms of fulfilling some of the prerequisite conditions stipulated by Mundell and his contemporaries.

## Criteria Analysis I: Cyclical Properties and the Nature of Shocks

Previously discussed was the importance of an independent monetary policy in the smoothing out as well as countering the effects of asymmetric shocks that might hit a nation. Also briefly touched upon was how a loss of this policy tool can intensify the impact of the shock and all of this leads us to appreciate the scope of loss that the CECs take on when they finally access into the union. When any nation decides to join a monetary union, it needs to take into account the symmetry of the shocks that hit both the domestic economy and also the established OCA simultaneously. This is because post-accession, there will be only a single monetary policy for the whole region. As Angeloni et al (2005) state, "the more similar aggregate supply and demand shocks are, and the more similar the speed with which the economy adjusts...less need there is for monetary policy autonomy and the higher the net benefits from adopting a common currency."<sup>55</sup>

While there is no alternative but to abandon independent monetary policy upon accession, measures have been implemented to gauge the susceptibility of the accessing nations to asymmetric shocks and also the speed with which they adapt to these shocks, all of which go into helping understand how well prepared the nations are in terms of their final adoption and how valuable an independent monetary policy remains to them. In that context, discussed below are three of the most commonly used measures to assess the acceding nations' stance and which have been used in recent analyses have been i) to measure the direct correlation of shocks between the CEC(s) and the euro area, ii) an appraisal of the correlation of growth rates of economic activity between the entities; and last but not least, iii) a review of the structural features of economies to see what makes the CECs any more or less prone to asymmetric shocks.

### *i) Correlation of Shocks between the CECs and the Euro Area:*

We now begin by looking at the first of these measures, that is, the direct correlation of shocks between the CECs and the established euro area. Studies to examine the types of shock correlations have indicated that for all countries and especially the CECs, there is a substantially higher correlation of supply shocks than correlations of demand shocks.<sup>56</sup> For the authorities of any nation looking the route of joining a currency union whereby they would surrender their monetary policy independence, this would be considered good news as studies have shown that degree of monetary and fiscal policy synchronization has a greater influence on demand shocks than on supply shocks (supply shocks are affected more by fundamental exogenous factors<sup>57</sup>). This fact gains added significance when we recall that upon adoption of the euro, the CECs and the rest of the euro area will jointly have a single monetary policy between them, so that the correlation of demand shocks between the two entities will also slowly increase. This higher synchronization in addition to the already-present higher supply shock correlation would work to increase the

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<sup>55</sup> Angeloni, I., et al, *Economic and Monetary Integration of the New Member States: Helping to Chart the Route*, ECB Occasional Paper 36, Washington, 2005, p 18

<sup>56</sup> Schadler, S., et al, *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, IMF Occasional Paper 234, Washington, 2005, p 19

<sup>57</sup> Schadler, S., et al, p 19

correlation of overall shocks between the two, which in the end means that the cost of losing an independent monetary policy becomes a little less sharp for the accessing nations.

Seeing as a good part of the way to final accession is overall convergence, then a study conducted by Frenkel and Nickel (2000) as quoted in Schadler et al (2005)<sup>58</sup> while it does not openly show a high level of symmetry in the types of shocks that have hit these nations as well as the adjustment modules, they do indicate a steady increase in the level of synchronization between them and the euro area: "They find that, over the period 1993-2001, there are still differences in the shocks and in the process of adjustment to shocks when the euro area as a whole is compared with the CEECs as a group [but when the individual economies are compared to the individual nations in the euro area, see table below] There is almost no difference between the more advanced CEECs and the small euro area countries as regards the correlation of their shocks vis-à-vis the euro area."<sup>59</sup>

**Table 1: CECs and Euro-Area Countries: Correlations of Shocks with Euro-Area<sup>1</sup> (coefficient of correlation)**

	Fidrmuc and Korhonen (2002) 1991–2000 <sup>2</sup>		Frenkel and Nickel (2002) 1995–2001 <sup>3</sup>	
	Supply	Demand	Supply	Demand
<b>CECs</b>				
Average	0.16	0.03	0.24	-0.10
Minimum	0.04	-0.18	-0.69	-0.43
Maximum	0.46	0.28	0.73	0.22
Czech Republic	0.04	-0.15	0.34*	-0.24
Hungary	0.46*	0.25*	0.73*	0.12*
Poland	0.08	0.28*	-0.69	0.22*
Slovak Republic	0.05	-0.05	0.18*	-0.43
Slovenia	0.15	-0.18	0.66*	-0.15
<b>Core euro</b>				
Average	0.55	0.12	0.51	0.20
Minimum	0.38	0.00	-0.01	-0.58
Maximum	0.69	0.30	1.00	0.94
Austria	0.38	0.08	0.18	-0.04
Belgium	0.53	0.00	1.00	0.94
France	0.69	0.30	0.74	0.35
Germany	0.66	0.18	0.62	0.31
Netherlands	0.47	0.04	-0.01	-0.58
<b>Noncore euro</b>				
Average	0.23	0.17	0.28	0.12
Minimum	-0.14	-0.01	-0.18	-0.10
Maximum	0.52	0.57	0.76	0.55
Finland	0.30	0.06	0.54	-0.10
Greece	0.05	-0.01	-0.10	-0.01
Ireland	-0.14	0.13	.	.
Italy	0.52	0.57	0.76	0.55
Spain	0.22	0.16	0.42	0.03
Portugal	0.45	0.09	-0.18	0.11
<b>Average for euro area</b>	<b>0.38</b>	<b>0.15</b>	<b>0.40</b>	<b>0.16</b>

Sources: Fidrmuc and Korhonen (2002); and Frenkel and Nickel (2002).  
\*Indicates correlation estimates that are positive and above the minimum of the euro core.  
<sup>1</sup> Correlation coefficients of shocks in individual countries with the aggregate of the euro area, based on VAR estimates.  
<sup>2</sup> Quarterly data, 1991–2000 for the euro-area countries; 1993–2000 for the CECs, except Hungary; 1995–2000 for Hungary.  
<sup>3</sup> Quarterly data, 1995–2001.

Source: Schadler, S., et al., *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, International Monetary Fund Occasional Paper 234, Washington, 2005, p 20

Two other studies conducted by Darvas and Szapary, 2003 and Fidrmuc and Korhonen, 2005 (cfr Schadler, 2005)<sup>60</sup> used a range of macroeconomic variables with their main purpose being to measure the business cycle co-movements between the

<sup>58</sup> Schadler, S., et al, *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, IMF Occasional Paper 234, Washington, 2005, p 19-20

<sup>59</sup> Angeloni, I., et al, *Economic and Monetary Integration of the New Member States: Helping to Chart the Route*, ECB Occasional Paper 36, Washington, 2005, p 18

<sup>60</sup> Schadler, S., et al, *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, IMF Occasional Paper 234, Washington, 2005, p 20

CECs and core euro area. While the exact level of correlations between individual pairs varied based on methodology used and time span in question, both studies showed that overall, of our sample of five countries, Hungary, Poland and Slovenia repeatedly exhibited higher business cycle synchronization with the euro area than levels demonstrated by the Czech Republic and Slovakia.

While all the studies came with the disclaimer that results varied depending on the indicator selected to measure the convergence, almost all indicated a positive correlation of business cycle movement between the nations and the euro area (or the benchmark nation of Germany).

Looking at the results above, we can presume that there are a number of reasons for the trends that are emerging. The length of time that each of our sample nations has been liberalizing in terms of its trade barriers (alternatively, openness of trade with the EU area) as well as other controls in relation to the EU appear to have had the strongest influence. Also, as researchers have already estimated, that the higher the trade integration between the nations and their euro counterparts, then the greater the integration, therefore stronger synchronization of business co-movement and influence of shocks and hence less the need of an independent monetary policy tool.

Table 2: Trade Openness, 1995-2004 (exports plus imports in percent of GDP)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<b>New Member States</b>										
Czech Republic	0.36	0.43	0.46	0.48	0.49	0.57	0.60	0.55	0.58	0.56
Estonia	0.58	0.57	0.75	0.72	0.64	0.84	0.77	0.72	0.75	0.74
Cyprus	0.27	0.29	0.28	0.25	0.24	0.25	0.27	0.24	0.21	0.27
Latvia	0.50	0.48	0.48	0.43	0.36	0.41	0.45	0.47	0.46	0.45
Lithuania	0.32	0.32	0.44	0.52	0.55	0.64	0.61	0.55	0.54	0.57
Hungary	0.32	0.33	0.36	0.38	0.32	0.33	0.34	0.34	0.36	0.42
Malta	0.70	0.64	0.59	0.74	0.62	0.77	0.93	0.63	0.61	0.75
Poland	0.19	0.20	0.22	0.22	0.22	0.24	0.23	0.25	0.29	0.30
Slovenia	0.45	0.44	0.46	0.46	0.43	0.50	0.49	0.48	0.48	0.50
Slovakia	0.47	0.50	0.53	0.57	0.56	0.64	0.69	0.67	0.67	0.62
mean	0.32	0.35	0.39	0.41	0.41	0.48	0.48	0.46	0.48	0.48
standard deviation	0.14	0.14	0.15	0.16	0.16	0.20	0.21	0.17	0.16	0.15
NMSL <sup>1)</sup>	0.26	0.28	0.31	0.33	0.34	0.38	0.37	0.38	0.41	0.42
<b>Euro area</b>										
Total trade										
mean	0.27	0.27	0.30	0.30	0.32	0.37	0.37	0.36	0.35	0.35
standard deviation	0.14	0.15	0.17	0.17	0.17	0.20	0.20	0.21	0.19	0.21
Extra-euro area trade										
mean	0.12	0.13	0.15	0.15	0.16	0.19	0.18	0.18	0.17	0.18
standard deviation	0.07	0.07	0.08	0.08	0.09	0.10	0.10	0.09	0.08	0.08
USA	0.09	0.09	-0.10	-0.09	-0.09	0.10	0.10	0.09	0.09	0.09

Sources: AMECO (European Commission Directorate General for Economic and Financial Affairs) and DTS (International Monetary Fund).

1) Large NMS: Czech Republic, Hungary and Poland.

Source: Angeloni, I., et. al., *Economic and Monetary Integration of the New Member States: Helping to Chart the Route*, European Central Bank Occasional Paper 36, Washington, 2005, p 19

### ii) Correlation of Growth Rates of Economic Activities between the CECs and the Euro Area:

The second measure put forth to gain a measure of the susceptibility of the CECs to asymmetric shocks (as well as their asymmetric response to systematic shocks) has been to look at the correlation of GDP and industrial production growth rates between independent economies and Germany. Germany has been chosen as a benchmark for a number of reasons, not least of which is the nation's commitment to maintain low inflation and strong economic growth. Looking at the correlation of indicators from the study conducted by Angeloni et al, and which are summarized in the table below, these then reinforce the conclusions previously drawn, namely that these correlations are on the rise what with the closer economic trade ties between the entities. The results, while showing the correlation varying over a wide range, also indicate that two of the CECs, Hungary and Slovenia, have some correlation coefficients which are similar if not as high as other core and non-core euro area nations.

**Table 3: CECs and Euro-Area Countries: Correlations of Indicators of Economies with Germany (coefficients of correlation)**

Period covered Variable	Fidrmuc (2001) 1993–99 <sup>1</sup>		Boreiko (2002) <sup>2</sup> 1993–2001 1997–2001 1999–2001			IMF 1996–2002	
	Industrial production	GDP	Industrial production		Industrial production		
<b>CECs</b>							
Average	0.45	0.54	0.38	0.53	0.64	0.51	0.43
Minimum	0.04	0.01	0.20	0.45	0.52	0.33	0.24
Maximum	0.77	0.80	0.52	0.60	0.84	0.79	0.62
Czech Republic	0.37*	0.01	0.20	0.50	0.52	0.40	0.31
Hungary	0.63*	0.75*	0.52	0.60	0.84	0.79*	0.62*
Poland	0.45*	0.38	0.39	0.59	0.68	0.50	0.44*
Slovak Republic	0.04	0.74*	0.30	0.53	0.58	0.52	0.24
Slovenia	0.77*	0.80*	0.49	0.45	0.56	0.33	0.54*
<b>Core euro</b>							
Average	0.63	0.75				0.76	0.61
Minimum	0.25	0.58				0.63	0.41
Maximum	0.91	0.88				0.89	0.77
Austria	0.81	0.58				0.89	0.77
Belgium	0.25	0.88				0.63	0.50
France	0.91	0.83				0.86	0.77
Netherlands	0.57	0.69				0.68	0.41
<b>Noncore euro</b>							
Average	0.66	0.63				0.72	0.53
Minimum	0.48	-0.03				0.38	0.11
Maximum	0.92	0.81				0.92	0.73
Finland	0.69	0.79				0.92	0.73
Greece	0.48	...				0.60	0.51
Ireland	...	-0.03				0.80	0.52
Italy	...	0.81				0.85	0.70
Spain	0.92	0.79				0.78	0.61
Portugal	0.56	0.78				0.38	0.11
<b>Average for euro area<sup>5</sup></b>	<b>0.65</b>	<b>0.68</b>				<b>0.74</b>	<b>0.56</b>

Sources: Fidrmuc (2001); Boreiko (2002); IMF, International Financial Statistics; Eurostat; and IMF staff estimates.  
\*Indicates correlation estimates that are above the minimum of the euro core.  
<sup>1</sup> Year-on-year growth rates of quarterly indicators of economic activity.  
<sup>2</sup> Monthly industrial production growth rates.  
<sup>3</sup> Year-on-year growth rates of monthly industrial production.  
<sup>4</sup> Monthly industrial production indices detrended using a Hodrick-Prescott (HP) filter.  
<sup>5</sup> Excludes Germany and Luxembourg.

Source: Schadler, S., et al., *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, International Monetary Fund Occasional Paper 234, Washington, 2005, p 21

Various authors have used various indicators to gain an idea of real convergence between adopting nations and the euro area. In a study conducted by Boone and Maurel in 1998 and quoted from Habib (2000), they used the correlation of industrial production business cycles in the CECs with Germany. The results always indicated a positive and higher correlation between the nations and Germany. To get a clearer idea, the correlation coefficients were the strongest between Hungary and Germany (0.427) and Czech Republic and Germany (0.699)<sup>61</sup>.

### *iii) Examination of Structural Features of CECs to study susceptibility to Asymmetric Shocks:*

A third measure of susceptibility to asymmetric shocks has been to study the structural features of accessing economies to gauge which characteristics might make these nations more or less sensitive to asymmetric shocks. As the world economy changes over time, then the factors affecting these nations have also been evolving over time. As researchers are gaining more insight into these features then they are better equipped to predict the ways in which these characteristics might change over time and that should assist in reducing the incidence of asymmetric shocks. All in all,

<sup>61</sup> Habib, M., "The Case for Euroisation in Central and Eastern European Countries", London, 2000, p 27 online available: <http://www.met-network.org.uk/papers/mhabib.pdf>

as per the study conducted by Schadler et al, 2005, they state that "Structural characteristics of the CEC economies are also changing in ways that should reduce the incidence of asymmetric shocks. In particular...the share of intraindustry trade...in total manufacturing trade has risen sharply since the early 1990s..."<sup>62</sup> Their studies also indicated that the indices for the late 1990s stood at levels comparable to those in the core euro area and while the employment and GDP indices varied largely, the manufacturing sectors looked similar to core EU area.

The above then completes our discussion on the position of the CECs in terms of the co-movements of their cycles as well as their susceptibility to shocks that affect the euro area. Seeing as these nations are steps from actual adoption of the euro, then logic dictates (and prognosis indicates) that a greater level of trade integration between the CECs and the overall area will be gradually achieved which over time should result in an even greater synchronization of business cycles.

These studies on correlations between the business cycles of the CECs and the euro area have signalled to policymakers that while these accessing nations are not completely synchronized to the EU area, they are on the right track. The general consensus is that if the CECs, especially Slovakia and the Czech Republic maintain their efforts and attain convergence levels with core EU area similar to Hungary, Poland and Slovenia, then conceding their independent monetary policy tool would not be as costly as it might be otherwise. Alternatively, the studies on correlation between the entities reflect a "diminution of transition-related shocks while economic integration with the euro area has deepened via trade, FDI, and financial market integration."<sup>63</sup>

On the basis of this criterion, even though all five CECs appear to be at a different stage in the process of adaptation to shocks to their cycles, they are still ready for euro adoption because "business cycle synchronization has shown a high degree of 'endogeneity' for euro area countries, that is EU membership – and in particular participation in the euro area – is expected to foster co-movements through diverse channels."<sup>64</sup>

#### Criteria Analysis II: International Factor Mobility – Labour and Capital Markets

From our preceding sections, we know that the greater the flexibility inherent in an economic system to adjust to shocks, the less need there is for monetary policy tool as a flexible system is well-equipped to absorb disturbances arising from supply and demand shocks via fluctuations in the exchange rate movements. We also know from the OCA theories that a high degree of price and wage flexibility is fundamental for a successful experience in joining a currency union. This is because "whatever the responsiveness of real wages to economic conditions, nominal wage flexibility must be

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<sup>62</sup> Schadler, S., et al, *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, IMF Occasional Paper 234, Washington, 2005, p 19

<sup>63</sup> Schadler, S., et al, p 19

<sup>64</sup> Angeloni, I., et al, *Economic and Monetary Integration of the New Member States: Helping to Chart the Route*, ECB Occasional Paper 36, Washington, 2005, p 18

adequate to ensure that unemployment does not shoulder the brunt of adverse shocks after euro adoption.”<sup>65</sup>

The optimum currency area theory also mentions that there be a high level of factor mobility between the member countries and therefore for our analysis on the level of factor mobility between our sample and the core EU countries, we will look at the labour and capital market institutions and discuss where the nations stand with respect to their currency convergence and eventual integration with the euro area.

Flexibility in labour market institutions generally produces wage flexibility in an economy and this as a pre-condition to joining an OCA has been touted by researchers as being vital in reducing the impact of supply and demand shocks on a nation’s overall output and employment and also for facilitating the accession and eventual participation in the union. As well, flexible labour market reduces the need for authorities to resort to active monetary and exchange rate management to try smooth the impact of shocks at a national level and seeing as upon accession, monetary policy autonomy disappears, then the less dependent policymakers are on this tool to stabilize the economy, the better it is in long-run. In terms of measuring this flexibility, then the best gauge to measure nominal wage flexibility within the economy has been to examine whether the regulations of that nation as well as its labour market institutions are of the type to nurture wage flexibility.

While historically the CECs have been much more controlled and centralized in terms of their market structure, recent studies on the labour markets of our sample show an evolution towards a more liberalized market. While direct comparison between countries cannot be made due to data set inconsistencies (length of time, availability of data and so on), researchers such as Angeloni et al have proposed generic measures to compare the characteristics and the labour market institutions of the CECs with the EU to make general assessments about the stance of these nations.

In terms of flexibility, there is no stronger symbol of rigidity in the labour market than the presence of a wage bargaining tool via medium such as unions (or similar central institution to oversee the supply of labour in the economy). Wage bargaining has been considered inefficient as it can interfere or at the very least influence wage flexibility. Initially, the Angeloni et al compared the CECs’ labour market structure to that of the established open market economies like the United States and United Kingdom, whereby the sample countries fell quite short on the flexibility scale. Seeing as the sample nations were in the process of joining the euro area, and it is vital that their structures be (somewhat) comparable to that set of nations, then it made more sense for the authors to compare the structural features of these with those of the EU member states.

The results of revised comparisons between sample and core EU countries were conducive to drawing more practical conclusions and also in conducting a more meaningful analysis. Results from Angeloni et al (2005) showed that in the first measure

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<sup>65</sup> Schadler, S., et al, *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, IMF Occasional Paper 234, Washington, 2005, p 23

of labour market flexibility, the presence of unions, the CECs fared better than some of the core euro countries.

**Table 4: Labour Market Institutions**

	Union density (%) <sup>1)</sup>	Collective bargaining coverage (%)	Dominant bargaining level	Low pay regulation mechanism
Czech Republic	30	25-30	Company	National minimum wage
Estonia	14.8	29	Company	National minimum wage
Cyprus	70	65-70	Sectoral	Collective agreements
Latvia	30	<20	Company	National minimum wage
Lithuania	15	10-15	Company	National minimum wage
Hungary	20	34	Company	National minimum wage
Malta	n.a.	n.a.	Company	National minimum wage
Poland	15	40	Company	National minimum wage
Slovenia	41.3	100	Intersectoral	National minimum wage
Slovakia	40	48	Sectoral	National minimum wage
NMIS <sup>2)</sup>	34.1 <sup>3)</sup>	40 <sup>4)</sup>	n.a.	n.a.
Belgium	69.2	100	Intersectoral	National minimum wage
Germany	29.7	67	Sectoral	Collective agreements
Greece	32.5	n.a.	Sectoral	National minimum wage
Spain	15	81	Sectoral	National minimum wage
France	9.1	90	Company	National minimum wage
Ireland	44.5	n.a.	Intersectoral	National minimum wage
Italy	35.4	90	Sectoral	Collective agreements
Luxembourg	50	60	Company/sectoral	National minimum wage
Netherlands	27	78	Sectoral	National minimum wage
Austria	39.8	98	Sectoral	Collective agreements
Portugal	30	62	Sectoral	National minimum wage
Finland	79	90	Intersectoral	Collective agreements
Euro area <sup>5)</sup>	38.4	81 <sup>6)</sup>	n.a.	n.a.
Denmark	87.5	85	Sectoral/intersectoral	n.a.
Sweden	79	94	Sectoral	n.a.
UK	29	36	Company	n.a.
EU15	30.4	n.a.	n.a.	n.a.

Sources: European Commission and European Industrial Relations Observatory (EIRO) "Industrial relations in the EU Member States and candidate countries" (2002).  
Note: Data refers to various years in the period 1999-2001.  
1) Union membership as a percentage of total employment.  
2) GDP-weighted.  
3) Excluding Malta.  
4) Excluding Greece and Ireland.

Source: Angeloni, I., et. al., *Economic and Monetary Integration of the New Member States: Helping to Chart the Route*, European Central Bank Occasional Paper 36, Washington, 2005, p 22

They drew this conclusion based on the fact that the level of unionization in the CECs was lower than levels prevalent in some of the EU15 countries. Looking at the table above, we notice that the average for our sample CECs (Czech Republic, Hungary, Poland, Slovenia and Slovak Republic) is 29.26 and which is slightly lower than the EU15 average of 38.4. Taken on an individual basis and compared to the core average, Hungary, Czech Republic and Poland appear to be winners (20, 30 and 15, respectively) and indicate greater flexibility in the labour market when degree of unionization is used as an indicator.

Another indicator used in this study to measure flexibility of the CECs' labour market was the level at which collective bargaining (of contracts and the like) was conducted (the levels being company, sectoral or intersectoral level). If we consider this, then the more centralized the bargaining process, then greater the built-in rigidity of the labour market. Based on the table above, collective bargaining in most of the union area countries took place at the sectoral or even national level. For 3 out of 5 of our CECs (again, Czech Republic, Hungary and Poland), their collective bargaining was done mostly at the company level which would be the most flexible of the three levels indicated above.

A driving force behind this evolution towards a more liberalized market would have to be the fact that since these nations decided to enter the union, then most

have actively been working towards achieving a higher degree of cohesion with the EU area which will help ease their accession into the EU. To work towards this goal they have gradually relaxed their regulations concerning a number of labour market factors such as minimum wage laws, the density of unions and the level at which collective bargaining is conducted.

All in all, the CECs illustrate a level of flexibility in their labour markets which is certainly equal if not higher than the core EU average. As well, there is "significant heterogeneity in labor market institutions across [the CECs] as well as the EU15 countries..."<sup>66</sup> That being said, in considering the individual cases, we would have to say that based on the degree of convergence that has been achieved by the nations, Poland, Hungary and Czech Republic are more closely aligned with the EU15 than Slovenia and Slovakia (the laggards). If these nations decided to access tomorrow, the similarity of their markets would go a long way to help reduce the impact of the symmetric shocks upon accession. Hence those three are in a better position to adopt the euro sooner rather than later but the laggards still need to work on this criterion if they wish to make a smooth transition.

The consensus amongst the economists has been that all the last 10-15 years the CECs have undergone a very rapid and deep transformation in all economic and institutional areas. This is especially true in the levels of capital account liberalizations that have recently been seen in the authorities' efforts to align their respective nations' policy stances as close to the euro area as possible. We now turn to this discussion on these same liberalizations and what they entail for the CECs in terms of easing their entry into the EU

As we have noted previously and as per the proponents, importance of capital liberalization stems from the fact that liberalization of this institution leads to higher output and greater efficiency for any nation. Others have suggested that with the increased trade integration amongst nations, then economic policies need to be adapted which must facilitate the operation of such nations in a world of liberalized capital markets. For accessing nations such as ours, where they will lose the use of their monetary policy upon joining the currency union, this is even more important as freedom of capital (and labour) movement has been touted in OCA theories as helping equate the ill-effects of trade imbalances.

For our sample CECs, at current time, the extent of capital account liberalization differs from country to country as shown in the table in Appendix D, and as borrowed from Habib, 2000 (the table shows the level of capital controls for three of the five nations that form our sample). In terms of some facts and figures, we refer to the study conducted by Schadler et al. They indicate that the '[c]apital inflows [in the CECs] are large, volatile, and virtually free of controls...'<sup>67</sup> While this lack of controls can constitute bad news for accessing nations in that such lack of controls was partially held responsible for the currency crises of the 1990s (and which we can not even attempt to cover for this paper), the benefits reaped from such liberalization can be considered

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<sup>66</sup> Angeloni, I., et al, *Economic and Monetary Integration of the New Member States: Helping to Chart the Route*, ECB Occasional Paper 36, Washington, 2005, p 23

<sup>67</sup> Schadler, S., et al, *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, IMF Occasional Paper 234, Washington, 2005, p 40

great news for our sample nations. This is because in our case of structured multilateral adoption, they are "expected to liberalise the capital account before entering the EU, but they can keep capital controls upon EU accession [as well] the Maastricht Treaty allow[s] for transitional periods before removing capital controls and temporary restrictions on capital movements in case of balance of payments crises."<sup>68</sup> For the CECs, accession into the euro signals to other EU member states as well as other trading partners the commitment of these nations to the convergence criteria.

We also see from the study by Schadler et al that the level of capital inflows amongst the CECs was highest in Slovakia at slightly over 12% of GDP, followed by nearly 10% of GDP in the Czech Republic. Overall, our sample nations averaged a rate of 7.2%<sup>69</sup> of GDP between them over the period 2000-2003. With respect to the composition of these inflows, majority (approximately 75%)<sup>70</sup> is seen to come about as a result of foreign direct investments in our sample countries.

In terms of the CECs' investments abroad, then foreign portfolios have recently started emerging. Portfolios such as these are vital in that they allow for self-insurance against asymmetric shocks but the diversification of this portfolio has been comparatively lower in the CECs relative to other euro-area countries. To give a clearer picture, the ratio of foreign assets to GDP ranges from 25% in Poland to 68% in the Czech Republic, while this same ratio is over 100% in some euro-area countries<sup>71</sup>. The key reasons behind this trend have been the lower rate of savings in the CECs as well as the recent liberalization of the capital markets as mentioned above but for some of the nations in question have some lingering restrictions on pension fund holdings of foreign assets.

Both the capital inflows into and outflows from the CECs are indicative of a rising level of integration with the financial markets of the euro area but even accounting for the remaining restrictions, researchers believe that once the euro is adopted by these accessing nations, then further rapid changes in this institution may be expected.

### Criteria Analysis III: Trade Integration with the EU Area

As discussed in the first part of the essay, while there are many benefits to the adoption of the euro (or any other common currency), the biggest benefit that would arise would be from the higher trade integration with the euro area and the subsequent foreign investment that the common currency might foster. As well, empirical studies have shown that these trade benefits would then overflow into positive income effects for the CECs or other adopting nations.

When a nation decides to join a currency union and in effect surrenders its ability to conduct an independent monetary policy, then one of the biggest incentives to joining the union are the gains from trade that will realized by the smaller nations. For our analysis, the openness of trade (described as the average ratio of exports plus

<sup>68</sup> Habil, M., "The Case for Euroisation in Central and Eastern European Countries", London, 2000, p 17 online available: <http://www.met-network.org.uk/papers/mhabib.pdf>

<sup>69</sup> Schadler, S., et al, p 44

<sup>70</sup> Schadler, S., et al, p 40

<sup>71</sup> Schadler, S., et al, p 20

imports to GDP) of the CECs and the core area is an important measure of the level of integration these nations have achieved with their counterparts and following that, it is also a measure of the ease with which these may access into the union.

The higher the degree of trade openness between the nations, then the more changes in the international prices of tradables is transmitted to domestic prices and the cost of living. This transmission makes the nominal exchange rate tool much less effective for the authorities, and can get to the point where loss of this tool (as is inherent upon accession) is slight. Closer trade integration has also been regarded as a factor leading to more synchronous business cycles between the partner entities and this also works in reducing the need for independent domestic stabilization policies. Following from the assumption that upon accession, nominal exchange rate adjustment tool is lost, then we can safely state that if the CECs achieved a high level of trade integration with the euro area nations, then when they would eventually lose their independent monetary policy tool upon accession, the cost of the loss will not be as great.

The study conducted by Angeloni et al (2005) spanned the sample period 1995-2004 and it reviewed the new member states (NMS) but as pertains to our analysis, we can pick out the five nations that constitute our sample and examine their trade features in detail. As we see from table 4 above, there is a clear upward trend which demonstrates the high and rising level of trade openness between the CECs. For comparison, the table also shows the change in trade openness within the euro area. For each of our sample countries, the ratio of their imports and exports to their GDP has on average been 12.2% higher in 2004 than the initial ratio in 1995. Also, for the ten year period as a whole, the average degree of openness of the CECs rose from 0.358 to 0.48 whereas this change for the sample period was only 7% (0.35 less 0.27) for the euro area members. This then goes on to show that on the whole our accessing nations have made a conscious effort to closely align their economies with those of the core euro area.

If we were to look at the level of openness on a case-by-case basis amongst our CECs, then we realize that the highest level of trade openness was achieved by the Czech Republic. The change for this nation for the ten-year sample period was 20% (ending less beginning: 0.56 less 0.36). Close at its heels was Slovakia, indicating an openness in the ten years of 15% and Poland was the second runner-up with a 11% increase in openness.

Bi-lateral trade relations are another measure to see how dependent and integrated the CECs are amongst each other but more importantly their trade relations with the core euro area. From the table below, we can see that again between the sample period 1995-2004, the level of trade that was generated between the NMS (which include our CECs) has remained fairly constant, to the point that the percentage ratio of bilateral trade to total exports between the NMS was 14% in 1995 and it ended at the same 14% in 2004. On the other hand, the bilateral trade ties between the NMS and the euro area started out at 40% in 1995 but since then, the level has risen to 55% (in 2004) and the deviations/volatility have actually dropped from 15% to 10%, respectively.

**Table 5: Export Diversification, 1995-2004 (percent ratio of bilateral export to total export)**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
NMS towards NMS										
mean	0.14	0.16	0.14	0.14	0.13	0.13	0.13	0.13	0.13	0.14
standard deviation	0.14	0.12	0.11	0.09	0.08	0.08	0.08	0.07	0.06	0.06
NMS towards euro area										
mean	0.40	0.49	0.53	0.57	0.61	0.60	0.59	0.57	0.58	0.55
standard deviation	0.15	0.11	0.13	0.12	0.11	0.12	0.11	0.11	0.11	0.10
Total										
(NMS towards NMS and euro area)										
mean	0.54	0.65	0.67	0.71	0.74	0.72	0.72	0.70	0.71	0.70
Euro area towards euro area										
mean	0.52	0.51	0.45	0.46	0.51	0.51	0.50	0.49	0.51	0.50
NMS towards USA										
mean	0.02	0.02	0.02	0.03	0.04	0.04	0.03	0.03	0.03	0.04
Euro area towards USA										
mean	0.06	0.06	0.06	0.07	0.07	0.08	0.08	0.08	0.07	0.07

Source: DOT (International Monetary Fund).

Source: Angeloni, I., et. al., *Economic and Monetary Integration of the New Member States: Helping to Chart the Route*, European Central Bank Occasional Paper 36, Washington, 2005, p 20

Integration in the level of trade and trade relations is a measure of the degree of real convergence between the nation(s) and the euro area. In the case of the CECs, all five at this time have strong trading ties with the euro area. There is openness to trade with their share of intra-industry trade tending to be relatively high. This then translates into substantial gains from joining the euro area. In the other study conducted by Schadler et al, they postulate the trade gains to be anywhere between 6 and 60% over 20 years for the CECs, with the exception of Poland due to its smaller ratio of total trade to GDP than in other CECs.<sup>72</sup>

**Table 6: CECs Potential Long-Run Increase in Trade and Per Capita Output Following Euro Adoption<sup>1</sup> (in percent)**

	Trade <sup>2</sup>		GDP <sup>3</sup>	
	High estimate <sup>2</sup>	Low estimate <sup>2</sup>	Trade <sup>4</sup>	GDP <sup>3</sup>
Czech Republic	60	20	7	2
Hungary	55	18	6	2
Poland	25	8	3	1
Slovak Republic	59	20	7	2
Slovenia	53	18	6	2

Sources: Frankel and Rose (2002); Rose (2002); IMF, *World Economic Outlook*; IMF, *Direction of Trade Statistics*; and IMF staff calculations.

<sup>1</sup> Based on 2002 trade and GDP data.

<sup>2</sup> Percent change in ratio of total trade to GDP Assumes currency union increases trade (the sum of exports and imports) with current euro-area members and the other accession countries by 85 percent over 20 years. Based on Rose's fixed-effect meta estimates (Rose, 2002). Assumes trade with other countries rises in line with GDP.

<sup>3</sup> Assumes a 1 percent increase in total trade/GDP increases real GDP per capita by 0.33 percent. Estimate drawn from Frankel and Rose (2002).

<sup>4</sup> Assumes currency union increases trade with current euro-area members and the other accession countries by 10 percent. Estimate drawn from analysis of average five-year gain from EMU experience.

Source: Schadler, S., et al., *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, International Monetary Fund Occasional Paper 234, Washington, 2005, p 15

<sup>72</sup> Schadler, S., et al, *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, IMF Occasional Paper 234, Washington, 2005, p 15

So, to conclude this section of the analysis, we can see that the studies on evidence of trade openness and the direction of exports are showing a trend whereby the NMS (with CECs forming part of them) are in the process of considerably increasing their share of trade and hence degree of real convergence with the euro area. This higher level of integration will go a long way to synchronize the business cycles of between the CECs and the euro area which can only be considered good news due to the CECs losing their key policy tool upon accession.

#### *Accession into the European Union for the CECs:*

Accession to the EU and the European monetary union is not a unilateral process in the traditional sense. Unilateral adoption would imply that if a country wanted to adopt the euro, then it could do so without the explicit permission of the EU authorities. This is clearly not the case because the key assumption behind euro adoption is the attainment of greater stability for all the member states. To attain this goal, the authorities have maintained that the eventual adoption of the euro would be the result of "structured convergence process within a multilateral framework."<sup>73</sup>

To this end, the EU authorities envisaged three distinct stages for complete integration of the nations contemplating joining the union. The *first*, pre-accession, stage covers the period up to the EU accession and this is when there are no restrictions on the choice of an exchange rate regime for the nominee nations. The *second phase* (*actual accession*) is the period from EU accession up to the expected entry into the European Exchange Rate Mechanism (ERM II) and which for the duration of our analysis we refer to as the pre-ERM II stage. Before going further, we need to establish a definition of the ERM II. The ERM II is a "system of bilateral exchange rate banks with the euro, whose main elements are the central parity (to which markets tend to attribute a high signalling value as to future conversion rates) and a wide band size ( $\pm 15\%$ ), combined with a unilateral intervention requirement at the margin."<sup>74</sup> The CECs that form our sample are currently in this stage of the accession process. During this period, these nations are required to maintain an exchange rate policy that will be based on the 'big picture', that is, they agree to immediately start looking beyond their national interests and take into account the implications of their policies for the rest of the EU member states. The choice of the exchange rate regime during this stage becomes vital because the policy must be maintained (in effect, pegged) and the stipulations do not allow for individual nations to devalue their currencies to maintain competitiveness in the economy. The *final phase* of accession to the euro covers the period from entry into the ERM II to the final adoption of the euro. During this time, the exchange rates within the nations are required to abide by the rules and regulations of the ERM II. Finally, once the accessing nations satisfy the complete Maastricht criteria requirements (which includes maintaining a stable exchange rate for two years), then the nations are considered ready for the final adoption of the euro and granted permission to join the union.

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<sup>73</sup> Habib, M., "The Case for Euroisation in Central and Eastern European Countries", London, 2000, p 22 online available: <http://www.met-network.org.uk/papers/mhabib.pdf>

<sup>74</sup> Angeloni, I., et al, *Economic and Monetary Integration of the New Member States: Helping to Chart the Route*, ECB Occasional Paper 36, Washington, 2005, p 29

Seeing as the CECs are currently in the second stage of accession, then that will be the focus of this section of the paper. We will start off by discussing the exchange rate regimes that are currently in place within the CECs (the interim exchange rate regimes are shown in the table below) and then deviate into a discussion of what the entry into the ERM II will entail for the nations. We will conclude this section by briefly discussing the vulnerabilities that can arise during the period from entry into the ERM II and the final euro adoption by the sample countries.

Table 7: Exchange Rate Regimes, Plans for ERM II Entry and Euro Adoption

	Exchange rate regime (as of May 2005)	Entry into ERM II	Planned adoption of Euro
Czech Republic	Managed float to Euro	Not announced	2010
Estonia	ERM II member (as of June 2004)	June 2004	2007
Cyprus	ERM II member (as of May 2005)	May 2005	1)
Latvia	ERM II member (as of May 2005)	May 2005	2008
Lithuania	ERM II member (as of June 2004)	June 2004	2007
Hungary	Peg to euro with band $\pm 1.5\%$	Not announced	2010
Malta	ERM II member (as of May 2005)	May 2005	1)
Poland	Free Float	Not announced	2008-2009
Slovenia	ERM II member (as of June 2004)	June 2004	2007
Slovakia	Managed float	2006	2009

Source: ECB.  
 1) As soon as possible after ERM II Membership.  
 2) As soon as economic convergence permits.

Source: Angeloni, I., et. al., *Economic and Monetary Integration of the New Member States: Helping to Chart the Route*, European Central Bank Occasional Paper 36, Washington, 2005, p 29

#### Interim Exchange Rate Regimes within the CECs:

The strategies adopted by the five CECs in the management of their rates to prepare for the EU membership have varied quite significantly based on each nation's particular needs and policy goals. Some followed de facto an inflation targeting regimes where they floated their exchange rates (to achieve a level of inflation convergence with the euro area) while others fixed or at least semi-fixed their regimes. At the same time, the strategies of these nations have been subject to a set of rules which were to prepare them for ERM II participation whereby they will be required to adhere to even more stringent policies. These rules would include an obligation on the CECs' part to not only cooperate, but also to consult on many policy matters.

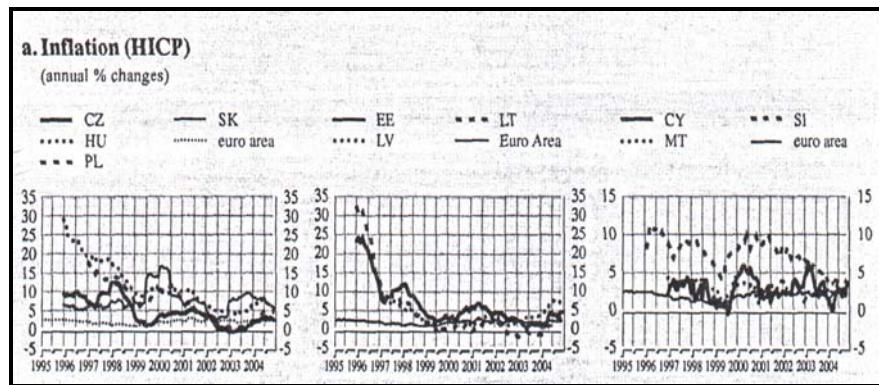
To analyze if the exchange rate regimes that the accessing nations subscribed to were successful in accomplishing what they had set out to do, which is to reach a level of real and nominal convergence that would allow for a gentle phasing into the ERM II, we first look at the movements of the nominal and real exchange rates (key is understanding that the domestic rate of inflation is an key influential variable).

If we can gain insight into the level of nominal convergence (using inflation as our main indicator), then that allows us to derive the trend for real convergence. This is because if we presume that the real rates follow a long-run path *ceteris paribus*, then if the domestic inflation rate fluctuates and if it is higher than say the euro area average, then that would result in appreciation of the real bilateral exchange rate between the partner nations. Alternatively, the rate would remain stable or depreciate if the domestic inflation level would remain stable or if it were to drop vis-à-vis the bilateral counterpart (in our case, the euro area average). For our analysis, we refer to the study conducted by Angeloni et al (2005) where they have attempted to look to track the rates of inflation of the NMS and used those to gauge the degree of nominal convergence with the euro area<sup>75</sup> over the period from 1995 to 2005. Looking at the

<sup>75</sup> Angeloni, I., et al, *Economic and Monetary Integration of the New Member States: Helping to Chart the Route*, ECB Occasional Paper 36, Washington, 2005, p 11

graph below, we can see that most of the nations have come a long way in the management of their inflation rates. The trend clearly shows the efforts on the part of the authorities to align their economies with those of the euro area and which in itself is important because recall that comparable levels of inflation is one of the vital conditions for successful accession into a currency union.

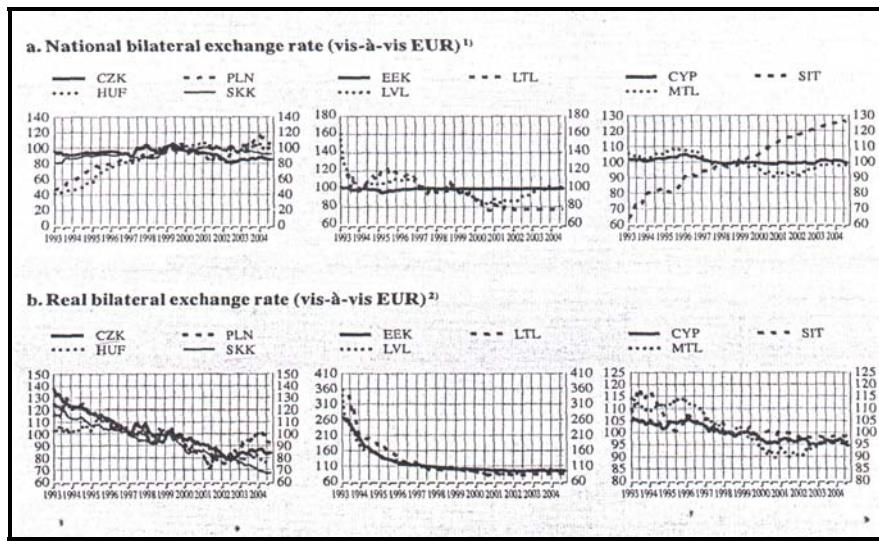
**Figure 3: Selected Indicators of Nominal Convergence, 1995-2004**



Source: Angeloni, I., et. al., *Economic and Monetary Integration of the New Member States: Helping to Chart the Route*, European Central Bank Occasional Paper 36, Washington, 2005, p 8

In terms of the exchange rate regimes prevalent in the five countries under review, they span the continuum from free float (in Poland) to managed float (in Czech Republic and Slovakia) and pegging to the euro (with  $\pm 15\%$  band) in the case of Hungary. Finally, Slovenia has been granted admittance into the ERM II since 2004. For us to be able to analyze which regime was 'most' effective in the achievement of the policy goal of maintaining a steady exchange rate vis-à-vis the euro, and having gained insight into the inflation levels in the CECs, we now look at two other graphs (again from the Angeloni et al study) which illustrate the nominal and real bilateral exchange rates in these nations over the sample period with reference to the euro.

Figure 4: Selected Exchange Rate Indicators, 1993/1995-2004



Source: Angeloni, I., et. al., *Economic and Monetary Integration of the New Member States: Helping to Chart the Route*, European Central Bank Occasional Paper 36, Washington, 2005, p 10

Of our sample countries, we first take the example of the two managed floaters. Looking at the graph for inflation for the Czech Republic and Slovakia, we notice that the inflation rates in their economies were higher than the average prevailing rates in the euro area. Now, taking our real exchange rate equation,  $\rho_A = \eta_A \cdot (p^d / p^f)$ , if the domestic price level is higher than levels in the partner nation (euro area in our case), then *ceteris paribus* that causes is an appreciation in the real bilateral exchange rate. This then is demonstrated for Czech Republic and Slovakia in the graph on the real bilateral rates where these nations experience appreciation in their real bilateral rates on account of their inflation levels being higher than those in the euro area.

Taking the example of the free floater in our sample, Poland, then that nation started out with inflation levels in the double digit at the beginning of the sample period. In the period from mid-2002 to mid-2003, the levels dipped lower than the euro average but around 2004, there is again a rise in the inflation level vis-à-vis euro average. This trend is reflected quite clearly in the graph for real bilateral exchange rate where during the time that its inflation was higher than euro average, there is gradual depreciation in the nominal bilateral exchange rate (vis-à-vis the euro) but in terms of the real bilateral rates, the currency has shown a steady appreciation but around the time that its inflation started to rise again (between 2003 and 2004), a trend towards depreciation is detected.

All in all, this brief précis goes on to show that even though each respective nation subscribed to an interim currency regime that best suited its needs, the results are almost uniform in that the authorities of all nations actively managed to achieve levels of convergence both nominal (as gauged by the inflation level) and real with the euro area. At the same time, this study also illustrates that the CECs are still in different stages of policy convergence. Economists have noted that in some cases, the speed of convergence may be affected if the nation allowed for a freer movement of the

nominal exchange rates. This would be the result if the prices in the economy were sticky but the exchange rates adjusted flexibly.<sup>76</sup> Alternatively, and as we saw in the case of Poland, there may be other economic factors at play, such as the level of capital liberalization and openness of trade, all of which could lead to higher market pressure on the adjustment of the exchange rates.

Vulnerabilities during Euro Adoption in the CECs:

We have briefly reviewed the stance of our CECs in terms of their level of convergence with the euro member states. As well, we have glanced over the exchange rate regimes that are prevalent in these nations at current time so that the next logical step becomes to examine the vulnerabilities that will arise in the system when they gain admittance into the ERM II.

Recall from previous discussion that according to the propositions concerning the endogenous nature of some of the OCA criteria, then this creates a very uncertain situation for the authorities in that they are not in a position to say ahead of time as to how a nation will be affected by the final accession into the union. This means that the scope of vulnerabilities that can assail a nation start from the very beginning where much contemplation must go into getting the parity right for ERM II entry and the rate for euro conversion. As well, upon accession, the entities would most certainly encounter volatility in their capital account which can be destabilizing if measures are not in place to keep these under check.

To maintain the flow of our paper, we review the risks that go together with the factors that were reviewed under our criteria analysis. The first key vulnerability we review here then is the level of risk that can arise from the asymmetric shocks that are likely to assail the nations upon accession.

Asymmetric shocks in the period right before and during ERM II accession are likely to be the greatest threat to the macroeconomic stability of our sample nations upon which the respective authorities will not have any direct control. Up to the ERM II entry, the nations will still have other policy tools at their disposal which they have used to combat these and similar shocks, as was seen when the Russian crisis hit in 1998. At the time of this crisis, “[m]ost CECs, in the face of substantial potential effects on market confidence, raised interest rates, used scope within their flexible exchange rate frameworks to allow their currencies to depreciate [and] permitted the operation of fiscal stabilizers.”<sup>77</sup> As a result of such action on the part of the authorities, none of the nations experienced a speculative attack (which is one of the most destabilizing consequences of asymmetric shocks).

Corrective action post-accession into the ERM II will depend on the nature of the shocks, the consistency of the policy response of the authorities, and more so than anything else, the clarity of their communication to the markets as to how they plan to make their monetary policy decisions. As Schadler et al state, “in the face of a significant shock with effects on capital account flows, credible mechanisms for

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<sup>76</sup> Angeloni, I., et al, *Economic and Monetary Integration of the New Member States: Helping to Chart the Route*, ECB Occasional Paper 36, Washington, 2005, p 32

<sup>77</sup> Schadler, S., et al, *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, IMF Occasional Paper 234, Washington, 2005, p 52

allowing either exchange rates or interest rates to adjust are essential...[M]ost shocks can be addressed within any clearly defined monetary framework that leaves little doubt in the market about the credibility of the authorities' response [but] ERM2 could weaken this credibility if it were perceived as limiting the scope for exchange rate changes beyond the ability of other macroeconomic policies to support..."<sup>78</sup>

A second area where the authorities of the CECs would need to keep a closer watch would be the level of capital inflows into the economy as well as the volatility of this account. Recall that we stated that about 75% of the total inflows into our CECs were the result of FDI. Current projections see these inflows continuing at similar levels while some researchers have even suggested that during the ERM II process, factors will come into play which will probably cause an increase in the levels of inflows (and therefore in the volatility of the flows).

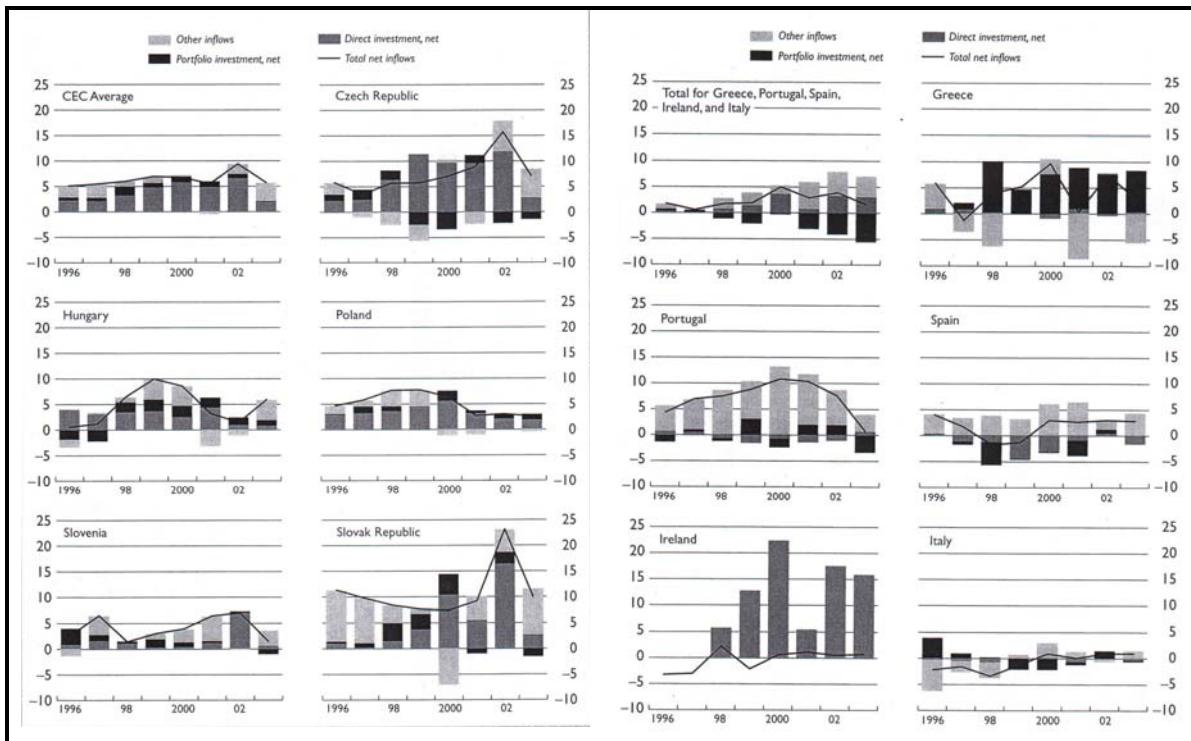
As past experience has shown, factors such as more favourable macroeconomic conditions in accessing nations generated a higher level of capital inflows. This will probably be the case for our CECs as well in that as they gain entry into the ERM II, the "prospects for euro adoption will foster higher growth; structural reforms [should] improve confidence and reduce risk premia..."<sup>79</sup> Studies conducted have indicated that already the CECs have net inflows relative to GDP which sometimes exceed that of other noncore euro area prior to their adoption of the euro.

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<sup>78</sup> Schadler, S., et al, *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, IMF Occasional Paper 234, Washington, 2005, p 53

<sup>79</sup> Schadler, S., et al, p 48

**Figure 5: CECs and Selected Noncore Euro-Area Countries: Capital Flows (in percent of GDP)**



Source: Schadler, S., et al., *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, International Monetary Fund Occasional Paper 234, Washington, 2005, p 49-50

Corresponding to the higher level of inflows, there has also been a level of volatility which is higher than the euro area average in the CECs. Excessive volatility of a sizeable sector such as this can be harmful to the macroeconomic stability of our nations in that they are generally much smaller in (economic) size than the other member states and hence the effects of shocks are more magnified for them. While factors such as a larger share of FDI and smaller derivative markets will continue to protect the accessing nations against excessive volatility, Schadler et al maintain that a certain level of risk remains. As per the results of their simulations, the standard deviations of annual net inflows "ranged from 59% of the average euro-area level in Poland to 84% in Slovenia."<sup>80</sup>

Academics postulate that this level of volatility will probably rise immediately before and upon accession into the ERM II because until now the nations have had flexibility in their exchange rates, which have helped cushion the economy against too much volatility. To give an idea of the cushioning effect of the exchange rates, for some noncore nations (Greece, Italy, Portugal and Spain) in the ten year period right up to their accession, they indicated standard deviations of over 100% of the average level of inflows while the CECs at current time (again, for the last decade) have shown volatility at 70% of the average.

<sup>80</sup> Schadler, S., et al, *Adopting the Euro in Central Europe: Challenges of the Next Step in European Integration*, IMF Occasional Paper 234, Washington, 2005, p 40

### **Case Study Conclusion:**

While it has already been established that the accessing nations have conducted a preliminary cost/benefit analysis and evidently the benefits outweighed the costs as they have signalled their intention to join the currency union, then for this section of the paper we conducted a quick run through of some of the OCA criteria as they applied to the CEC countries, the interim exchange rate regimes that are prevalent in the same and finally a selective review of the risks that await these nations upon final accession.

The five nations we reviewed are currently still operating independent monetary policies and are all at different levels of real and nominal convergence with the euro area. With regards to a decision about the timing of euro adoption then for the authorities that entails reaching a view on the long-term benefits and costs that will be realized upon adoption of the euro. While the outcome of the assessment does not change the ultimate objective that the countries adopt the euro, it helps give the authorities an idea of the type of approach that they must take towards the final adoption. If the assessment indicates that net benefits from adoption outweigh the costs, then researchers suggest a more expedited approach. If, on the other hand, there is a balanced assessment, then a gradual approach is recommended, more so if taking thing slower will allow for greater degree of real convergence (relating to income and structural convergence) with the euro area nations and which can lower overall costs and lead to higher benefits.

Of our five sample CECs, all countries have shown a high level of convergence with the current euro area members, be it with regards to the labour and wage flexibility or the level of trade integration and openness or any of the other OCA criteria. If we had to suggest a approach that our nations take, then, for various reasons, it appears that the larger of our sample nations, namely Czech Republic, Hungary and Poland, are more closely converged with the EU area. This then makes them ready to make a quicker accession to the euro than Slovakia or Slovenia.

Further, looking into the results of simulations and studies conducted to analyze the prospects of the CECs joining the euro area has shown that these nations have much to gain in terms of a clearer framework for policy discipline, more enhanced credibility of monetary policy in the interim or until euroization and lower inflation expectations. As well, joining the currency union would generate a significant amount of trade for these nations over the long term, benefits of which have been postulated to overspill into transfer of technology via FDI, lower transaction costs and lower emerging market financial risk. As well, the benefits from the currency union would indirectly feed into higher growth, and result in an acceleration of the convergence of the CECs to the area income levels.

While the benefits reaped will be many, joining a currency/economic union would entail quite a few significant cost, greatest of which would be the loss of their independent monetary policy as their national stabilization tool and for which we discussed in prior sections what measures may be taken to prepare for the eventual loss of this policy tool.

To close this discussion, while all the accessing nations will in effect choose to euroize their economies when they finally join the currency union, this system can only succeed the way it is intended to when the accessing nations at the time of their convergence and thereafter implement correct policies and regulations as well as a clear platform to announce to the market participants

## APPENDIX A: Alternative Exchange Rate Regimes

Source: Edwards, S., et al., *Exchange Rates in Emerging Economies: What do we know? What do we Need to Know?*, NBER Working Paper 7228, Cambridge, 1999, p 6-7

**Table 1. Alternative Exchange Rate Regimes**

Regime	Main Features	Main Benefits	Main Shortcomings	Key episodes /Comments
<b>1. Free Float</b>	-Value of foreign exchange freely determined in the market. Actual and expected changes in demand/supply of assets and goods reflected in exchange rate changes.	-Changes in nominal exchange rate shoulder bulk of adjustment to foreign and domestic shocks. -High international reserves not required.	-High nominal (and real) exchange rate volatility may distort resource allocation. -Monetary policy needs to be framed in terms of nominal anchors different from the exchange rate; scope for discretion and inflation bias may be large.	-Virtually no country has a pure float. The United States, Germany, Switzerland (and Japan, according to some) come close.
<b>2. "Dirty" Float</b>	-Sporadic central bank interventions in foreign exchange market. Modes and frequency of intervention vary, as do the objectives guiding the intervention. -Active intervention (sterilized and non-sterilized) results in changes in international reserves. Indirect intervention (through changes in interest rates, liquidity and other financial instruments) does not result in changes in reserves.	-Same as in a free float, except that higher international reserves may be needed. - Dampens "excessive" fluctuations of exchange rates.	-Lack of transparency of central bank behavior may introduce too much uncertainty. -Effects of intervention are typically short-lived (even when intended as a signal) and may be destabilizing.	-Many advanced economies have adopted this regime—Canada, Australia (Japan, according to others). -Mexico adopted a system similar to this following the 1994-95 crisis. -A dirty float could be thought of as a managed float with wide bands, with the (undisclosed) position of the bands providing the criterion for intervention.
<b>3. Floating within a Band (Target zone)</b>	-The nominal exchange rate is allowed to fluctuate (somewhat freely) within a band. The center of the band is a <i>fixed rate</i> , either in terms of one currency or of a basket of currencies. The width of the band varies (in the ERM it was originally ± 2.25 percent). - Some band systems are the result of cooperative arrangements, others are unilateral.	-System combines the benefits of some flexibility with some credibility. -Key parameters (bands, mid-point) help guide the public's expectations. - Changes in the nominal rate within the bands help absorb shocks to fundamentals.	-In some cases (especially when the band is too narrow and when domestic macro policies are not consistent with a "horizontal" band) the system can be destabilizing and prone to speculative attacks. -Selecting the width of the band is not trivial. -Systems that allow for the possibility of realignment of the bands and central parity weaken the credibility afforded by the regime.	-The Exchange Rate Mechanism of the European Monetary System is the best known example of this type of regime. - The ERM crises of 1992-93 showed clearly that the system can be subjected to severe speculative pressures, and even collapse, when currencies become misaligned and central banks are hesitant to defend the bands.
<b>4. Sliding Band</b>	-There is no commitment by the authorities to maintain the central parity "indefinitely". Instead, it is clear at the outset that the central parity will be adjusted periodically (e.g., due to competitiveness considerations). -The system is an adaptation of the band regime to the case of high-inflation economies.	-The system allows countries with an ongoing rate of inflation higher than world inflation to adopt a band without having to experience a severe real appreciation.	-The fact that the timing and size of central parity adjustments are unknown, introduces considerable uncertainty, which often leads to high interest rate volatility. -As in the case of the standard band system, it is difficult to choose the appropriate width for the band.	-Israel had a system similar to this from early 1989 to December 1991. -The uncertainty and volatility associated with this system makes it less attractive than other alternatives, such as the crawling band.
<b>5. Crawling Band</b>	-A band system whereby the central parity crawls over time. -Different rules can be used to determine the rate of crawl. The two most common are: backward-looking crawl (e.g., based on past inflation differentials), and forward-looking crawl (e.g., based on the expected, or target, rate of inflation).	-System allows high inflation countries to adopt a band system without having to undertake (large) stepwise adjustments of the central parity.	-Choosing the criteria for setting the rate of crawl entails serious risks. A backward-looking approach can introduce considerable inflationary inertia into the system. A forward-looking approach that sets the "wrong" inflation target can produce overvaluation and give rise to speculative pressures.	-Israel adopted this system in December 1991. Chile had a widening band system from 1986 to mid-1998. Italy also had, effectively, a system of this type between 1979 and 1991.

**Table 1 (Concluded). Alternative Exchange Rate Regimes**

Regime	Main Features	Main Benefits	Main Shortcomings	Key Episodes/Comments
<b>6. Crawling peg</b>	<ul style="list-style-type: none"> <li>-The nominal exchange rate is adjusted periodically according to a set of indicators (usually lagged inflation differentials) and is not allowed to fluctuate beyond a narrow range (say, two percent).</li> <li>-One variant of the system consists of adjusting the nominal rate by a pre-announced rate set deliberately below ongoing inflation (variant known as a "tablita" regime).</li> </ul>	<ul style="list-style-type: none"> <li>-Allows high-inflation countries to avoid severe real exchange rate overvaluation.</li> <li>-The "tablita" variant helps to guide the public's expectations, and buys a limited amount of credibility.</li> </ul>	<ul style="list-style-type: none"> <li>-A pure backward-looking crawling peg (where the nominal rate is mechanically adjusted according to past inflation differentials) introduces inflationary inertia and may eventually cause monetary policy to lose its role as nominal anchor.</li> <li>-Equilibrium changes in the real exchange rate are difficult to accommodate.</li> <li>-A "tablita" system will not last if fiscal and incomes policies are not supportive.</li> </ul>	<p>-This system became popular in the 1960s and 1970s in Chile, Colombia and Brazil. It had its longer run in Colombia, which to this date has a high degree of inflationary inertia.</p>
<b>7. Fixed-but-adjustable exchange rate</b>	<ul style="list-style-type: none"> <li>-The regime epitomized by the Bretton Woods system. The nominal exchange rate is fixed, but the central bank is not obliged to maintain the parity indefinitely. No tight constraints are imposed on the monetary and fiscal authorities, who can follow, if they so decide, policies that are inconsistent with preserving the parity.</li> <li>-Adjustments of the parity (devaluations) are a powerful policy instrument.</li> </ul>	<ul style="list-style-type: none"> <li>-Provides macroeconomic discipline by maintaining (tradable good prices) in line with foreign prices in a context of relatively low uncertainty</li> <li>-The built-in "escape clause" (which allows the authorities to devalue in case of need) provides the system with some flexibility.</li> </ul>	<ul style="list-style-type: none"> <li>-Realignments (devaluations) under this system have typically been large and disruptive (introducing uncertainty and inflationary pressures) rather than smooth and orderly events.</li> <li>-If supplemented by the right institutions (e.g., an independent central bank) the time inconsistency problems embedded in the system could be attenuated.</li> </ul>	<p>-The most popular regime of this century. Most developing countries held on to (variants of) it after the formal collapse of the Bretton Woods agreement in 1973.</p> <p>-Many emerging countries continue to subscribe to this system <i>de facto</i> (e.g., Mexico 1993-93, Thailand, 1997), if not <i>de jure</i>.</p>
<b>8. Currency board</b>	<ul style="list-style-type: none"> <li>-Strict fixed exchange rate system, with institutional (legal, and even constitutional) constraints on monetary policy and no scope for altering the parity.</li> <li>-The monetary authority only can issue domestic money when it is fully backed by inflows of foreign exchange.</li> </ul>	<ul style="list-style-type: none"> <li>-The system maximizes credibility and reduces (eliminates) problems of "time inconsistency".</li> </ul>	<ul style="list-style-type: none"> <li>-The system is long on credibility but short on flexibility. Large external shocks cannot be accommodated through exchange rate changes but have to be fully absorbed by changes in unemployment and economic activity.</li> <li>-The central bank loses its role as lender of last resort.</li> </ul>	<p>-Historically, a number of small countries have had systems of this type. Some of them, however, have not been successful. When faced with major external shocks, countries have been forced to abandon the regime.</p> <p>-Currently, Hong Kong and Estonia have currency boards. Argentina and Bulgaria have (quasi)-currency boards arrangements.</p>
<b>9. Full 'dollarization'</b>	<ul style="list-style-type: none"> <li>-Generic name given to an extreme form of a currency board system where the country gives up completely its monetary autonomy by adopting another country's currency.</li> </ul>	<ul style="list-style-type: none"> <li>-Credibility is maximized under this regime. Monetary authorities have, in theory, no scope for "surprising" the public.</li> </ul>	<ul style="list-style-type: none"> <li>-As in the currency board, the system is long on credibility but short on flexibility. Adverse external shocks have to be absorbed fully by the real economy.</li> <li>-The central bank loses its role as lender of last resort.</li> <li>-A non trivial shortcoming of this system is that it is usually resisted on political and nationalistic grounds. Another one, is that the rules of the game can be changed under extreme circumstances.</li> </ul>	<p>There are few historical episodes of full dollarization. A regime similar to this has worked relatively well in Panama. However, the case of Liberia unmasked a serious shortcoming of this type of system: when faced with an emergency (civil war) politicians decided to change the rules of the game and issued a national currency.</p>

**Appendix B: De Facto Exchange Rate Arrangements and Anchors of Monetary Policy as of June 30, 2004**

Source: IMF Staff Report

Exchange Rate Regime (Number of countries)	Monetary Policy Framework						
	Exchange rate anchor			Monetary aggregate target	Inflation targeting framework	IMF-supported or other monetary program	Other
Another currency as legal tender (9)	ECCU (6) <sup>2</sup>	CFA franc zone (14)	WAEMU	CAEMC			Euro area (12) <sup>3</sup> Austria Belgium Finland France Germany Greece Ireland Italy Luxembourg Netherlands Portugal Spain
Ecuador El Salvador <sup>4</sup> Kiribati Marshall Islands Micronesia, Fed. States of Palau Panama San Marino Timor-Leste, Dem. Rep. of	Antigua and Barbuda Dominica* Grenada St. Kitts and Nevis St. Lucia St. Vincent and the Grenadines	Benin Burkina Faso* Côte d'Ivoire* Guinea-Bissau Mali* Niger Senegal* Togo	Cameroon* Central African Rep. Chad Congo, Rep. of Equatorial Guinea Gabon*				
Currency board arrangements (7)	Bosnia and Herzegovina Brunei Darussalam Bulgaria China-Hong Kong SAR Djibouti Estonia <sup>9</sup> Lithuania <sup>9</sup>						
Other conventional	Against a single currency (34)	Against a composite (8)	China, P.R. off <sup>6</sup>				

<b>fixed peg arrangements (42)</b>	Aruba Bahamas, The <sup>5</sup> Bahrain, Kingdom of Barbados Belize Bhutan Cape Verde* China, P.R. off <sup>6</sup> Comoros <sup>7</sup> Eritrea Guinea <sup>6</sup> Iraq <sup>6</sup> Jordan* <sup>6</sup> Kuwait Lebanon <sup>6</sup> Lesotho* Macedonia, FYR* <sup>6</sup> Malaysia Maldives Namibia Nepal* Netherlands Antilles Oman Qatar Saudi Arabia Seychelles <sup>6</sup> Suriname <sup>5,6</sup> Swaziland Syrian Arab Rep. <sup>5</sup> Turkmenistan <sup>6</sup> Ukraine* <sup>6</sup> United Arab Emirates Venezuela, Rep. Bolivariana de Zimbabwe <sup>6</sup>	Botswana <sup>5</sup> Fiji Latvia Libyan Arab Jamahiriya Malta Morocco Samoa Vanuatu			
<b>Pegged exchange rates within horizontal bands (5) <sup>8</sup></b>	<b>Within a cooperative arrangement (2)</b> Denmark <sup>9</sup> Slovenia <sup>9</sup>	<b>Other band arrangements (3)</b> Cyprus Hungary† Tonga	Hungary†		
<b>Crawling pegs (6)</b>	Bolivia* Costa Rica Honduras* <sup>6</sup> Nicaragua* Solomon Islands <sup>6</sup> Tunisia	Tunisia		Honduras* <sup>6</sup>	
<b>Exchange rates within crawling bands (2)<sup>10</sup></b>	Belarus Romania <sup>6</sup>				

Managed floating with no pre-determined path for the exchange rate (48)	Bangladesh* Cambodia <sup>5</sup> Egypt <sup>5</sup> Ghana* <sup>6</sup> Guyana* Indonesia Iran, I.R. of Jamaica <sup>6</sup> Mauritius Moldova Sudan Zambia*	Czech Rep. Peru* <sup>6</sup> Thailand	Argentina* Azerbaijan* Croatia Ethiopia* Georgia* Haiti <sup>3,6</sup> Kenya* Kyrgyz Rep.* Lao PDR* <sup>5</sup> Mongolia* Mozambique <sup>6</sup> Pakistan* Rwanda* Serbia and Montenegro* <sup>1</sup> Tajikistan* Vietnam	Afghanistan, I.S. of Algeria <sup>3</sup> Angola <sup>3</sup> Burundi* <sup>3</sup> Gambia, The* <sup>3,6</sup> India <sup>3</sup> Kazakhstan <sup>3</sup> Mauritania* Myanmar <sup>3,5,6</sup> Nigeria <sup>6</sup> Paraguay* <sup>3</sup> Russia Federation <sup>3</sup> São Tomé and Príncipe Singapore <sup>3</sup> Slovak Rep. <sup>3</sup> Trinidad and Tobago Uzbekistan <sup>3,5</sup>
Independently floating (36)	Malawi* Sierra Leone* <sup>6</sup> Sri Lanka* Uruguay* Yemen, Rep. of	Australia Brazil* Canada Chile <sup>5</sup> Colombia* Guatemala Iceland Israel† <sup>6</sup> Korea Mexico New Zealand Norway Philippines Poland South Africa Sweden Turkey* United Kingdom	Albania* Armenia* Congo, Dem. Rep. of* Madagascar* Tanzania* Uganda*	Dominican Rep.* <sup>3</sup> Japan <sup>3</sup> Liberia <sup>3,6</sup> Papua New Guinea <sup>3</sup> Somalia <sup>5,12</sup> Switzerland <sup>3</sup> United States <sup>3</sup>

## APPENDIX C: The Main Benefits and Costs associated with a Currency Area

Source: Mongelli, Francesco P., "New" Views on the Optimum Currency Area Theory: What is the EMU Telling Us?, ECB Working Paper 138, Washington, 2002, p 33-34

<p><b>Benefits from improvements in microeconomic efficiency</b> result principally from the increased usefulness of money -- i.e., the liquidity services provided by a single currency circulating over a wider area -- as a unit of account, medium of exchange, standard for deferred payments, and store of value. The latter benefit is subject to a "network externality" i.e., the broader the circulation of a currency, the greater this benefit. There will be greater price transparency that will discourage price discrimination, decrease market segmentation, and foster competition. Intra-area nominal exchange rate uncertainty will disappear (and correspondingly intra-area exchange rate risk) leading to savings in transaction and hedging costs. The more concentrated trade is in a currency area, the greater the savings in transaction costs are likely to be (for a qualification see Fratianni and Von Hagen (1990)). This will strengthen the internal market for goods and services, foster trade, lower investment risks, and promote cross-area foreign direct investments (FDI) and enhance resource allocation.</p>	<p><b>Costs from the deterioration in microeconomic efficiency.</b> There are changeover costs from switching to a new currency. These costs include administrative, legal and hardware costs such as re-denominating contracts and adapting vending machines. There is also the psychological costs resulting from a new numéraire. With boundedly rational individuals such costs will fade out very slowly. Furthermore, if a country chooses the wrong nominal exchange rate parity at the onset of a currency area, this country may be too competitive or not competitive at all with respect to the other members. The imbalance in the external accounts will likely persist until the structure of prices and wages, as well as the level of economic activity, adjusts to those prevailing in the other members. With the introduction of a single currency a supranational institution is needed. This will result in increased administrative costs for each member country that could be offset by a fall in size of some national institutions due to a redistribution, and sharing of functions. A neoclassical optimal public finance argument against relinquishing monetary sovereignty is that joining a monetary union prevents a national government from equalising the marginal cost from taxation and inflation (i.e., losing control over the "inflation tax"). But such a scheme may conflict with the price stability objective.</p>
<p><b>Benefits from increased macroeconomic stability (and growth)</b> resulting from: improved overall price stability, the access to broader and more transparent financial markets increasing the availability of external financing; reputational gains for those members with a history of higher inflation that benefit from an anti-inflationary anchor; the reduction of some types of fluctuations of output and employment across the currency area due, possibly, to different economic policies. However, the single currency does not safeguard the members of the currency area from the effects of real economic shocks.</p>	<p><b>Costs from decreased macroeconomic stability.</b> Membership in a currency area narrows the menu of policy instruments directly available to national governments. As the responsibility for setting monetary policy and exchange rates is transferred to a supranational central bank, no country can pursue some real adjustment in the wake of asymmetric disturbances (and if its prices and wages are downward sticky). Furthermore, when a member country exhibits higher nominal price and wage rigidities than the other partner countries in the currency union, the lower inflation rate in the area can increase its frictional unemployment (until its nominal rigidities are reduced by means of structural reforms). This may eventually lead to more pronounced short-term output and employment fluctuations in the "rigid countries." Direct control of part of the foreign exchange reserves and other assets is also transferred to the supranational central bank. National</p>

	<p>governments also forsake the option of "inflating away" their national debt in the future. In addition, common fiscal restraints (as is the case with the Stability and Growth Pact and its Excessive Deficit Procedure) may be superimposed to reduce the ability of national governments to conduct possibly unsustainable national fiscal policies. These restraints may be relatively more binding for countries with relatively higher public debt and/or high budget deficits. In addition, the EMU will lack a supranational risk sharing arrangement that may assist its members in coping with asymmetric economic shocks. National governments also loose the option of "inflating away" their national debt. Any future "gradual default" by means of unanticipated inflation during exceptional times is also precluded.</p>
<p><b>Benefits from positive external effects</b> resulting principally from: savings on transaction costs resulting from a wider international circulation of the single currency, revenues from international seigniorage, the reduced need for foreign exchange reserves; and simplified international co-ordination. We can classify the main costs as follows:</p>	<p><b>Costs from negative external effects.</b> If one, or more, member countries were to run sizeable and protracted budget deficits, accumulating an unsustainable public debt, eventually some pecuniary externalities might ripple through the currency area. For example, the fear could rise that such debt might have to be monetised. This might pose a strain on the interest rate of the currency union. International confidence in the single currency may even plummet. Every member country would suffer in this scenario, particularly those that previously had stable currencies.</p>

## Appendix D: Exchange Rate Regime, Monetary Policy & Capital Controls in the CEEC-5

Source: Habib, Maurizio, *The Case for Euroisation in Central and Eastern European Countries*, University College London, online available: <http://www.met-network.org.uk/papers/mhabib.pdf>, London, 2000, p 18

**Table 1. Exchange rate regime, monetary policy and capital controls in the CEEC-5**

	Bulgaria	Czech Republic	Hungary	Poland	Romania
<b>Exchange rate regime<sup>1</sup></b>	Currency board	Managed float with no pre-announced path for exchange rate	Exchange rate within crawling bands	Managed float with no pre-announced path for exchange rate	Managed float with no pre-announced path for exchange rate
<b>Monetary policy framework<sup>1</sup></b>	Exchange rate anchor (Euro)	Inflation targeting	Exchange rate anchor (Euro)	Inflation targeting	Fund-supported or other monetary program
<b>Capital account liberalisation index<sup>2</sup></b>	As of 31 December 1997	As of 31 December 1997	As of 31 December 1997	As of 31 December 1997	As of 31 December 1997
- Controls on credit operations	37.5	62.5	75.0	75.0	0.0
- Controls on portfolio flows	25.0	70.0	33.3	35.0	0.0
- Overall index of liberalisation	35.3	73.7	59.5	55.3	12.5
<b>Controls on<sup>3</sup></b>	As of 30 April 1999	As of 31 January 1999	As of 31 January 1999	As of 31 January 1999	As of 31 January 1999
- Capital market securities	YES	YES	YES	YES	YES
- Money market instruments	YES	YES	YES	YES	YES
- Collective investment securities	YES	YES	YES	YES	YES
- Derivatives and other instruments	YES	NO	YES	YES	YES
- Commercial credits	YES	NO	NO	YES	YES
- Financial credits	YES	NO	YES	YES	YES
- Guarantees and financial backup facilities	YES	NO	YES	YES	YES
- Direct investments	YES	YES	YES	YES	YES
- Liquidation of direct investments	NO	NO	NO	NO	NO
- Real estate transactions	YES	YES	YES	YES	YES
- Personal capital movements	YES	NO	YES	YES	YES
<b>Controls on credit operations and portfolio flows. Major changes since 1998<sup>4</sup></b>	2000. New Foreign Exchange Law entered into force. All transactions involving residents and non-residents may be conducted freely unless otherwise stipulated in the Law. Prior registration with the BNB remains for a limited number of transactions. Import of national and foreign exchange cash by residents and non-residents liberalised. Law on Public Offering of Securities, granting equal treatment of resident and non-residents, entered into force. Admission of foreign securities to the Bulgarian capital market.	1998. The Securities Commission Act entered into force, removing most restrictions on controls imposed by the previous Securities Law. Prior registration with the BNB remains for a limited number of transactions. Import of national and foreign exchange cash by residents and non-residents liberalised. 1999. Controls on foreign securities operations and in derivatives were eliminated.	1998. Issue of shares and bonds with exchange law maturity of more than one year, denominated in foreign exchange and issued by OECD-based enterprises, was liberalised.	1999. New foreign bonds with exchange law entered into force. The law differentiates between bank and non-bank entities. Banks can conduct some short-term capital transactions freely.	1998. All credit operations became a subject of NBR authorisation, except bank loans. 1999. NBR approved a three-stage liberalisation programme. Loans with maturity over one year by non-residents to residents, guarantees and similar operations by non-residents to residents, were liberalised. There is still a de facto exclusion of foreigners from most issues of T-bills.

<sup>1</sup> As of July 2000, IMF World Economic Outlook 2000.

<sup>2</sup> Temprano-Arroyo and Feldman (1999). The index ranges from 0 to 100, where 100 = full liberalisation.

<sup>3</sup> IMF Annual Report on Exchange Arrangement and Exchange Restrictions 1999.

<sup>4</sup> IMF Annual Report on Exchange Arrangement and Exchange Restrictions 1999 and European Commission 2000 Regular Reports on progress towards accession.

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