A Cost-Benefit Analysis of a Monetary Union for MERCOSUR with Particular Emphasis on the Optimum Currency Area Theory

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Summary

Potential costs and benefits of a monetary union for the four MERCOSUR countries Argentina, Brazil, Paraguay and Uruguay are compared. Particular emphasis was put on the traditional and new approaches to optimum currency area theory which were reviewed and analyzed with respect to their validity for less developed economies. Based on these insights 6 theses have been developed and thereafter were tested empirically, as far as empirical material was available. Evidently MERCOSUR will not start negotiating a treaty on a MERCOSUR monetary union à la Maastricht tomorrow. An adequate institutional framework would still have to be established. Further the member countries showed limited monetary cooperation in the past. Nonetheless, the creation of a single MERCOSUR currency could serve as political lubricant for deepening integration. Such a deepening of the integration process could go hand in hand with sound and coordinated macroeconomic management which in turn could lead to more stability and increased credibility in the region.

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I. Introduction

The Treaty of Asuncion, the founding document of the Common Market of the South (MERCOSUR), was signed in 1991 by the four member states Argentina, Brazil, Paraguay and Uruguay. The transition of the customs union took five years and from the economic point of view was extraordinarily successful in its initial stage. Despite marked skepticism by many economists, MERCOSUR intra-trade doubled within this period. At that time MERCOSUR seemed to be the most successful integration project of several decades. In order to keep the momentum of the integration process on 27 April 1997 the Argentinean and the Brazilian president of state, Carlos Menem and Enrique Cardoso, expressed their intention of establishing a single currency for MERCOSUR by 2012. They

clearly had in mind the European Economic and Monetary Union as a model for MERCOSUR. So far, this description would look like a linear development toward a monetary union of MERCOSUR. However, the crises in Brazil 1999 and in Argentina 2001/02 dampened expectations on a rapid establishment of MERCOSUR monetary union.

Several works have already been published that tackle the question whether MERCOSUR is apt for a common currency by focussing on the traditional approach to optimum currency area theory - sometimes without questioning underlying assumptions too much and occasionally neglecting the findings of the new optimum currency area. Some of these works are Giambiagi [1997], Lavagna and Giambiagi [1998], Licandro Ferrando [1998], Levi Yeyati and Sturzenegger [1999a], Berg *et al*.[2002], Hochreiter *et al*. [2002].[1] Unsurprisingly more often than not it was concluded that MERCOSUR does not form an optimum currency area. This work aims at adding some crucial points to the rather superficial mainstream discussion, which in consequence may lead to fundamentally differing conclusions. These crucial points are a critical and extensive review taking into account the aspects of developing/emerging countries, the consideration of the findings of the *'new'* optimum currency area theory, an updated empirical analysis of MERCOSUR, and a discussion on inflation targeting as a possibly important instrument for the creation of a MERCOSUR monetary union.

Potential benefits and costs of the creation of a single currency of less developed member states will be compared. Optimum currency area theory will be reviewed and, importantly, analyzed for its validity for less developed economies. Based on these insights 6 theses have been developed that thereafter were tested empirically, as far as empirical material was available. Assumedly benefits of a common currency are even more difficult to grasp for developing/emerging economies than for developed economies. Welfare gains by policy coordination can be important, although rather within than outside the monetary union. If dynamic integration gains are analyzed the question has to be permitted whether prior development of the national economies offers more potential for dynamic gains than economic integration itself. On the cost side it is asked whether devaluations are really effective in developing/emerging countries. Are they effective short-term or long-term? Traditional optimum currency area is critically reviewed. Theoretically as well as empirically the traditional optimum currency area theory leaves many questions unanswered. When the *'new'* optimum currency area theory is brought into play it cannot be dismissed that MERCOSUR may become an optimum currency area in the future. Trade integration may lead to convergent business cycles within MERCOSUR. The creation of common political institutions and respective common rules represent a necessary ingredient for a credible future common currency.

II. The Benefits of a Common Currency

Monetary unions are frequently evaluated with emphasis on the cost side of their creation. The early optimum currency area literature concentrates almost exclusively on the analysis of the cost of a monetary union. More recent optimum currency area (OCA) literature revises many of the findings, as far as costs are concerned. The benefits of monetary union to date have received limited attention. Economic theory as well as empirical evidence leave much to be desired in many fields of optimum currency area theory. Further, on the benefit side OCA theory often disregards aspects found in the more general microeconomic theory on money.[2] The objective of this section is to briefly review benefits of the establishment of a common currency. If particularities applying to less industrialized economies are of importance, they will be pointed out, for example, reduced depth of financial markets, a less efficient financial sector of developing/emerging countries in general,

which in turn may result into a relatively larger growth potential, or reduced network and credibility effects.

Welfare Gains by Policy Coordination

As soon as two economies are analyzed that are linked by trade and/or capital flows economic interdependence can be observed. The use of a policy instrument in one country may have welfare implications for the other country. Cases exist where the coordination of policies improve welfare for the participating countries. This relationship can either be of a relatively symmetrical nature (interdependence) or of an asymmetrical nature (dependence). At least two approaches for economic analysis of this problem exist. (1) A two- or more-country model is set up and the management of their policy instruments and its effect(s) on the respective economy(ies) is (are) analyzed;[3] and (2) A more strategic approach is applied by game theoretical considerations. The authorities (policy makers) aim at maximizing their social welfare function. The welfare function depends positively on the fulfillment of the objectives. Furthermore, the welfare function is conditioned by the economic system and by other countries' policy management.[4] Whatever approach is used information about the economic model, the welfare function has to be known in order to reap welfare gains by coordination. The players will rarely dispose of this information in real world. Nonetheless, two cases can be identified, where by the fact of creating a monetary union will help to avoid competitive, and thus possibly harmful, policies between member countries.[5] (1) Competitive devaluations (beggar-thy-neighbor policy) are ruled out by the simple fact of an existing single currency; and (2) Within the monetary union speculative attacks can be avoided (compare Bofinger [1993] p. 144, and Ishiyama [1975] p. 362).

(1) The first argument has been used frequently in the context of the creation of European Economic and Monetary Union. Sectoral interests will press hard – or already did so in the European Community – for the avoidance of disproportionate exchange rate swings (competitive devaluations) (see Eichengreen [1996] p. 2). Both, importers and exporters have a strong interest in maintaining favorable (or at least stable) relative prices.

(2) The second argument – speculative attacks within the monetary union can be ruled out - is rather hypothetical for a small monetary union largely dependent on foreign capital. Assume four relatively small countries forming a monetary union, whose joint Gross Domestic Product (GD2P) does not even represent a fourth of the GDP of the important economic players as, for instance, the USA. Moreover, these other important economic players are the most important foreign investors in the monetary union. It is thus more than questionable that speculative attacks between member states of the monetary union will have played an important role before forming the monetary union.

> Thesis 1: A common currency avoids beggar-thy-neighbor policies in terms of competitive devaluations vis-à-vis other monetary union members. The maxi-devaluation of Brazil in January 1999 caused considerable economic cost for the rest of MERCOSUR, that by the theoretical existence of a common currency, could have been avoided.

Network Externalities

Yet in the early microeconomic theory of money it was recognized that as the number of monies increases its exchange becomes less convenient and more expensive and thus its utilities decrease, from the individual as well as from the national point of view. Already Mill [1894] recognized *"So much barbarism, however, still remains in the transaction of most civilised nations, that almost all independent countries choose to assert their nationality by having, to their own inconvenience and that of their neighbors, a peculiar currency of their own"*

The increased size of a currency area is assumed to reap scale economies not only with respect to transaction holdings for non-banks and within the production function of banks[6] but also the utility of money will increase in general. In the context of the more recent optimum currency area theory, Dowd and Greenaway ([1993] p. 1180) considered network effects of money. Network effects of the respective money will not be existent to their full extent on day zero of the introduction of a new currency, but have to evolve over time (since it is a dynamic process). Money is assumed not to be neutral and as result will create externalities.[7] Network effects might lead agents to decide whether to hold a particular currency or not. The utility of the particular currency increases with its public good characteristics. The utility of the currency is dependent on the number of other agents using the same currency or as Brunner and Meltzer [1971] put it: *"The marginal cost of acquiring information about the properties of any asset does not vary randomly within a social group and declines as the frequency with which the group uses a particular asset increases."*

Even though the use of a particular currency may result advantageously due to its increased network qualities, an agent formerly holding a less advantageous currency will face switching costs when changing from one currency to the other. Non-institutionalized switching – that is, economic agents switching to the use of another currency regardless of whether national authorities allow it[8] or not - tends to occur only in the face of an increasingly unstable environment.

Growth and Monetary Union

Network externalities are relatively subtle and difficult to account for. Economic growth as a result of monetary integration does convey a simple outcome, despite the fact that growth theory represents a controversial field of economic theory. Baldwin [1991] identifies five main channels which foster economic efficiency in an economic and monetary union and consequently may have beneficial effects on output growth:

(1) Elimination of transaction costs
(2) Improved allocation of common market capital
(3) Intensified cross-border competitive pressures
(4) Higher efficiency of corporate ownership
(5) Increased output as a result of reduced and converged inflation rates

The static gains will have immediate welfare effects whereas dynamic gains will materialize over time. With growth theory these dynamic gains can be grasped. Baldwin estimates medium-term growth by the means of the traditional growth theory (neo-classical growth model). Constant returns to scale are assumed. Liberalization will induce capital formation over time through the channels enumerated before. Thus, an initial efficiency

gain will be enforced by an increased capital stock which, in consequence, will lead to a higher per capita GDP growth than the static efficiency gains alone. Nevertheless, the traditional growth model does not explain for lasting growth effects. The induced capital formation does not have a permanent effect on growth, since the steady-state growth rates of per capita output, capital and consumption are not altered.[9] The neo-classical growth model *"will not provide explanations of the determinant of long-run per capita growth"* (Barro and Sala-i-Martin [1995] p. 19).

On the contrary, endogenous growth models allow for accelerating growth. Returns are no longer diminishing. An extra unit of capital raises output independently from the capital-labor ratio. The overall level of efficiency now affects the per-capita-GDP growth permanently. Crucial to the endogenous growth model is the inclusion of scale economies. These scale economies can be reaped through research and development (R&D) investments of individual firms, who thus maintain their leading edge over their rivals or through external economies of scale.[10]

Growth and Financial Development

For less developed economies growth stimulation will probably not triggered by the same channels as presented before. Considering developing countries and an integrational scheme, which is not as advanced as the European Economic and Monetary Union the above presented model would seem unrealistic. Sticking to the conjecture that financial development is triggered by government, pertinent active policy measures would have to be undertaken, for instance, the facilitation of a legal environment apt to liberalization and deepening of the financial market preceding the introduction of a single currency.[11] However, starting with the assumption of underdeveloped financial markets in developing countries the growth potential in the long run - when introducing a single currency in a final stage - could be even larger than in developing countries. Nonetheless, it is left open to which extent a single member of the integration scheme would be able to foster growth by national financial efficiency augmenting measures alone and to which extent additional growth would be attributable to the creation of monetary union.

In developing/emerging economies banks play the most important role in the financial sector, leaving the importance of equity or bond markets far behind. Fees and commissions, etc. charged the financial intermediation services are relatively high. In fact these transaction costs are actually withheld from investment activities that would alternatively contribute to economic growth.

Pagano [1993] identifies three possible channels through which financial development might have an effect on economic growth: (1) The saving rate may decrease, since the availability of consumer credit may discourage households from saving. Whether saving will rise or fall will finally depend on the degree of risk aversion of the individual; (2) Cost of financial intermediation may decrease thus allocating a larger share of saving to investment; and (3) Finally, the marginal productivity of the capital stock might augment. Contrary to the majority of the individual investors, financial intermediaries can use portfolio techniques to mitigate risk of single investment projects thus improving the risk-return relationship. Furthermore, financial intermediaries dispose of advantages in the collection of information with regard to the evaluation of alternative investment projects. In the absence of a sufficiently deep financial sector too much capital might be directed toward relatively unproductive liquid assets (Bencivenga and Smith [1991] p. 197).

Even if financial development exercised downward pressure on the saving rate, still two channels would remain to outweigh this possible negative effect on growth.

III. The Costs of a Common Currency

The costs of the creation of a common currency are frequently put into relation with the traditional approaches of optimum currency area (OCA) theory pioneered by Mundell [1961]. The approach of the latter infers from the absence of factor mobility between two regions, that a flexible exchange rate is needed for adjustment in the presence of an asymmetrical exogenous disturbance. In economic discussions the loss of the exchange rate instrument was often put forward as the main argument against monetary union. This approach however, faces several limitations worthy of some analysis: A flexible exchange rate will not always provide adjustment as required. Is the exchange rate really capable of effectively cushioning shocks? Will the exchange rate always move in the indicated direction? Does a link between the real exchange rate and productivity exist? Do devaluations always tend to be beneficial to output in developing/emerging economies?

Exchange Rate Considerations in the Context of the OCA Theory

Traditional OCA theory emphasizes the cost of introducing a monetary union in terms of loss of the exchange rate instrument. Underlying assumptions relative to the working of the exchange rate are mistaken. If important conclusions are drawn from applying these traditional approaches without reviewing them carefully and critically, this can be strongly misleading.

In a static Mundell-Fleming (MF) model with perfect capital mobility as outlined in Gandolfo ([1995] p. 295) a monetary expansionary policy of an economy would induce a depreciation and consequently an improvement of the current account and an increase of output. Under these assumptions prices are rigid and therefore a change in the nominal exchange rate translates completely into a change of the real exchange rate. In a portfolio model under static expectations a link between the exchange rate and monetary equilibrium can be established. Such a model is more realistic, particularly in the Latin American context. The assumption of rigid prices (especially upwards) would not find too many advocates there. With respect to short term results the MF model and the portfolio balance approach are similar. Moreover, the portfolio balance approach comes up for one caveat of the MF model, it considers stocks and flows simultaneously. In the presence of monetary expansion output will not increase as much as in the MF model. Nominal depreciation will be accompanied by an increase in the price level, therefore the increase in the real monetary stock is limited and output will not increase as much under the MF model.

> Thesis 2: In the past devaluations of Latin American currencies often proved to be highly ineffective. Under the assumption that devaluations continue to be ineffective a single currency would not impose costs on the single member countries in terms of the loss of an adjustment instrument. Nonetheless, the Brazilian maxi-devaluation of January 1999 showed a relatively high degree of effectiveness until January 2002.

If the exchange rate is looked at from a long-term perspective – with particular emphasis on the real exchange rate - the distinction of two strands of exchange rate models is important: (1) The real exchange rate is determined by the relative price of imports to

exports (Edwards [1989]); and (2) The real exchange rate is – inter alia – determined by differences in productivity (Claasen [1996] p. 172). In a classical model productivity changes are translated fully into changes of the nominal wages. The real exchange rate remains unchanged. If, on the contrary, productivity changes have to be born out completely by a change in product prices, the real exchange rate has to adjust. For example a gain in labor productivity would result in a real appreciation.

De Gregorio and Wolf [1994] show that the truth probably lies somewhere in between the two extreme positions (productivity changes are fully transmitted to nominal wages versus productivity changes are fully transmitted to the product prices). Hence, the possibility that productivity differences will influence the real exchange rate cannot be dismissed. Countries with considerable productivity growth differences joining a monetary or an exchange rate union may face costs, if they relinquish the exchange rate instrument. Suppose a positive supply shock caused by technological process in the tradable sector in Brazil. If productivity increases are fully transmitted to wages, workers - under the assumption that they are equally skilled - will move from the nontradable sector to the tradable sector until wages are equalized in both sectors. However, assuming higher income elasticity of the demand for nontradables than for the demand for tradables and an unchanged demand structure the price of nontradables will increase more than the price of tradables resulting in an appreciated real exchange.[12]

> Thesis 3: Differences in productivity combined with inflexible real wages might require the exchange rate instrument for adjustment over the long run. These preconditions possibly apply to MERCOSUR.

The assumption that productivity increases, are fully conveyed to nominal wage increases, is dependent on the nature of institutional arrangements. Usually the presence of strong unions and thus a strong bargaining power of labor is needed; that workers will take the full profit from growth of productivity. However, if a negative shock to productivity occurs and the unions use their bargaining power alike, and thus will not agree to a reduction of nominal wages, the whole adjustment burden has to be born out by product prices. This is a scenario which is common in many developing countries and in particular in many Latin American countries, where in the past powerful wage indexation mechanism had been in effect (Levi Yeyati and Sturzenegger [1999a]).

Optimum Currency Area Theory

Nature of Disturbances and the Exchange Rate

The old approaches to OCA theory are examined further down. What these approaches have in common is that they remain rather unspecific about the nature of disturbances that affect a single or a group of economies. This section will offer a more general view of shocks and will hereby classify possible shocks. It will be shown which type of shock affecting an economy, renders the exchange rate instrument necessary for adjustment.

The following scheme provides an outline of temporary disturbances, possibly requiring the exchange rate instrument for restoring internal and external equilibrium, for a group of two or more countries. As outlined before a country suffering from an asymmetrical

external shock, lacking alternative adjustment mechanisms, will most likely need the exchange rate instrument for adjustment in order to avoid pronounced decreases in output. But not only demand shifts but also cyclical asymmetries could possibly render the discretionary use of the exchange rate instrument more optimal.

- Temporary Shocks -

TIPOLOGY OF SHOCKS REQUIRING DIFFERENTIATED RESPONSES PER COUNTRY

Changing from the aggregate level, to the sector level shows that if a specific industry in a hardly diversified economy or even in a diversified economy, where this sector is relatively large, is hit by a negative asymmetrical shock, the economy as a whole might be affected by this type of shock . However, these disturbances do not necessarily have to be exogenous. Shocks can also be '*home-made*'. Assume the Argentinean authorities opted for a significant tax raise. Such a policy move would likely dampen overall demand, thus possibly having the same consequences as an exogenous demand disturbance requiring the exchange rate for adjustment. Similar effects could be produced by other policy areas, too. It has to be stressed, however, that policy shocks are controllable to a certain extent. Thus, the question has to be permitted whether they were desired from an overall point of view (Bergmann [1995] p. 1254). In particular, in the context of developing or 'emerging' economies policy shocks are imposed comparatively more often by the means of stabilization programs accounting for significant variations in output.

But even symmetrical shocks might require differing policy responses. Suppose another oil shock would happen. Brazil imports significantly more oil than Argentina does, since the former possesses a relatively larger energy sector, and produces more oil. Suppose further, that Brazil uses energy as an input for its metal processing. The more expensive energy input would also increase the price of its industrial exports. In such a scenario a devaluation could render Brazil's exports less competitive.

- Permanent Shocks -

Basically the types of shocks described before have been well covered in the old OCA theory. Nonetheless, a long-term perspective is needed to complete the picture. Seen from the view of classical economics the nominal exchange rate does not possess the ability

to balance internal and external disequilibria, since in the long run money is neutral. Permanent shocks are thus caused by structural problems requiring other policy responses than a change of the nominal exchange rate. Suppose Argentina faces a demand shock in its industrial sector because its products have become obsolete. Adjustment for this sector can hardly be eased by the means of an open capital account. For example, Brazilian banks would provide short-term loans for troubled Argentinean enterprise hoping that these enterprises would not default before the maturity of their debt (this would imply, for example, that the respective enterprises would have managed a fast and successful turn-around by introducing new products). In such a case, default risk could be reduced by devaluation, thus, reducing the Argentinean product prices or alternatively structural changes as product innovation could be envisaged, which would probably be a mid- to long-term strategy.

It can be assumed that changes (shocks) in productivity are not fully transmitted to product prices. This is even more so, if a high degree of wage indexation prevails. In such an environment productivity changes are likely to cause changes in the real exchange rate. Ongoing real appreciation will therefore put increasing pressure on the nominal exchange rate requiring occasional devaluations.

- Monetary Shocks -

OCA theory is widely associated with shocks originating from the goods market. In the real world monetary shocks are common as well. In particular, in countries with less sound financial and monetary management, monetary shocks are an important source of disturbances. Leaving aside the assumptions of an emerging economy, as in the case of Argentina and Brazil, assume that the authorities are prone to use the instruments of inflation tax and devaluations excessively. In such a setting, where monetary shocks to the economy prevail, a fixed exchange rate will represent a more ideal instrument than the flexible exchange rate for stabilizing the economy.[13] In a Mundell-Fleming world, with perfect capital mobility, the nominal interest rate is given exogenously and assumed to be constant, which implies a constant expected rate of exchange rate depreciation. Consequently the fixed exchange rate is the appropriate tool for limiting shocks to the money market.

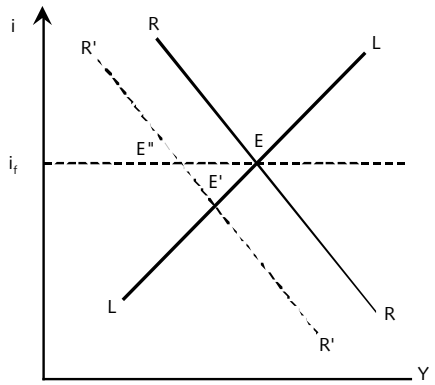
Predominantly Temporary Real Shocks

Under a flexible exchange rate regime monetary policy constitutes the optimal policy instrument in a Mundell-Fleming world in the short run. The consideration of the monetary policy instrument under a flexible exchange regime in a portfolio balance model under static and under rational expectations does not only establish a link between the price level and the exchange rate, but also explains the phenomenon of exchange rate overshooting.[14] In addition, the introduction of rational expectations yields the monetary policy instrument, in case of an anticipated monetary expansion, relative to the static MF model much less effective in terms of output.[15] In the middle and in the long-term, other than temporary shocks, for instance, productivity differentials may create demand for adjustment. These findings should change the way traditional approaches to OCA theory are seen. The traditional approaches to OCA theory are presented in the following subsection.

- A Temporary Demand Shift from Argentina to Brazil – The Mundellian Approach to OCA Theory -

Assume a Mundell-Fleming world. There happens to be a demand shift away from Argentinean to Brazilian products (a negative real disturbance to the Argentinean economy). Again, perfectly mobile capital is assumed. Overall demand for Argentinean goods has decreased, which in turn will exert downward pressure on income and output. Reduced money demand will bring about a decrease in the domestic interest rate (the *RR* schedule – the goods market equilibrium - shifts to the left and theoretically the new equilibrium between the goods and the money market could be found at *E'*). The interest differential will cause capital to flow out. Balance of payments turns negative. *E'* lies south of the *BB* schedule – balance of payments equilibrium - that is identical to the foreign interest rate axis, and the exchange rate will depreciate. This depreciation will cause the *RR* schedule to move left again and restore equilibrium.

REAL DISTURBANCE IN A STATIC MUNDELL-FLEMING MODEL WITH PERFECT CAPITAL MOBILITY UNDER A FLEXIBLE EXCHANGE RATE REGIME



What would happen, if the exchange rate were fixed? Again, reduced money demand would lead to a decreased domestic interest rate provoking capital outflows. Monetary authorities would have to intervene by buying domestic currency. However, these interventions are only effective in the very short run without being able to maintain a lower interest rate for increasing the output. Thus, the monetary authorities have no control over the money stock (under the assumption of no sterilization). The *RR* schedule would shift to the left as a consequence of the shrunken real money base. Since the domestic interest rate cannot stay below the international interest rate and the current account balance cannot improve, output and income will be further reduced finding new equilibrium in *E"*.

A very similar setting served Mundell [1961] to develop his seminal approach to the OCA theory. Before addressing his approach the underlying assumptions will be presented:

- Contrary to the MF model no distinction between the use of the monetary and fiscal policy instruments was made. He sees both instruments generally as one aggregate demand management.

- A flexible exchange rate always balances internal and external disequilibrium. The exchange rate instrument works efficiently, as well as, effectively.
- Wages and prices are rigid (like in the MF model).
- Factors like capital and labor are internally mobile and externally immobile.
- The three objectives of price stability, full employment and external balance have to be achieved simultaneously.
- No distinction between permanent and temporary shocks are made.

Mundell's approach to OCA theory is as follows: Suppose Argentina and Brazil formed a monetary union. As before a demand shift from Argentinean to Brazilian products would occur. Zero capital mobility is assumed. Argentina would run a current account deficit and output would decrease. If the Brazilian authorities were unwilling to increase inflation (they would not lower their interest rate), Argentina would suffer the full consequences of the demand shift, that is, output would decrease at the expense of employment. For restoring internal and external equilibrium alternative instruments for adjustment would be needed. The alternative instrument proposed by Mundell, was factor mobility.

Capital Mobility

In the MF model (see above), full capital mobility was assumed. Interest rate differences between countries possessing an open capital account would be arbitraged within a relatively short period of time. Thus, the interest rate at best can be used for attracting capital inflows temporarily. As soon as the interest rate is forced back to the international level of the interest rate these inflows would stop, and they would revert again. As a relatively short period of time is considered, it is extremely unlikely that the demand shift would have been reverted or the current account, by any other means, would have been equilibrated.

De Grauwe ([1989] pp. 138) makes the point by using a model of Ricardian equivalence with imperfect foresight that the cumulative current account position might influence the interest rate in such a way that increasing default risk would drive up the interest rate in terms of a risk premium. This phenomenon is often found in developing countries. The mechanism of equilibrating capital flows might prove non-existent or at least asymmetrical. Add a high degree of external indebtedness to the previously presented demand shift from Argentina. Fearing default risk, foreign investors are likely to withdraw their short-term capital from the Argentinean financial system. Subsequently pressure toward devaluation will evolve. In the presence of a weak financial system the government would have to bail out the banks. As a consequence the government itself would be forced to assume a short foreign-currency position in order to avoid a collapse of the domestic banking system. Hence, the government runs short of foreign exchange reserves putting a constraint on borrowing in the world credit markets (Obstfeld [1998] p. 26).[16]

The above described capital movements do reflect changes in the fundamental variables. Adverse short-term capital movements, however, might even occur in the absence of the deterioration of the Argentina's current account. Assume that instead of Argentina, Brazil is hit by an exogenous demand disturbance, resulting from the European Union. Brazil's accumulated current account situation is assumed to be highly negative, not so Argentina's. Now Foreign investors might not only withdraw short-term capital from Brazil but also from Argentina as the result of so called *'herd behavior'*. Such behavior occurs if

investors diversify widely without worrying about information, since it does not pay for them to become more thoroughly informed. Hence, they are merely following others reinforcing the volatility of capital flows (Calvo and Mendoza [1997]).

So far short-term capital movements were indicated, which were motivated within the private sector. Theoretically, a fiscal transfer between members of a monetary union could provide an alternate adjustment mechanism.[17] In the traditional Mundell-Fleming model under perfect capital mobility and a fixed exchange rate the monetary policy instrument becomes absolutely ineffective. Only fiscal policy remains as the sole effective policy instrument. The demand shift modeled at the beginning could now be helped by transferring public funds from Brazil to Argentina. Argentina would not have to reduce its public spending drastically and pressure on real wages, as without these transfers. It has been stressed before, that a temporary demand shift is considered.

Hence, if a distinction between stabilizing and redistributive flows is made, it is the former that would (partially) eliminate temporary imbalances. The latter provides long term adjustment resulting from structural differences within the regions or economies (Bayoumi and Masson [1994]).[18] This mechanism of fiscal federalism proves to be quite problematic for already developed economies forming a monetary union. The European Economic and Monetary Union (EMU) does not have powerful stabilizing flow mechanisms, nor are redistributive flows of significance relative to GDP per-capita. Considerations of national sovereignty represent the main barrier for the setting up of a mechanism that transfers funds from one sovereign nation to the other. Regarding developing/emerging countries the establishment of such a mechanism seems even less likely. Tax collection usually works less efficiently and effectively compared to more developed economies, thus, putting fiscal income on a relatively less solid base. In conclusion, if fiscal income already represents a relatively *'scarce good'* within an economy, it is illusory to think of fiscal transfers between national economies.[19]

Labor Mobility

Besides capital, labor represents the other factor facilitating adjustment according to Mundell ([1961] p. 664).[20] The demand shift from Argentina to Brazil results into an increased demand for labor in the latter country. Assume an internationally mobile labor force in Argentina. In the presence of higher unemployment, Argentinean workers are prepared to move to Brazil, satisfying augmented Brazilian labor demand. The Argentinean current account would again tend toward equilibrium, since less Brazilian exports to Argentina would be demanded, by a then shrunken Argentinean labor force. By analogy, emigrated Argentineans (to Brazil) would transform a part of the former Argentinean export demand into the Brazilian domestic demand.

Assume the demand shift in question would put a temporary strain on the Argentinean current account only. Thereafter, the Argentinean current account would turn positive, as the demand shift would have reverted. Then if labor mobility were the only adjustment mechanism, the previously emigrated Argentinean workers would need to return to their home country in order to restore equilibrium between the two countries again. Thus, for balancing temporary shocks at least one of the two countries requires a mobile labor force, who move according to the state of the current account balance. That is, migration in theory would need to be *'reversible'* (Buiter [1995] p. 30; Ricci [1997] p. 25). Nevertheless, labor cannot move as easily, as for instance, capital since labor migration

imposes social and cultural costs (e.g. language and different way of thinking). Moreover, labor demand in one country would have to coincide with the expelled labor force of the other country and vice versa, a requisite unlikely to be found in reality.

Wage Flexibility

As just seen the case was made against labor mobility as a means of adjustment. In contrast, wage flexibility seems to be a working adjustment mechanism found more often in reality.[21] As before rigid wages are assumed. If the assumption of flexible wages is added to the MF model, full wage indexation (Argy [1994] pp. 85) would render monetary policy completely ineffective, regardless of the degree of capital mobility.[22] Moreover, the real exchange rate would remain unchanged. More interesting, is the case of flexible real wages under a fixed exchange rate regime. Assume the same demand shift as in Diagram 0-2. Resulting from lower income and output the *RR* schedule will shift to the left. If prices were fixed, the *LL* schedule would also move to the left as to establish new equilibrium in *E"*. The flexible price assumption would allow producers to reduce real wages - nominal wages would have to grow slower than the domestic price – this way a real depreciation could take place without having to alter the nominal exchange rate.

- Openness of the Economy and Stability of the Domestic Price Level -

It was only a question of time until Mundell's approach was challenged by others. McKinnon [1963] introduced additional to the criterion of factor mobility the one of openness. Suppose Argentina was a small extremely open economy. Openness is defined in terms of the share of tradables (as the sum of importables and exportables) of the total product of an economy. As before assume that Argentina is hit by an external demand shock. If Argentina now devalued, the effects on output would be limited, if present at all. In an extremely open economy the general price level is dominated by the import prices. The probability of wage illusion in such an open economy is negligibly small. Thus, adjustment could not be facilitated via the wage channel nor via the nominal exchange rate. The exchange rate instrument in such an economy becomes obsolete. The structuralist school made a somewhat differing but still relatively similar point, in the context of developing countries.[23] How could this economy restore equilibrium then? Only by the means of fiscal policy. The government could, for example, reduce its real expenditure, which should result in an improvement of the balance of payments.

However, a prerequisite for abolishing a flexible exchange rate regime would be that "*Price stability prevails in the rest of the world"* (Ishiyama [1975] p. 352). If the main trade partners exhibited volatile price levels or frequently used the exchange rate instrument, they would also export volatility to the domestic economy. Therefore, in a highly volatile environment flexible exchange rates could be of some utility for small open economies in order to insulate them from exogenous shocks.

- More Than Two Goods – A Diversified Economy -

Up to now just two-good economies were considered, goods that were exported, goods that were imported and when dealing with the quantitative model a distinction between a traded and a non-traded goods sector was also made. Nonetheless, in reality an

economy will produce more than one product at a time, which it exports. As before a demand shift from Argentina to Brazil is assumed. In addition, the Argentinean economy now produces ten products. The assumed demand shift affects but a single export product that represents a tenth of total exports. Simply by *"the law of large numbers"* the effect on the balance of payments will be much reduced compared to the single product economy (Kenen [1967] p. 49). As a result, the exchange rate instrument for restoring external and internal balance is comparatively less needed.

In addition, if Argentina were even more diversified - if it produced additional 10 import competing products - and even its major export products were affected by an exogenous demand disturbance, the downward pressure on economic activity would not be as pronounced as without a diversified import-competing goods sector. Suppose the import-competing sector's elasticity of labor demand with respect to real wages were high. This sector would now possess the ability to absorb the unemployed workers of the export sector; all the more so, if the link between investment and exports is considered. Greater diversity might help to stabilize capital formation. As with exports, variations in investment might average out by the law of large numbers.[24]

What might be puzzling, is that more diversified economies tend to be large and typically are thus assumed to be rather closed economies. This would allow for a flexible exchange rate regime. This puzzle can be resolved by analyzing the nature of the trade, inter- or intra-industry trade. A high degree of intra-industry trade will conflict less with the degree of openness of a large economy.[25]

- Similarity of Inflation Rates -

Another relevant criterion for determining the optimality of a currency area is the similarity of inflation rates. Although this criterion was less renowned in the traditional optimum currency area theory it is subject to academic debate.[26] Take the two countries Argentina and Brazil. Assume, labor productivity in Brazil is significantly higher than in Argentina, and Brazilian unions are relatively weak. Thus, increased labor productivity is neither fully translated into wage increases nor to the price level. Changes in the real exchange rate would result; therefore increasing the pressure toward a nominal appreciation of Brazilian currency versus the Argentinean one. Bilateral imbalances favoring Brazil would result. Under these conditions the respective two countries would not represent ideal candidates for forming a monetary union. The criterion of the similarity of inflation rates was introduced by Haberler [1970] and by Fleming [1971] pp. 476). The latter identified three factors determining the level of inflation: (1) similar objectives in national unemployment; (2) similar productivity growth rates; and (3) similarity of union behavior regarding wages. Not all of the three points have to be fulfilled simultaneously. If one of these points is not fulfilled it might be compensated by the other two points. For example, Brazil displays a significantly higher productivity growth rate than Argentina. If the Argentinean unions proved to be less aggressive regarding their wage claims, or the Argentinean government were inclined to accept increased rates of unemployment, the relatively lower Argentinean productivity growth could be compensated for.

Traditional OCA theory offers additional criteria for analyzing currency areas that will not be covered in depth here (for an overview see Ishiyama [1975] p.354). These are *'Degree of Financial Integration'*, and the *'Degree of Policy Integration.'* Tower and Willet (`[1976] p.15) defined policy integration as the extent of agreement over the position on the Philips curve.

THESIS 4: If optimum currency area criteria derived from the traditional approaches to optimum currency area theory are not satisfied, it cannot be concluded that the respective currency area is not optimal. The MERCOSUR countries do not, or only to a limited extent, fulfill these criteria. Within the context of MERCOSUR these criteria suffer serious caveats, theoretically as well as empirically.

The New OCA Theory

Traditional approaches to OCA theory presented in the previous section lost much of their appeal, inter alia, due to their mistaken assumptions regarding the effectiveness of the exchange rate as an adjustment instrument and due to the fact that they took into account just a limited range of shocks affecting an economy. Some of the traditional approaches did not distinguish between a fixed exchange rate and a common currency. It was assumed that economies could chose freely a point on the Philips curve. Different economic models were employed. Two-country models rather than three-country models were applied. If two countries were to join a monetary union, adjustment costs in terms of a fixed bilateral exchange rate between these two countries were analyzed. It was not usually analyzed how adjustment of these two countries vis-à-vis the rest of the world worked (Mèlitz [1995] p. 493).

Besides these caveats other findings in economic theory have further questioned the validity of the traditional approaches to OCA theory. The endogeneity of some of the OCA criteria suggests that a non-optimal currency area can become one. In the developing/emerging country context the endogeneity approach can be twofold. In the past, many of the developing/emerging countries have been characterized, inter alia, by a series of asymmetrical endogenous policy shocks. It may prove difficult in a group of developing/emerging countries intending to create a monetary union to remove the source(s) these shocks. Only in a second step the conventional discussion on the endogeneity of OCA criteria will be of importance. Time inconsistency literature demonstrated that a formerly high inflation economy can join a monetary union with the objective of price stability without too much adjustment cost. However, the question remains what to do, if none of the prospective monetary union members can look back to a *'conservative'* central bank policy.

- Endogeneity of the OCA Criteria -

Dynamic considerations regarding the creation of a monetary union have been left out until now. Suppose MERCOSUR, with Argentina and Brazil, achieved the stage of a common market. All the car production would now – after a concentration process – be located in and around Sao Paulo and Rio de Janeiro. If the car sector faced an external demand shock, only the two respective states would be affected. This industry-specific shock would be of an asymmetrical nature, which had not been the case before this assumed concentration process. This point was made by Krugman [1991]. However, considering developing countries, regional concentration has to be considered in an additional context. In developing countries with strong regional differences in terms of concentration the question has to be asked whether concentration on the national scale is more important than concentration, and possible changes of concentration, on the regional scale.

Empirically Krugman's assumptions have not been confirmed. On the contrary, a small number of empirical studies suggests that in the most recent undertaking of an economic and monetary union project (EMU) the criterion of shock correlation exhibits endogeneity. Increased trade integration resulted in an increase of intra-industry trade, augmenting the correlation of the respective business cycles setting off (at least to a certain extent) emphasized asymmetrical shocks, resulting from increased specialization in trade. Two examples are:

(1) Frankel and Rose [1996] regress the correlation of the business cycles on the degree of openness finding a clearly positive correlation between the two variables. It is important, however, to consider the time interval of the analyzed series. Economic data from 21 *'old industrial economies'*, with emphasis on members of the European Union, from the year 1959 to 1993 was divided into four subsets of equal size. Thus, a relatively lengthy time span was analyzed suggesting that the effects of increased trade integration and consequently the degree of openness will take its time until it brings business cycles into a more equal pace. Moreover, the study does not refer exclusively to the endogeneity of the exchange rate regime, but also to the effects of a deepening trade integration. The link between the effects of the exchange rate regime, trade integration and business cycles is somewhat blurred. First, the exchange rate regimes changed over the time period analyzed. Fixed exchange rates date back to the Bretton Woods arrangement. Its abandonment was followed by an era of flexible exchange rates until the European Monetary System was introduced in 1979. Thereafter exchange rate bands were in operation until the members of Economic and Monetary Union fixed their exchange rates in 1998. Trade integration in the then European Economic Community started in 1959 (Urwin, [1991] p. 85). Trade structure (assumedly) and the degree of openness started to change from the beginning of the time series analyzed. Thus, the results of this study have to be seen in the context of changes in the exchange rate regime and changes in the degree of trade integration.

(2) Artis *et al.* [1999] find, by the means of a time domain analysis, using three different filter methods (centered seven-term-moving average, Hodrick-Prescott filter and an unobserved-component model) that the cross correlation of 8 European Union members with Germany vis-à-vis the US has increased after the implementation of the ERM. Frequency domain statistics deliver similar results. This study, however, does not imply endogeneity of the business cycles as does the foregoing one. It simply shows changes of the correlation of some business cycles and their contribution to a single European business cycle.

Both studies analyze a very limited set of variables like the degree of openness and variables indicating economic activity (GDP, industrial production and unemployment). Disaggregated data delivering some information about the trade structure and how it changed was not applied, although such a setting would have been even more interesting from the point of view of OCA theory.

THESIS 5: Integration of trade will probably increase the degree of trade openness and therefore lead to a higher degree of symmetry of shocks. In MERCOSUR the customs union is not yet perfectly implemented, and it was created just several years ago. With further trade integration, a further increase in intra-trade and less asymmetrical shocks to the trading bloc are likely.

Nonetheless, evidence exists that a region, that before the start of an economic integration project, was less of an optimum currency area can over time become one. This view fundamentally changes the way optimum currency area is looked at. But even the latter approach faces some limitations. It is unknown how fast trade structure and openness within a monetary union will change. Further, it is uncertain which degree of trade integration (unilateral reduction of tariffs, customs union, common market, etc.) will influence the degree of openness and the change in trade structure most.

- Endogeneity of the Optimum Currency Area Criteria, Monetary Union and the Degree of Political Integration -

Political affinity, if not to say unity, of potential members of any economic integration scheme represents an essential prerequisite for successful integration projects. In most of the OCA literature economics is strictly separated from political considerations. However, the findings that OCA criteria can change endogenously, that is, they can be influenced by political agreements deserves a brief analysis. The relevance of political integration for monetary union can be illustrated by the following two scenarios:

(1) Supposing Argentina and Brazil, are not in the sense of the traditional OCA theory, an optimal currency area due to either a limited degree of trade openness or due to more or less frequent asymmetrical external shocks. A high degree of political cohesion between the two economies prevails and economic integration deepens gradually from a customs union to a common market over time without too many tensions, and a common political intention of establishing a monetary union will exist. The potential members are formally disposed to relinquish national sovereignty over monetary policy and will create supranational institutions assuming the conduct of a common monetary policy; and

(2) Assume that both countries now form a close to optimal currency area in the sense of traditional OCA theory. However, economic integration has not deepened very much - it is stuck in a customs union and no power has been deferred to supranational institutions - and a low degree of political cohesion predominates the political arena. Although common agreement regarding fixing the nominal exchange exists, political commitment seems to be at best temporary and rather vague.

Even on intuitive grounds one would not bet, despite the optimality of the currency area, on the second option being a good basis for the creation of a monetary unio2n. Thus, it is essential to include political considerations into the analysis, whilst thinking about the creation of a monetary union. De Grauwe [1984] puts it even more stringently: "*Therefore, it is utopian to separate the problem of monetary union from political unification... Monetary union is an essential part of political union.*"[27]

The proposition of accompanying monetary union by political union, since political union serves as *'adhesive'* for monetary union, is an appealing proposition. In practice this would mean formerly sovereign nations would have to bundle up their political institutions to one single entity foregoing national political sovereignty. The participants in EMU opted for an intermediate concept: full monetary union and the centralizing of monetary authority to the European Central Bank. Fiscal policy remained in national hands, although the Stability Pact prescribes some fiscal rules for the EU members. If central banks of emerging countries were judged on the basis of their institutional convergence many of them would have accelerated their pace of increasing the degree of independence, constituting an important

ingredient for augmenting credibility for monetary policy and eventually providing the basis for further convergence of monetary policy.

THESIS 6: The establishment of a common central bank with the principle objective of price level stability requires a bundle of rules and measures, inter alia, the guarantee of the independence of the national central banks that represent the predecessors of the common central bank. The central banks of the MERCOSUR countries have already shown some convergence in their degree of independence in recent years. An inflation targeting regime for the national central banks of MERCOSUR could help increasing their credibility further.

- Time Inconsistency, Stabilization and Monetary Union -

The deliberate use of the exchange rate instrument in the absence of wage illusion is likely to increase inflation. In addition, even negative effects on output are possible. In fact such preconditions already limit the use of this policy tool. Furthermore, the time-inconsistency literature demonstrates that economic agents apply optimal strategies as a response to the strategic behavior of the authorities. Consequently, the private sector possesses the ability to limit the effectiveness of discretionary policies by the authorities even more. The basic insight of this approach is that a high inflation country can by pegging its exchange rate credibly to one of a low inflation country reduce its inflation rate without too much cost in terms of unemployment or contraction of output.

Usually three scenarios are modeled: (1) The authorities undertake policy actions in a discretionary manner. Assume the Brazilian government decides to increase the inflation rate in order to augment real economic activity. Since the private agents expect the Brazilian government to do this, they will offset the resulting monetary expansion by increasing their wage claims. The effect on the economic activity will be limited or null. A possible reduction of the real stock of the nominal debt will be frustrated, too. Seignorage gains, however, can be obtained by the government; (2) The Brazilian authorities announce a rule for a fixed inflation rate that is below the current one and they stick to it. Private agents believe the government. There will be no loss in terms of a decreased economic activity or increased unemployment (mid and long term); and (3) The Brazilian authorities announce a rule, as they did in (2). Now, they renege on the commitment and cheat the private agents by a unexpected inflation. Economic activity will be increased in the short term and welfare will be the highest within this option. Nonetheless, the loss in credibility is not taken into account. If the scenario of a repeated game is introduced, a punishment function comes into play. Cheating the private agents is associated with costs. The government has to take into account that by reneging its commitment it will not be able to make the rule under (2) or (3) credible in the following period. The authorities know that *"cheating cannot occur systematically"* (Barro and Gordon [1983] p. 113). Consequently the government will weigh the costs of adopting a discretionary policy (enforcement) in the future against the gains of cheating (temptation) with unexpected inflation. What the equilibrium will be like depends on various factors: The higher the inflation rate is, that the rule describes, the less costly the loss of reputation is. If inflation is not very costly the rate prescribed by the rule has to be high.[28]

The Barro-Gordon framework can be extended to the open economy by adding the real exchange rate to the model (compare Giavazzi and Pagano [1988]). By credibly committing to an exchange rate rule an economy can reduce its rate of inflation without incurring too much cost. If an economy admits a relative increase in its rate of inflation, it will be punished anyway by an appreciating real exchange rate. However the type of commitment to the exchange rate rule will in the end influence on its credibility. *"..., merely fixing the exchange rate does not solve the problem, because the fixed exchange rate rule is no more credible than a fixed inflation rate rule"* (De Grauwe [1992] p. 53). Examples, where this exchange rate rule lacked credibility are numerous in the context of Latin American economies. Fixed exchange rate regimes often suffered speculative attacks. Klein and Marion [1996] analyzed the duration of currency pegs in a group of 17 mainly Latin American countries. The mean duration of a currency peg did not exceed 32 months.[29] Thus, as the past shows (and empirical literature), simply pegging to another exchange rate or to a basket will not deliver sufficient credibility. The possibility of a Krugman-like or self-fulfilling prophecy-type attack will persist as long there is a fixed or a close to fixed exchange rate one can speculate against. Thus, the instrument of a fixed exchange rate would represent an instrument for temporary stabilization[30] of an economy rather than considering such a solution for a durable exchange-rate union.

Thus, perfect credibility can only be achieved by the creation of a monetary union.[31] A monetary authority, that formerly had the reputation of assigning much weight to competitiveness/low unemployment, will be able to improve its reputation when entering a monetary union that has inherited its reputation from a *'conservative central banker'*. Imagine an economy with a floating exchange rate regime, a tight monetary policy in order to suppress significant inflation expectations due to a not too distant hyperinflationary past. If such an economy joined a monetary union as just described, it could not only reduce inflation credibly but also relieve the interest burden on its external debt.[32] Such a decrease in the interest rate would be advantageous for the case that interest payments relative to debt payments are high, that is, a relatively low debt level.

In conclusion, an *'irrevocably fixed exchange rate'*, as such, simply does not exist. Nonetheless, a fixed exchange rate proves a valuable stabilization instrument by which, at least over the short run, credibility can be *'imported'*. Only a monetary union-cum-unification of the currency will deliver perfect credibility and consequently be close to costless disinflation. If before joining a monetary union interest rates had been high, due to inflation expectations and, interest payments of foreign debt relative to debt repayment had been high, positive effects on the fiscal accounts may even occur.

- The New OCA Theory in the Context of Developing/Emerging Countries -

Endogeneity of the OCA criteria may be judged differently in the context of developing/emerging countries. Continuous trade opening which tends to occur over several cycles and the simultaneous application of a single currency presuppose political coherence and economic cooperation, a constituent often lacking in developing/emerging countries. Endogeneity should thus be considered from the point of view of the establishment and sustainability of a common economic and monetary policy.

Time inconsistency in developing/emerging countries may acquire a different meaning compared with developed industrialized countries, too. If a group of developing/emerging countries wants to import credibility for its common central bank the question

has to be permitted where they should import it from, if none of the national central banks have sufficient credibility.

Preconditions for Endogeneity

Take a group of developing/emerging countries, which in the past have been fairly closed in terms of trade openness. Moreover, their economies are characterized by frequent endogenous policy shocks (besides symmetrical and asymmetrical exogenous shocks that for the current problem are of secondary order). If the argument of the endogeneity of the OCA criteria should be applied to them at least two central aspects have to be taken into account. (1) Although barriers to trade can be removed relatively fast, the adjustment of trade flows and trade structure will take some time; and (2) Endogeneity presumes stable and coherent policies of the member states.

(1) Economies that formerly were relatively closed and that employed import-substitution programs will, despite having rapidly removed their barriers to trade, require some time to change their trade structure. Industries will have to adapt in order to compete on a regional scale and possibly on a global scale. Not only the structure of trade but also the level of trade flows will most likely increase. As a result fundamental equilibria are also likely to change. The direction of change cannot be predicted from the beginning. Therefore, some adjustment valves have to be provided until the new equilibria are established. It cannot be ruled out that at a transitional stage of an economic and monetary union the exchange rate mechanism provides an apt adjustment mechanism until the new equilibria are reached.

(2) The finding, that OCA criteria are endogenous, could be of a mixed blessing for developing/emerging countries. Many developing/emerging countries look back to a long period of negative endogenous policy shocks that resulted either from economic mismanagement or from subsequent stabilization attempts. This has several consequences for judging whether a group of developing/emerging countries forms an OCA or can become one. (a) If the respective countries are capable of successfully stabilizing their economies and capable of maintaining relatively consistent macroeconomic policies at a national level, an important source of asymmetrical endogenous shocks can be removed, thus, rendering these countries more optimal for a common currency area;[33] (b) From an empirical point of view, the analysis of past shocks will be of little value, if the present and the future are characterized by more stable and consistent macroeconomic policies. In the past the cycles of these countries were superimposed by rather unpredictable endogenous policy shocks. If it is technically difficult or impossible to separate the endogenous policy shocks from the resting shocks the indicated analysis will be of little use.[34] Further, the judgement, whether cycles have converged or not due to economic and monetary integration efforts; the economy needs to have run through a series of cycles under, at best, a similar policy setting; (c) Assume formerly closed economies, that applied import-substitution programs and adhered to the '*hypothesis of conflict*' in order to be independent from the rest of the world, may find it relatively difficult to turn to more cooperative policy schemes. Firstly, they might have to concentrate on consolidating their formerly unstable economic and monetary policies. Secondly, they will have to establish a framework for new rules of cooperation. It will take time to negotiate and subsequently implement this framework; and (d) In a similar way the reasoning goes that considerable effort is necessary to successfully go from economic cooperation to setting up common political entities with common policy objectives. It will require less of an

effort to agree on common central bank standards with regards to credibility of monetary policy than, for instance, cede sovereign rights to a supranational common central bank.

To conclude: there has to be a strong political will and strong political consensus for providing the necessary political-economical framework for positively affecting OCA criteria, that is, providing stable, consistent and lasting common trade policies or even monetary policies in order to make cycles converge and render the respective region a more optimal currency area than it was before the application of the regional liberalization measures.

Credibility for a Common Central Bank of a Group of Developing/Emerging Countries

If a group of developing/merging countries decides to form a monetary union, usually none of their members can look back to a history of credibly pursued monetary policies. Thus, the benefit for one developing country to import the credibility of one another is likely to be low. The probability is low that one of the members has a long record as a *'conservative'* central banker that deserves tying one's hands to.

A relatively intuitive answer to this problem would be tying the member countries hands that presumably face a credibility problem, to a *'conservative'* central banker outside the prospective monetary union. The probability is high that such a set-up would result in an asymmetrical monetary or exchange-rate union.[35] An asymmetrical monetary union may bring about higher credibility but at the same time exit may be more difficult, in case the monetary union proves to be non-optimal for the member countries. An exchange-rate union makes exit easier but may at the same time be less credible. It can, for instance, become subject to exchange rate speculations.

Suppose a set of countries: Country A and country B are emerging markets. Country U is a large industrialized economy with a low inflation record.

(1) A ties its hands to the conservative central banker U, possibly for the reasons of stabilizing the economy. Since U is assumedly a large economic entity, which is not interested ceding national sovereignty to a group of developing/emerging countries, the monetary union remains asymmetrical.

(2a) A and B may gradually try to build up the credibility of their national central banks and then with a sufficiently built up credibility record form a monetary union. Inflation targeting (IT) regimes seem to be an adequate instrument for improving the credibility record of national central banks of emerging markets.[36] An important merit of IT is that the central bank is obliged to set the targets and to communicate its decisions effectively and transparently to the public. Therefore, it is accountable for its actions. An increase in credibility is the consequence. Also empirically it was found that inflation targeting (IT) implementers were able to achieve their set targets with smaller adjustments in their policy instruments than with foregoing monetary regimes (Loayaza and Soto [2002] p. 7). This is in line with the argument of Agénor [2000] p. 21): IT-cum-flexible-exchange rate will help to lend the domestic currency or in a next step the common currency of a set of emerging markets more credibility - provided clear commitment to macroeconomic stability - compared to the situation where the central bank(s) had an implicit or explicit exchange rate target not perceived to be credible.

(2b) A and B establish a band with a currency basket representing the weights of their most important trading partners, thus, possibly importing credibility by this means, and as a third step form a monetary union with a common central bank. However, the peg to a currency basket may be subject to exchange rate speculations at least in the medium term (compare Eichengreen, [1998]).

An intermediate solution to 2a and 2b may also make sense. In literature different notions of exchange rate management combined with IT are proposed:

The stance of Mishkin and Schmidt-Hebbel ([2001] p. 24) is: "...targeting on the exchange rate is likely to worsen the performance of monetary policy. This does, however, not imply that central banks should pay no attention to the exchange rate." They recognize that, e.g., a negative terms of trade shock resulting in increasing import prices would in principle render a decrease in interest rate an appropriate response. If, however, the economy of concern is characterized by a substantial throughput the adequate response would be an increase in the interest rate. If - for portfolio reasons - a large depreciation occurs, important negative effects on balance sheets can be the consequence. Also in this case the use of the interest rate instrument would represent the ideal response to influence the exchange rate. For nominal exchange rate targets - inter alia - sterilized and unsterilized interventions tend to be employed that are not as transparent.

Agénor ([2000] p. 65) follows a similar line: "In middle- and high-income developing economies that have relatively low inflation to begin with, reasonably well-functioning financial markets, and can refrain from implicit exchange rate targeting, it has the potential to improve the design and performance of monetary policy compared with alternative operational procedures available to central banks."

Amato and Gerlach ([2002], p. 789) judge intermediate exchange rate objectives as helpful. In contrast to the before mentioned authors, they do not exclude nominal exchange rate anchors. They observed the following transition scenario: Especially in emerging markets "exchange rate objectives might play a relatively greater role...primarily due to the financial structure of these economies." In these countries exchange rate targets and IT were present at the same time though giving priority to the inflation objective. With decreasing inflation formal exchange rate bands were extended and finally eliminated.

IV. Empirical Analysis of MERCOSUR

In the three previous theoretical chapters a total of 6 theses were derived. The objective of this chapter is the empirical consideration of these theses. The order of the theses corresponds to the ones presented in the previous chapters.

Avoiding a "Beggar-Thy-Neighbor Policy"

> Thesis 1: A common currency avoids beggar-thy-neighbor policies in terms of competitive devaluations vis-à-vis other monetary union members. The maxi-devaluation of Brazil in January 1999 caused considerable economic cost for the rest of MERCOSUR, that by the theoretical existence of a common currency, could have been avoided.

In the past exchange rate devaluations proved to be traumatic in particular in developing countries in Latin America (Edwards [1989] p. 2). Devaluations were often accompanied by, or were the consequence of, political upheaval. Finance ministers had to resign or even governments as a whole had to resign. Due to its high political cost, even in the presence of large macroeconomic disequilibria, governments resisted devaluation. This

argument also holds true for Brazil during the period of the Real Plan. Nevertheless, in the past devaluations were evaluated on their internal cost rather than on their possible effects on neighbor countries, specifically with respect to developing countries. The membership of Brazil in MERCOSUR, however, demands a different perspective than the internal cost side on the Brazilian maxi-devaluation in January 1999. The political cost of the devaluation will briefly be discussed, as well as, the question of its economic cost will be treated, in terms of the behavior of aggregate trade variables.[37]

Political Cost

In Section II the point was made that pronounced exchange rate swings would alert political pressure groups representing the exporting industries of the affected countries. Political reactions in Argentina were alike. Soon after the devaluation had occurred representatives, from the Argentinean Industrial Union and various political parties pushed, for compensatory measures in order to provide some protection for the most likely affected sectors; like rice, chicken, processed pork, automobiles (car, car bodies and tractors), dairy products, shoe manufacture, textiles and chemicals (Clarin, [1999a; Clarin, 1999b]).

Interestingly the representatives of the export industry did not press for the abandonment of the Argentinean currency board in favor of a flexible exchange rate regime. In Argentina regardless of the political party and the economic sector, the consensus on the maintenance of the fixed parity of the peso vis-à-vis the US dollar was very broad. The pressure groups asked for the use of other instruments rather than a change in the exchange rate. The demanded instruments ranged from the application of tariffs, a stop of Brazilian subsidies to Brazilian exporters, the voluntary application of taxes on Brazilian imports, to temporary restrictions on imports by the means of quotas (Burgueño, 1999).[38]

The Argentinean government decided to introduce the instrument of the *'previous permission'* on 1,200 Brazilian products - all of them pertaining to sensitive sectors (Clarin [1999c]). Brazilian imports had to be registered at the Argentinean border and were monitored carefully. Other measures that would provide compensation on a more general basis could not be agreed on. Arising sector imbalances had to be negotiated on a case by case basis. Often the outcome was unsatisfactory for both parties leading to severe political tensions between the two governments (Peña [1999]). These tensions built up to a full blown trade war between the two large economies. The severity of these tensions can be judged on the grounds of selected announcements of the respective government officials.

The Brazilian government officially announced that it was revising three possible attitudes toward the prevailing trade war; (1) abandon the customs union; (2) leave the things as they are, that is, continuation of the trade war; and (3) deepening of the integration scheme (Ambito Financiero [2000]).

Nonetheless, the discussion was not only geared toward indirect measures concerning the relative price competitiveness of Argentinean and Brazilian products. Tensions between the large countries also arose in the monetary policy field. The Treaty of Asuncion does not provide any regulation regarding macroeconomic coordination.[39] This loose cooperation turned out to be a boomerang for the MERCOSUR countries in the presence of the Brazilian maxi-devaluation. As any other country outside the customs union, the MERCOSUR countries learned about the decision of the Brazilian government to devalue from newspapers.[40] The extremely reserved information policy of the Brazilian authorities, and the intent of Argentinean officials to suggest monetary and fiscal policy measures for the Brazilian government led to distress. Inter alia, the implementation of a debt conversion

scheme similar to the Argentinean BONEX plan[41] or the implementation of a currency board for Brazil were proposed by Argentinean representatives. These suggestions were immediately dismissed by Brazilian officials. The Brazilians themselves, criticized the Argentinean idea of a complete dollarization of the Argentinean economy. The official Brazilian view was that official dollarization would mean the end of MERCOSUR.

To conclude, the maxi-devaluation of Brazil culminated in a trade war, specifically between the two large MERCOSUR economies Argentina and Brazil. For Argentina the policy instruments at its disposal were strongly limited. Neither the exchange rate instrument could be used, inter alia, due to the common (Argentinean) consensus of no devaluation at any cost and the stipulation of the currency board in the Argentinean constitution nor could tariffs be imposed on Brazilian imports without violating the agreement on the weakly institutionalized customs union.

Economic Cost

Productivity and bilateral trade will be looked at as one, since the effect of the foregoing recession and the devaluation on trade cannot be clearly separated. By regarding the development of the real exchange rate after the maxi devaluation the following becomes evident: The drop in the exchange rate was largest in the period from December 1998 to February 1999, where the decrease in the exchange rate equaled 62.9%. In July 1999 the real had again appreciated (since December the real had overall appreciated by a total of 40,88%). In December 1999, the real appreciated reducing the competitiveness gain to 35,8%.[42] These numbers document an often observed overshooting effect. Thus according to relative price competitiveness major effects on the current account balances of Brazil and on its major trade partner Argentina were expected. Nonetheless, by regarding the Centro de Economía Internacional-CEI [1999] trade analysis important effects on bilateral trade flows until the third quarter of 1999 do not become evident. According to Argentinean and Brazilian gross domestic product (GDP) and industrial production both countries entered recession in the third quarter and the fourth quarter of 1998. Negative growth rates of these indicators can be observed up to the end of the third quarter of 1999.

The analysis of the Argentinean trade balance, once vis-à-vis the rest of the world (ROW) and once vis-à-vis Brazil confirms that both effects – recession and devaluation – supposedly had a significant influence on the trade balance. Argentinean imports (ROW) dropped 22.6% within one year, whereas exports decreased less than imports by 15.6%, from January 1998 to September 1999. The bilateral trade balance between Argentina and Brazil shows a somewhat different picture. Argentinean imports dropped 24.4%, and Argentinean exports dropped 34.2% in the same period. The bilateral trade balance had worsened, contrary to the trade balance vis-à-vis the ROW. In July 1998 Brazilian exports to Argentina accounted for 703 million US dollars and almost halved by January 1999 (386 million US dollars). From January to September 1999 Brazilian exports increased by less than 100 million US dollars to 469 million US dollars (CEI [1999] p. 6). Thus, the first nine months of the new exchange rate regime in Brazil did not bring about the feared flooding of the Argentinean market by exports originating from Brazil.

From October 1998 to December 1998 Argentinean exports to Brazil decreased from 768 million US dollar to 589 million US dollars (-23.3%). From December 1998 to January 1999 exports declined a further 31.91%. From January 1999 to September 1999 exports increased by 25.93% to a monthly volume of 505 million US dollars. Again, almost half of the decline in Argentinean exports to Brazil occurred in the last quarter of 1999.

Thus, the drop in exports is explained, inter alia, by the foregoing recession. The changes of competitiveness by the change of relative prices might come into play; but only later.

The evolution of the monthly bilateral trade balance might allow for the conclusion that the low in March 1999 was also helped by the change of relative competitiveness (CEI [1999] p. 9). However, it cannot be deduced from the timing alone, that the change of relative prices was the only explaining factor for the negative monthly trade balance in the first quarter of 1999. It had already been negative 12 months before, when the monetary regime of the Real Plan was still in place.[43]

The Effectiveness of Exchange Rate Devaluations

> Thesis 2: In the past devaluations of Latin American currencies often proved to be highly ineffective. Under the assumption that devaluations continue to be ineffective a single currency would not impose costs on the single member countries in terms of the loss of an adjustment instrument. Nonetheless, the Brazilian maxi-devaluation of January 1999 showed a relatively high degree of effectiveness until 01:2002.

In the past Latin American economies frequently adhered to the use of the exchange rate instrument for adjustment. It was discussed earlier that devaluations undertaken in Latin American economies were frequently of little effectiveness. Gains in competitiveness were eroded relatively quickly due to high levels of inflation and/or due to the increased importance of imported inputs for the price level. However, the Brazilian maxi-devaluation of January 1999, that was accompanied by a change of the exchange rate regime from an asymmetrical exchange rate band to managed floating, does not show such clear signs of erosion.

Applying the effectiveness index to the recent Brazilian devaluation renders the devaluation of January 1999 relatively effective (Edwards [1989] p. 255).[44]

$$\textit{effectiveness index}_k = \frac{\hat{RER}_k}{\hat{E}_k} \tag{1}$$

Two time series were applied, $\textit{effectiveness index}_1$ (08:1994 – 01:2002), from the introduction of the Real Plan, until 3 years after the devaluation, and $\textit{effectiveness index}_2$ (01:1999 – 01:2002), from the devaluation until 3 years after.

$$\textit{effectiveness index}_1 = 0.40 \tag{2}$$

$$\textit{effectiveness index}_2 = 0.71 \tag{3}$$

In the latter case 29% of the devaluation was eroded. If the real appreciation during the real Plan period were taken into account, the maxi-devaluation discounted for the mini-devaluations, the effectiveness would still have been equal to 40%. Based on these numbers the Brazilian maxi-devaluation cannot be judged as ineffective as this was the case for many Latin American economies in the seventies and in the eighties (Edwards [1989]). [45]

Thesis 3: Differences in productivity combined with inflexible real wages might require the exchange rate instrument for adjustment over the long run. These preconditions possibly apply to MERCOSUR.

In Section III the point was made that in the long run productivity changes have to be balanced by the means of wage adjustment. It is shown in 4.5.2.2 that wages were relatively rigid in the MERCOSUR countries during the nineties. Marginal productivity rates as suggested in the model were not available for the MERCOSUR countries over a longer period. Instead the only available productivity variable was real GDP per capita (1960-1999) and GDP adjusted by PPP in USD[46] (1975-1999). Per-capita GDP is highest in Argentina and Uruguay (6,483 USD and 5,938 USD respectively in 1999). Brazil is intermediate with 4,412 USD and Paraguay exhibits the lowest product of 2,176 USD in 1999. The average annual growth rate for real GDP per capita from 1975 to 1999 has been highest for Uruguay (1.29%), followed by Paraguay (1.12%), Brazil (0.92%) and Argentina (0.28%) (see Error! Reference source not found.). In the subperiod from 1991 to 1999 - coincident with the existence of MERCOSUR - growth figures were subject to considerable changes. Annual average growth accounted for 2.62% in Argentina, 2.47% in Uruguay, 1.08% in Brazil and 0.16% in Paraguay.

GDP adjusted to purchase power parity in USD does not change the observed patterns with respect to real GDP per capita. Over the whole period from 1975 to 1999 nominal growth was 8.15% in Paraguay, 6.68% in Brazil, 5.94% in Uruguay and 5.46% in Argentina. In the MERCOSUR period the Argentinean economy grew on average 6.53%, Uruguay 5.57% and relative decelerations can be observed in Brazil with an annual growth rate of 4.16% and in Paraguay of 4.11%.

A limited insight can be gained from the inspection of the data provided in Error! Reference source not found.. The growth differences measured in real GDP per capita have widened significantly in the MERCOSUR period relative to the large 1975-1999 period. Not only the data provided in Error! Reference source not found. reveals that marked structural breaks in the growth paths are at play. It is also shown in literature[47] that in the nineties, growth in Latin American countries increased relative to the eighties (the lost decade) due to the implementation of a set of reforms; among them trade liberalization. Brazil has the most developed and largest industry but until 1999 it lagged behind Argentina and Uruguay. Under the assumption of further convergence between industrialized and less industrialized regions in Brazil, its overall productivity should increase further relative to Argentina and Uruguay in the future. When analyzing GDP at current market prices, over the longer observation period, it becomes evident that Brazil is on average growing faster than Argentina and Uruguay. In the MERCOSUR period, however, this pattern has reversed. The slower Brazilian growth performance in this period is also explained by the later implementation of its stabilization program, the Real Plan, relative to the earlier implementations of the Argentinean Convertibility Plan and the Uruguayan stabilization programs. For real GDP per capita the growth differences increased by more than 50% in the MERCOSUR period.

To conclude, growth performance and thus productivity is far from convergent in the MERCOSUR economies. Over the long run increased wage flexibility compared to the end of the nineties will be needed to compensate for productivity differences.

Thesis 4: If optimum currency area criteria derived from the traditional approaches to optimum currency area theory are not satisfied, it cannot be concluded that the respective currency area is not optimal. The MERCOSUR countries do not, or only to a limited extent, fulfill these criteria. Within the context of MERCOSUR these criteria suffer serious caveats, theoretically as well as empirically.

Symmetry of Shocks

Prior to the creation of MERCOSUR all the member countries of today's MERCOSUR had been subject to frequent shocks whose origins were highly heterogeneous. Endogenous shocks that followed political instability, credit restrictions originating from the external sector, changes of the economic model (Convertibility Plan, Plan Real), etc. The analysis of these shocks proved to be highly challenging, inter alia, due (1) to the properties of the empirical data available - the available series are integrated by different orders, display structural breaks, etc.; (2) The application of multivariate time series techniques is highly data consuming. With respect to MERCOSUR large samples do not exist due to the simple fact that MERCOSUR was founded 10 years ago. Consequently larger samples would include Pre-MERCOSUR data; and (3) Large representative continuous samples are hardly available for MERCOSUR countries at all.[48] The application of the Hodrick Prescott filter to the respective GDP series will show that cycles differed considerably in the past.

- Decomposition of the GDP of the MERCOSUR Countries into a Trend and a Cycle Component -

The Method

Originally it was intended to apply the Blanchard and Quah [1989] decomposition of a vector autoregression (VAR) method. By the means of a structural decomposition of a VAR demand shocks (defined as temporary shocks) and supply shocks (having a permanent effect on output) are identified. This method allows for analyzing the timely coincidence of temporary and permanent shocks in a group of countries. In addition, it allows for the comparison of the dynamics of the shocks by the means of impulse-response functions. In practice, however, available time series data for the MERCOSUR countries resulted to be inappropriate for the application of the before described method.

In other studies - inter alia, Bayoumi and Eichengreen [1993] - the real GDP which tends to be $I(1)$ and the deflator of GDP which tends to be $I(0)$ were used.[49] In case CPI were $I(1)$ it could also be differenced (Enders [1995] p. 332). Nonetheless, both series need to be stationary. For Argentina, Brazil and Uruguay continuous time series for GDP and CPI were available, which were tested for the presence of a unit root by the Philips-Perron and the augmented Dickey-Fuller test.[50]

The results of these tests rendered the application of the Blanchard-and-Quah method to all three countries Argentina, Brazil and Uruguay impossible.[51] Although the

GDP for all three countries was *I*(1), the orders of integration for the change in CPI of the respective countries were mixed. The log difference series (1980:1 – 2001:4) of the CPI for the three countries have been tested for the presence of a unit root. CPI_{BRA} was clearly *I*(0), CPI_{ARG} was *I*(0) and finally CPI_{UGY} was clearly *I*(1).[52]

Therefore, the widely applied Hodrick-Prescott filter was selected to decompose the time series into its trend and cyclical components. The trend is identified by the following convex minimization.

$$\underset{\{\tau\}_t}{Min} = \sum_{t=1}^{N}(z_t - \tau_t)^2 + \mu \sum_{t=3}^{N}\left[\left(\tau_t - \tau_{t-1}\right) - \left(\tau_{t-1} - \tau_{t-2}\right)\right]^2 \qquad (4)$$

The first term contains the difference between the original series z_t and the trend t_t, which is interpreted as the degree of adjustment. The second term indicates the degree of variability by means of the second differences of the trend t_t. The coefficient m reduces the acceleration of the trend. If *m* equals zero, the original series and the trend are equal. If *m* tends toward infinity the trend will become linear. *m* was chosen to be equal to 1600, which is standard for quarterly data analyses.

In the analysis the cycle c_t is defined as the difference between the original time series and its trend:

$$c_t = z_t - \tau_t \qquad (5)$$

Cycles were identified by determining the turning points. The turning points have to be proceeded either by two subsequent negative or positive values of the level of growth (Sachs and Larrain [1995] pp. 670). Ideally, a whole set of variables, such as whole sale, investments, savings, etc. as suggested by Moore [1983] would allow for a more sophisticated identification. However, due to a lack of data this was not possible.[53] Furthermore, business cycles of transition economies are harder to analyze as cycle length are often shorter and turning points are harder to identify due to phenomena such as two consecutive peaks. The Sachs-Larrain procedure was followed as closely as possible, so that an upturn was sustained as long as the next downturn could be separately identified by two consecutive negative values.

Identification of the Cycles and the Correlation of the cycle component c_t

The Argentinean cycle component allows for clearly identifiable cycles (Diagram 1). The most evident lows date at 1989/90 - during the hyperinflationary period - and 1995/96 - following the Mexican crisis. The debt crisis in 2001 initiated a dramatic fall in GDP that has not been seen before throughout the observed period.

The identification of cycles of the Brazilian GDP is slightly ambiguous. (Diagram 2). Extreme volatility becomes evident around 1990/91, during the late years of the Collor-de-Melho administration, that were marked by an important fiscal mismanagement accompanied by hyperinflation (Edwards [1997] p. 86). The following peak coincides with the introduction of the Plan Real in 1994/95. The subsequent low marks the debt and currency crisis in 1999.

In the beginning of the eighties the Uruguayan cycles show large down an up swings that in amplitude decrease over time. In Uruguay stabilization occurred more gradually starting at the beginning of the nineties exhibiting less of a stop and go pattern as in Argentina and in Brazil. (Diagram 3).

The visual analysis of the three graphs draws a disharmonic picture of the behavior of the cycles of the MERCOSUR economies. During the Pre-MERCOSUR period the Argentinean and the Brazilian cycle correlated with a coefficient of 0.202 and the Uruguayan and the Brazilian cycle with 0.224. The Uruguayan and Argentinean cycles show a correlation of 0.221. During the MERCOSUR period the cyclical correlation coefficient between Argentina and Brazil did almost not change (0.201). The cycles between Uruguay and Argentina became strongly correlated with a correlation coefficient of 0.602. The Brazilian and the Uruguayan cycle cease to correlate, the coefficient for the MERCOSUR period is a mere 0.057.

The cycles of all three countries showed little correlation in the Pre-MERCOSUR period. One exception is the correlation between the Brazilian and Uruguayan cycle their correlation coefficient is 0.425.[54] During the MERCOSUR period Argentinean and Brazilian cycles did not converge. This may be also due to the fact that Argentina and Uruguay were able to successfully implement stabilization programs at an earlier stage than could Brazil.[55] (Table 2).

Factor Mobility

If shocks occur asymmetrically between countries, as was shown in the previous section other adjustment mechanisms are required. Labor mobility, although often treated in studies on OCA theory, proves to be a very unsatisfactory OCA criterion. Despite these theoretical and empirical drawbacks labor mobility, in the large MERCOSUR countries, does not seem to be of importance. Wage flexibility has improved over the last years. The degree of financial market integration is intermediate in Argentina and in Uruguay but less so in Brazil.

- Labor Mobility -

Data on labor migration is relatively scarce in developing countries. From the data available only very weak conclusions can be drawn. In Argentina censuses with data of immigrants of the contiguous countries from the years 1980 and 1991 are available (Table 3) Argentina is a receiving country in the small regional subsystem (Table 4).[56]

The comparison of the respective figures shows that the fraction of Brazilian immigrants in Argentina was small throughout the observation period. In 1991 0.02% of the Brazilian population lived in Argentina. This represents a fraction that has hardly any influence on the labor markets of either country. In 1991, the development of the GDP in all two MERCOSUR countries indicated a recession in Brazil and in Uruguay and a starting recovery in Argentina, following the introduction of the Convertibility Plan. Thus, according to the cyclical data a higher fraction of Brazilian immigrants could have been expected, if Brazilian laborers were mobile and if labor mobility were facilitated by the respective labor laws. Net migration from Argentina to Brazil from 1990 to 1991 totaled 361 persons (Baeninger [2002] p. 36).[57]

The fraction of Uruguayan immigrants in Argentina has increased significantly over time. In 1970 51,249 Uruguayans emigrated to Argentina. By 1991 this number more than doubled to 139,721 immigrants. In terms of its total population 4.48% of the Uruguayan population moved its residence from Uruguay to Argentina. Besides the lower performance

of the Uruguayan economy, in terms of its GDP, unemployment was also relatively higher in Uruguay than in Argentina (8.9% compared to 6.5%). Hence, the aggregate economic variables GDP and unemployment could support the thesis that economic reasons were the cause for the relatively large stock of Uruguayan immigrants in Argentina.

In absolute numbers Paraguayan immigrants represent the largest share of immigrants from the bordering countries in Argentina.[58] In 1980 and in 1991 approximately 260,000 Paraguayans resided in Argentina. They represented 6% of the total Paraguayan population. Heikel and Rojas Bahr ([1993] p. 108) indicate wage differentials and cycles as the main reason for the large flow of Paraguayans to Argentina. However - as is true for all of the before presented figures on an aggregate level - clear conclusions cannot be drawn. Little knowledge of the socio-economic characteristics of the migrating population exists. One example would be: Do Paraguayan immigrants have a temporary working license and return to their domestic country after its expiration or do they have a permanent residence in the host country? This question comes close to the objection raised in the previous section, where it is doubted that migrants would act to balance internal and external macroeconomic equilibria. What role do legal and cultural barriers play? How large is the fraction of the economically active population in the cited statistics? How important are non-economic reasons for the migration flows? In the past many migrants were motivated by political instability to change their country of residence.

- Wage Flexibility -

Monetary policy becomes increasingly ineffective with an increasing degree of wage indexation. Real wage rigidity in the MERCOSUR countries has been high before the Brazilian maxi-devaluation in 1999 (Levi Yeyati and Sturzenegger [1999a] pp. 12). They cite correlations of 1.12 for Argentina and 1.01 for Brazil between inflation and nominal wages. Thereafter, real wage rigidity was reduced substantially.

Diagram 4 shows the evolution of real average wages in Argentina, Brazil and Uruguay. Real wages in Argentina do not show important changes until the Argentinean maxi-devaluation in the beginning of 2002. Brazilian wages increased significantly following the introduction of the Real Plan. The maxi-devaluation in January 1999 brought real wages back to the level that prevailed before the introduction of the Real Plan, thereafter showing a further decreasing trend. Uruguayan wages increased slightly from 1993 to 1996. From then on real wages stayed relatively stable. In 1999 wages started to fall continuously achieving levels seen only in 1994. As can be seen in Diagram 4 wages do not seem to have reacted dramatically to the major external crisis in South East Asia in 1997 or Russia in 1998. Wages in Uruguay seem to have reacted more to the Brazilian crisis in 1999 than did the Argentinian wages.

- Integration of Financial Markets -

Basically the use of two different methods of measuring the degree of capital market integration is widely acknowledged. The concept of the covered interest rate differential (CID) represents the first approach to measuring the degree of capital market integration. A high interest rate differential between two countries reflects barriers between domestic capital markets, which take the form of transactions costs, capital controls, default risk, etc. The second approach is the application of the Feldstein-Horioka equation (Feldstein

and Horika, 1980, pp. 316). If the saving and investment rate of a country correlate highly its capital market is assumed to exhibit a low degree of integration. Full capital mobility requires that the domestic real interest rate equals the world interest rate (real interest rate parity) and that domestic savings are not correlated at all with domestic savings. [59] A third approach that, however, is more limited in scope is the measuring of the co-movement of stock indices (Eichengreen [1991] p. 6). The closer the considered stock prices move, the less important regional shocks become; or looked at from the perspective of factor mobility, the faster factors of production are reallocated from the country suffering a negative shock to countries which are not affected by this shock.

The Covered Interest Rate Differential

The definition of the covered interest-rate differential (CID) is

$$DIC=i-i^*-fd \qquad (6)$$

The difference between the nominal domestic interest rate *i* and the foreign interest rate *i** and the forward premium *fd* "*...captures all barriers to integration of financial markets across national boundaries: transactions costs, information costs, capital controls, tax laws that discriminate by country of residence, default risk and risk of future capital controls.*" (Frankel [1992] p. 200).

Extensive data on forward rates was not available for either MERCOSUR country. Garcia and Valpassos [1998] computed the CID for Brazil and used altogether 3 different measures on the CID (CID computed with US dollar futures, CID computed with Brazilian bonds issued in US dollar, and the CID computed with Brazilian bonds indexed to US dollars).[60] The second type of computation was chosen for reasons of comparability and of data available. Ideally the difference between the domestic rate on treasury bills (this corresponds with 60c.f in the International Financial Statistics) and the US treasury bill (60c) would have served for the calculation of the CID. This measure was only available for Brazil and Uruguay (see Table 5) The CID for Uruguay throughout the observation period (from 1995:1 to 2002:2) was on average 0.51%, the CID in Brazil 9.59% indicating a significantly less integrated capital market of Brazil with the rest of the world.

The same indicator was not available for Argentina. Instead of the treasury bill rate, the lending rate was used (60p.f – 60p) for computing the CID. In Argentina the CID averaged 3.15%. However, the high interest rate (5.31%) variability is remarkable indicating the high peaks following the Mexican crisis and following the Argentinean default. Uruguay's credit market was slightly less integrated, with a CID 4.69%. By regarding column 2 and 4 of differences between the credit market and the treasury bill market become evident. A larger CID for the credit market than for the treasury bill market in Uruguay might reflect the fact that creditors in Uruguay faced relatively higher transaction costs or were more prone to default than treasury bills that are predominantly issued by the government and also on international markets (Banco Central del Uruguay [1995]).

The Cointegration of the Stock Markets

Sanchez Valle [1998] estimated an error-correction model (Johansen methodology) for the stock exchange indices of the United States, Argentina, Brazil, Chile

and Mexico for the period 1976:1 to 1998:3. Like the other two stock exchanges the MERVAL (Argentina), the BOVESPA (Brazil) and the Dow Jones index (USA) are cointegrated. The three stock indices converge to a long-run equilibrium. The first two estimations cover the whole period, once with a dummy variable for the 1987 stock exchange crash and once without. In both estimations the adjustment coefficient for Argentina (-0.020 and –0.018) is much larger than for the two larger countries (-0.003 and –0.003 for Brazil; 0.004 and 0.003 for the USA) (see Table 6). For the period from 1976 to 1987 the hypothesis of a cointegrated vector for all stock indices was rejected indicating a lower degree of integration in the second half of the seventies and the first half of the eighties.

The post-stock exchange crash period from 1987 to 1998 is characterized by much faster adjustment to shocks, relative to the adjustment in the models estimated from the larger samples. In Argentina the adjustment coefficient increased to –0.487, in Brazil to 0.071 and in the United States to 0.058.[61]

In conclusion, the lack of harmonized data does not allow for directly comparable results on the degree of capital market integration in all MERCOSUR countries. The CID on the T-bill markets in Brazil and Uruguay suggests a highly integrated Uruguayan T-bill market and a highly disintegrated Brazilian T-bill market in the period from 1995:1 to 2002:2. During the same period the CID on foreign currency credit in Argentina and Uruguay were in a range of 3 to 4%, in principle, indicating an intermediate degree of integration in this financial sector. The high volatility of the Argentinean rate provides evidence of the recently occurred disintegration. The cointegration of the stock market indices of Argentina, Brazil and the USA point at rather highly integrated stock markets in the Western Hemisphere. [62]

Openness of Trade

The McKinnon criterion of trade openness (compare 3.2.2.2) is often applied in empirical works on the optimum currency area theory. According to the expectations the two larger MERCOSUR countries show a significantly lower degree of openness than do the smaller countries. Openness was defined as the ratio of either exports or imports divided by GDP in nominal terms. The empirical data that is described below is summarized in Table 7.

When MERCOSUR was created Argentina's exports to Brazil were worth 1.01% of its GDP. The respective figure almost tripled by 1997 to 2.97% and thereafter declined again to 2.38% in 2001. In 1990 imports from Brazil represented 0.51% of GDP. A maximum value of 2.49% was reached in 1997, which in 2001 decreased to 1.98%. In 2001 the two small MERCOSUR countries Paraguay and Uruguay bought Argentinean products worth 0.18% and 0.28% of the Argentinean GDP. In the same year the two countries sold products worth 0.11% and 0.12% respectively.

The importance of Brazilian intra-MERCOSUR exports was low in the very beginning of MERCOSUR. In 1990 Brazil sold exports worth 0.16% of its GDP to Argentina. These exports increased by approximately 400% to 0.83% in 1993. In 2000 a maximum of 1.06% was achieved and shed 0.08 percentage points to 0.98% in 2001. The share of Brazilian exports to the two small MERCOSUR countries Paraguay and Uruguay was 0.09% and 0.07% respectively. The numbers of the import side in 2001 differ only slightly from the export side, for Paraguay it was 0.08% and for Uruguay 0.15%

Surprisingly the creation of MERCOSUR coincided with an important drop of Paraguayan sales to Brazil. Initially exports to Brazil represented 5.93% of Paraguayan GDP in 1990, subsequently dropping to 2.65% in 1992, increasing again to 5.42%, and finally dropping to 2.30% in 2000. After being close to 1% from 1990 to 1996 exports to

Argentina increased sharply to 3.19% in 1997 and finally represented a mere 0.92% in 2000. The import side is characterized by a more continuous increase. Imports from Brazil, Argentina and Uruguay rose from 4.22%, 3.27% and 0.19% in 1990 to 7.35%, 7.13% and 1.04% respectively.

Similar to Paraguay the creation of the customs union coincides with a significant decline in Uruguayan exports to Brazil. Exports to Brazil represented 6.06% of GDP in 1990 and fell to a minimum of 2.3% in 2001. Exports to Argentina increased from 0.98% in 1990 to 2.55% in 1998 and consequently decreased to 1.65% in 2001. The Uruguayan import side showed less significant changes. In 1990 Argentinean imports represented 2.62% of the Uruguayan GDP and increased to 3.69% in 2001. Brazilian exports stayed stable at 3.95%, being the same in 1990 and in 2001. Trade with the other small MERCOSUR country Paraguay is of hardly any significance, exports amounted to 0.43% and imports to 0.13% in 2001.

In 2001 the intra-MERCOSUR-trade-to-GDP ratios for Argentina, Brazil, Paraguay and Uruguay were 5.06%, 2.62%, 20.82% and 11.45%, Brazil being the MERCOSUR economy with the lowest degree of openness vis-à-vis the other three MERCOSUR countries. The respective ratios exhibit clear growth for Argentina, Brazil and Paraguay (166.3%, 201.3% and 39.8% respectively for the period from 1990 to 2001). The same ratio shows a negative growth for Uruguay (-17.08%).[63]

The last 3 rows in Table 7 further reveal that Argentina's degree of openness comprising intra- and extra-MERCOSUR is the lowest within MERCOSUR (18.8%) of which a fraction of 5.06 percentage points (or 26.9%) represents intra-MERCOSUR trade. Brazil too is a relatively closed economy with an overall degree of openness of 19.4%. Intra-MERCOSUR trade is smallest relative to total Brazilian trade with a share of 2.62 percentage points (or 13.5% of total Brazilian trade). The respective figures for Uruguay and Paraguay are 26.7% and 11.45 percentage points (or 42.9%) and 42.2% and 20.82 percentage points (or 49.33%) The two small MERCOSUR economies do not only have a higher degree of openness in terms of total trade but are also more intertwined with MERCOSUR in terms of their high share of intra-MERCOSUR trade.

For an analysis of Argentinean-Brazilian intra-industry trade see Lucángeli [1993] and Baumann [1998]. According to the latter intra-industry trade determined by the Grubel and Lloyd [1975] measure represented 56% at the 3-digit level and 41% at the 5-digits level in 1996.

Endogeneity of OCA Criteria

> Thesis 5: Integration of trade will probably increase the degree of trade openness and therefore lead to a higher degree of symmetry of shocks. In MERCOSUR the customs union is not yet perfectly implemented, and it was created just several years ago. With further trade integration, a further increase in intra-trade and less asymmetrical shocks to the trading bloc are likely.

Business cycles were subject to analysis before. Shocks to GDP between 1980 and 2001 tended to be asymmetrical. Shocks were decomposed into permanent and transitory components but no distinction between exogenous and endogenous shocks could be made. Carrera *et al*. [1998] provides a decomposition into endogenous and exogenous

shocks. In their analysis exogenous shocks tend to be more symmetrical than endogenous shocks to GDP. Thus, it can be concluded that endogenous shocks to the MERCOSUR economies have been rather asymmetrical in the past. This does not, however, mean that this asymmetry has to persist in the future.

It was found that further integration of trade and deeper economic integration in general will likely lead to the convergence of the business cycles in an economically integrated area. An empirical analysis whether business cycles have converged in MERCOSUR will not be very fruitful at the moment due to the lack of usable data. From the eighties on trade integration deepened on an international (Garriga and Sanguinetti [1995a] p. 6) and regional scale. The transition of the customs union ended in 1994, with the two large, and in 1995, with the two small, MERCOSUR countries.[64] From the point of view of trade integration it would only make sense to analyze business cycles from 1995 on.[65]

However, no doubt remains that the creation of MERCOSUR resulted in a significant increase of intra-regional trade flows. This impact not only becomes evident by regarding the openness of trade figures mentioned before but its effects have also been confirmed econometrically in a gravity equation model by Garriga and Sanguinetti [1995b]. Bilateral trade between Argentina and Brazil correlates positively with the product of the GDPs and negatively with the geographical distance between the two countries. Comparing two data sets (1987 and 1992) and adding two dummy variables (adjacency in terms of contiguous borders and a MERCOSUR dummy variable) as well as an explanatory openness variable (trade in terms of GDP), the two authors find that the creation of MERCOSUR had significant effects on trade flows. For the 1992 data set, all estimated variables were significant at the 1% level and showed the expected signs. Thus, Garriga and Sanguinetti [1995b] p. 21) *"conclude ... that tariff preferences within MERCOSUR have had an independent and positive effect on regional trade. Nevertheless it is also clear that once geography and unilateral trade policies are taken into account, the effect of tariff preferences on bilateral trade is greatly moderated."* In other words, the effect of MERCOSUR is comparatively small to the effects of unilateral trade liberalization and geography. Does this change the conjecture for the endogeneity of the OCA criteria for MERCOSUR? If it does, it does so only to a limited extent. Whether unilateral trade liberalization cum the increased importance of geography or preferential trade agreements, in the form of a customs union, explain increasing bilateral trade will not change the conclusions to be drawn for the endogeneity of the OCA criteria. Cycles should be expected to converge within MERCOSUR and if the unilateral trade liberalization explains trade with the rest of the world cycles should also converge accordingly with the cycles of the rest of the world.

Endogeneity has not only to be seen in terms of a different trade policy but also in terms of stabilized economic policies in general. It is often highlighted in literature that Latin American economies were subject to frequent and severe policy shocks in the past. This was due to political mismanagement and subsequent attempts to stabilize the respective economies (see inter alia Ramos [1985]; Bruno [1988]; and Machinea and Fanelli [1988]). Since these shocks were numerous and are difficult to identify and above all are not necessarily relevant for the current state of the MERCOSUR economies, conclusions drawn on the analysis of business cycles in the eighties and in the nineties should be very cautiously dealt with. In this period the business cycles of the MERCOSUR countries were very much influenced by endogenous policy shocks. Business cycle analysis in the context of the endogeneity of the OCA criteria will only make sense after the MERCOSUR economies will have stabilized successfully over longer period (in terms of cycles).

Thesis 6: The establishment of a common central bank with the principle objective of price level stability requires a bundle of rules and measures, inter alia, the guarantee of the independence of the national central banks that represent the predecessors of the common central bank. The central banks of the MERCOSUR countries have already shown some convergence in their degree of independence in recent years. An inflation targeting regime for the national central banks of MERCOSUR could help increasing their credibility further.

Suppose the MERCOSUR countries agreed about the creation of a common MERCOSUR central bank (MCB) with the exclusion of the currency-board-for-all-MERCOSUR-countries variant.[66] Since the three MERCOSUR countries Argentina, Brazil and Uruguay showed hyperinflationary or highly inflationary behavior in their recent past, commitment of the MCB to the stable-price level objective would be crucial.

As with the creation of the European central bank (ECB), independence of the MCB would represent an important ingredient for signaling effective commitment to the price level objective. Besides the commitment to price level stability the credibility of the MCB could be increased by sensible regulations with respect to the protection of the soundness of the banking system, provision of the necessary preconditions of a functioning market mechanism, rules of regulation and direct intervention and avoidance of the use of derivatives (Blejer [1998]).

In many of these fields the central banks of the single MERCOSUR countries have already made advances. In particular, the central banks could enhance their degree of independence in recent years. Thus, the question of credibility would rest, inter alia, on two important aspects:

(1) Has the degree of independence of the national central banks increased considerably? Would the MERCOSUR members allow for a supranational independent MCB, thus ceding national sovereign rights to a supranational authority?

(2) Would IT enhance credibility of the national central banks further and pave the way for a MERCOSUR Central Bank?

Convergence in Independence of the National Central Banks in MERCOSUR

Independence of the national central banks of the MERCOSUR members has increased over the past years. Hence, when thinking in terms of a credible future MCB the question will be whether the MERCOSUR members agree credibly on common objectives and rules for the MCB and whether they are prepared to cede national sovereign rights to a supranational entity. Nonetheless, it has to be taken into account that Brazil *'represents two thirds'* of MERCOSUR (Kronberger [2001a] p. 24). In real political terms it is difficult to imagine that Brazil would cede power to a supranational entity where all four MERCOSUR countries were represented by equal shares. However, it is not intended to analyze political motives for and against the establishment of a common central bank for MERCOSUR from the perspective of the respective member country.

In the following a tentative answer to the questions will be given whether the central banks of MERCOSUR have been able to increase their degree of independence and to which extent.[67] The results of two studies of two different time periods was compared. Cukierman [1992]) - he constructed a set of indicators for the measurement of the degree of central bank independence for the period 1950 to 1989 - and Zagari Rigolon [1996] - this study updates the Cukierman indicators for the Brazilian central bank up to 1996 - will be presented and compared. In addition, the Organic Charter of the Argentinean central bank was analyzed according to the Cukierman criteria.

Cukierman distinguishes three different sets of indicators for the measurement of central bank independence: (1) legal independence, (2) turnover of central bank governors, (3) and a questionnaire identifying factors which most likely are responsible for the divergence between the central bank charter and the actual practice. The turnover of central bank governors should also like (3) show the deviation of the actual term in office and the legal norm in general.

(1) Cukierman constructed sixteen variables that were divided into the four groups: chief executive officer, policy formulation, final objectives and limitations on lending. A value equal to 1 corresponds with the highest degree of independence and a value equal to 0 corresponds with the lowest degree. For Argentina, Brazil and Uruguay the average without weights of these 16 variables[68] was calculated: From 1972 to 1989 the respective coefficients were equal to 0.43, 0.20 and 0.20. When this time range was divided into two subsets (1972-1979 and 1990-89) the coefficients stayed the same. The degree of legal independence of the Argentinean central bank almost doubled the ones of the other two MERCOSUR countries. Of all analyzed central banks in the eighties, legal independence was highest in Switzerland (0.68), West Germany (0.66) and Austria (0.58). Based on Kronberger [2001a] the legal independence of the Argentinean Central Bank was calculated by including a more limited range of variables[69] than in Cukerman [1992]. Assignments of values to the variables were based on the analysis of the Argentinean Central Bank Charter of 1992 including amendments until February 2002. The non weighted average of the 11 variables resulted to be 0.53 in 1989 compared to 0.62 in 2002.[70] According to these numbers a slight increase in the legal independence of the Argentinean Central Bank during the nineties can be stated. (Table 8).

(2) The turnover rates of CB governors were available for Uruguay and Argentina for the period of 1950 to 1989. For Uruguay it was 0.48 (approximately 2 years) and for Argentina it was 0.93 (every 13 months a new CB governor was assigned). In the period from 1991 to 2002 this coefficient increased to 0.41 and thus proxied the value of Uruguay.[71] In the nineties the turnover of central bank governors in Brazil was still considerable. In February 1999 Arminio Fraga was appointed Brazilian central bank governor. He was the fifth governor since the introduction of the Real Plan 1994/95 indicating a coefficient close to 1 (Ambito Financiero, [1999b]).

(3) The third set of indicators draws on 9 questions[72] which are put as a questionnaire to monetary specialists. Like the rotation criterion these questions aim at the divergence of legal and real independence. In Cukierman [1992] the analyzed group of countries only included Uruguay from the MERCOSUR countries. The indicator of real independence yielded a value of 0.49 for Uruguay, where it ranked 18 out of 24 (non weighted average).[73] Zagari Rigolon [1996] obtains a degree of real independence of 0.29 for 1980 to 1985 and 0.33 for 1986 to 1989. Like Uruguay Brazil's position would be in the last quartile. For the nineties the Brazilian central bank improved its degree of real independence. It increased to 0.45 in 1992 and to 0.64 in 1996 (see Table 9).[74]

The case of the Brazilian maxi-devaluation of January 1999, with the successive change of the exchange-rate regime, had shown that after adhering to an exchange rate based stabilization program the abandonment of the exchange rate anchor did not necessarily lead to a relapse into its hyperinflationary past. Partly the successful changeover (in terms of the maintained price level stability) is attributable to the increased credibility of the Brazilian central bank (compared to Pre-Real Plan periods) and also due to its increased degree of independence.[75].

On 21 June 1999 the Brazilian central bank adopted successfully an IT regime - joining a growing group of emerging market countries that have already done so before.[76] The inflation target was set at 8% in 1999, 6% in 2000 and 4% in 2001 allowing for deviations of +/-2% from the target. So far inflation was brought down and targets were met within the intervals. The chosen price index for IT is the Broad Consumer Price Index (IPCA). The operational framework of IT is based on a small number of small-scale structural econometric and short-term univariate forecasting models, as well as on surveys of market expectations of a set of macroeconomic variables. The effects of changes in the interest rates on monetary demand and the exchange rate are monitored and simulated. Annual inflation is evaluated at year end. An escape clause does not exist. In September 1999 the Brazilian central bank started to issue a quarterly inflation report with information on current and future inflation performance, also including the effect of monetary policy on prices.

A particularity of the Brazilian IT regime is the type of inflation the central bank has to handle. Specifically public services are priced backward. Thus backward looking prices are weighed with 25% in the IPCA and are known to be overly persistent requiring a relatively tight monetary policy of the Brazilian central bank (Bogdanski [2001] p. 26).

Dias Carneiro [2000] p. 16) presumes that "...the Brazilian economy is still excessively dependent on the fluctuations of international liquidity." The interest rate has - due to anomalies in the Brazilian financial system - been determined rather by the exchange rate channel than by credit and asset market channel. A well functioning credit sector would be needed for avoiding boom-and-bust credit cycles.

Roughly three years after the Brazilian currency crisis Argentina defaulted on its foreign debt and had to abandon its currency board. It changed gradually over to a flexible exchange rate regime.[77] In the first seven months of 2002 the index of consumer prices rose to 34,7%. Wholesale prices rose 97,5% indicating a significant exchange-rate pass-through in the tradable sector. The Argentinean central bank has already implemented some elements in its charter with hindsight to IT. "The BCRA shall primarily and essentially preserve the value of legal tender (.....). It shall also disclose the grounds on which the targets already informed have not been attained and submit a new program on a quarterly basis or whenever a bias on projected targets is foreseen." Recommendations by the independent Advisors that where invited by the Argentinean government and by the IMF confirm the viability of the implementation of IT in Argentina (Tietmeyer *et al.* 2002). Thus, high probability prevails that the second large MERCOSUR economy will adopt an IT regime in the near future.

In the case Argentina adopts an IT regime it will similar to Brazil face a period of transition whose length is difficult to estimate. The IT regime has to be designed and implemented and thereafter gradually refined. After the abandonment of the currency board and the subsequent pesification of the economy it will take time until the behavior of the economy can be grasped appropriately by econometric models and stable parameters can be determined. Also consistent macroeconomic management has to be put in place.

Fiscal equilibrium is an important ingredient for a well working IT regime. In addition, well functioning financial markets will be necessary to allow for an effective transmission channel for monetary policy.

After Argentina will have taken this step and the IT regimes of both large economies are well established the build up of a common MERCOSUR central bank could be tackled. An adequate IT framework for MERCOSUR as whole should be designed. For the framework design among others the following crucial points are to mention:

- Build up of the technical and institutional capacity to model and forecast inflation
- Understanding of the monetary transmission mechanism and development of appropriate policy responses to shocks. Shocks and appropriate policy responses may differ across MERCOSUR countries. The effect of interest rate changes may induce varying effects on balance sheets of the single MERCOSUR members. Inflation persistence may be of different nature. Backward-looking indexation is an issue in Brazil, dollar-indexed contracts and public services are present in Argentina (Soldano Deheza [2002]).
- Estimation of the time lag between the adjustment of monetary instruments and their effect on output and prices. These time lags may be different in the single countries.
- Determination of adequate price indicator and target level: Although a consensus in literature exists that for emerging markets headline inflation is the appropriate indicator (e.g. Agénor [2000]) there may be pros and cons for the single countries targeting core inflation or pronounce either tradable or nontradable prices. Further, the target will also have to accommodate to growth differences.
- Determination of an explicit quantitative target for inflation for some periods ahead: an optimal horizon has to be found for MERCOSUR. A longer horizon will favor output stabilization at the cost of credibility. Current inflation as well as the output[78] gap between Argentina and Brazil will have to be lowered before this issue can be seriously discussed.
- Exchange rate regime: Although in a MCB exchange rate vis-à-vis the member countries are fixed by definition, the level of the exchange rate vis-á-vis third countries remains an issue. Relatively high foreign indebtedness of the MERCOSUR countries points toward some intermediate exchange rate objective for the future MCB.
- As is already a prerequisite for the national IT regimes fiscal equilibrium and deep financial markets would help to lend the MCB sustained credibility.

As this outline has shown yet there are some tasks pending which would prevent an immediate establishment of a common MERCOSUR central bank. However, if these issues are solved, monetary union could become reality medium or long term.

V. Concluding Remarks

Evidently MERCOSUR will not start negotiating a treaty on a MERCOSUR monetary union à la Maastricht tomorrow. MERCOSUR is a relatively recent integration

project. MERCOSUR was able to profit from considerable momentum in its early stage, in the first half of the nineties. A difficult economic environment put the weakly institutionalized integration scheme to test in the second half of the nineties. Efforts in deepening the integration scheme have virtually come to a halt. Yet MERCOSUR represents nothing more than a customs union. A further deepening of the integration scheme toward a common market or even monetary union was only manifested by declarations of intentions. Concrete steps into this direction are still on the agenda. Changes in the institutional design, that is, a move toward supranational institutions would represent an essential ingredient for the successful creation of a monetary union. Such a step is conditioned by political rather than by economic factors. One of the crucial questions for MERCOSUR monetary union will be whether the largest MERCOSUR country will cede sovereign rights to supranational MERCOSUR entities.

The Brazilian currency crisis of 1999 clearly illustrated the economical and political turmoil caused by competitive devaluations. Interestingly, in the beginning of MERCOSUR, Brazil launched the initiative for setting up exchange rate bands for MERCOSUR, a proposal which was then rejected by the Argentinean authorities. Thereafter, the tables turned. In 1998 devaluation expectations on the Brazilian real increased drastically that finally culminated in the currency crisis of January 1999. As a consequence, the Argentinean authorities started to publicly discuss full dollarization of their economy, thus, reducing the declared desire of establishing a single MERCOSUR currency to absurdity. The abandonment of the currency board in 2001/02 and the subsequent announcement of the Argentinean authorities to possibly implement an inflation targeting regime similar to Brazil points toward future convergence in MERCOSUR regarding monetary and exchange rate policies.

Economic analysis provided some interesting answers and identified issues to be investigated further:

The application of the traditional OCA criteria to the MERCOSUR countries would render MERCOSUR straight forward a non-optimal currency area – a result which was expected. In the past GDP cycles were highly asymmetrical. They differed in timing, size and duration. From this point of view one would have to argue that in the absence of acceptable wage flexibility and alternative adjustment mechanisms as, for instance, fiscal transfers or mobile labor equilibrating the abandonment of a flexible exchange rate would be very costly for the MERCOSUR countries. Such a conclusion, however, would abstract from two basic aspects: (1) The only indicator analyzed was the GDP variable. A sophisticated identification of different shocks could not be undertaken; and (2) From the description of stylized facts it can be assumed that many of the shocks were of endogenous nature due to the stop-and-go policies very common during the eighties and the first half of the nineties. Thereafter, all MERCOSUR economies had become relatively more stable and evidently exogenous shocks prevailed in the second half of the nineties (Kronberger [2001a] p. 154). At the turn of the millenium, the currency and debt crises in Brazil and Argentina introduced particularly strong shocks to the latter economy leading to an immense output drop estimated to reach 15% of GDP in 2002 (Krueger [2002]).

If once concluded that shocks occur asymmetrically, alternative adjustment instruments to a flexible exchange rate regime should be analyzed. The empirical analysis of labor mobility within MERCOSUR suggested that labor moved from the smaller to the larger countries in the past. Consequently an asymmetrical shock between Argentina and Brazil would not have been equilibrated by moving labor, as far as timing is concerned. It can also be doubted that labor between the smaller countries moved to balance for asymmetrical shocks. Usually a bundle of heterogeneous motives are responsible for labor

migration (political and economical motives) which are not covered by simple migration statistics and which are simply not taken into account in the OCA literature. Wage flexibility in the MERCOSUR countries was low during the nineties. The maxi-devaluations in Argentina and Brazil brought about increased real wage flexibility in both countries. Yet specifically in Argentina it is questionable how wages will behave over the medium term. The capital mobility is of an intermediate degree within MERCOSUR. The covered interest rate differentials for Uruguay points toward high integration of its T-bill market and medium integration of its credit market during the observation period. The average of the Argentinean interest rate differential in its credit market is similar to that of Uruguay, although the Argentinean differential exhibits an extraordinarily large standard deviation indicating the recent Argentinean decoupling from the world financial markets. The Brazilian interest rate differential indicates an increased insulation of its T-bill market. However, portfolio capital movements do not necessarily balance for asymmetrical shocks. Even worse, portfolio capital movements can represent an additional source of shocks. Finally, the McKinnon criterion was applied to MERCOSUR. As could be expected, the larger the economy was, the lower the degree of trade openness was. Nonetheless, Brazil's low level of intra-MERCOSUR share was not really expected. The high growth rate of bilateral trade with Argentina leaves room for speculation about increasing interdependence between the two large MERCOSUR countries. Paraguay and Uruguay show high interdependence with the two large MERCOSUR countries and would thus, according to the McKinnon criterion, represent far more optimal candidates for a monetary union than Argentina and Brazil. Intra-industry trade between Brazil and Argentina was at similar levels in 1985 and 1996, close to 50% in both measures (3 digits and 5 digits). All in all, even though Brazil's trade with Argentina and MERCOSUR is relatively unimportant, intra-industry trade seems to be quite significant.

This work, however, should have contributed to the insight, that the singular application of these indicators is only of limited value, if any at all. The endogeneity argument for MERCOSUR is very important. Economic models in all MERCOSUR countries were subject to major and minor changes during the last three decades. Further liberalization on the sub-regional level and also a deepening of the MERCOSUR integration scheme is highly probable. Admittedly it is hard to predict of which nature (qualitatively and quantitatively) the effects of ongoing political and economic integration will be.

Differences in productivity in MERCOSUR are likely to persist. Suspected swings in the long-run real exchange rate, under the assumption of a nominally fixed exchange rate or a common currency, makes increased wage flexibility desirable. Thus, the MERCOSUR countries should strive for more flexible labor markets. More flexible labor markets would increase the optimality of the MERCOSUR region as a currency area. As mentioned before, little can be said about the future behavior of the cycles of the single MERCOSUR economies. From this point of view, ongoing economic analysis of the MERCOSUR countries is necessary in order to learn more about the comovement of MERCOSUR cycles. Future economic analysis should also include the two smaller MERCOSUR countries Paraguay and Uruguay (and the associate members Chile and Bolivia, too). This is even more desirable, since current studies on MERCOSUR of Argentinean and Brazilian origin tend to concentrate merely on the two large MERCOSUR economies.

For real word considerations, however, the De Grauwe-citation: *„Therefore, it is utopian to separate the problem of monetary union from political unification... Monetary union is an essential part of political union."* is very true. If economic disequilibria combined

with the absence of consensus on monetary and economic policy prevail impulses rather for disintegration than integration can be the consequence. Recently the Brazilian and the Argentinean debt and currency crises put much distress on MERCOSUR. The integration process has virtually come to a halt. Thus, short-term both economies need to stabilize before the focus can be geared again toward increased monetary and exchange rate cooperation. Medium term, however, policy cooperation may be increasingly institutionalized together with the build up of macroeconomic credibility converting the establishment of a MERCOSUR monetary union into a viable option.

Notes

[1] The latter 2 works analyze the viability for monetary union rather from a Latin-American perspective than from a focussed view on MERCOSUR.

[2] E.g. Niehans [1980] elaborated a treatise on monetary theory. Inter alia, this work reconciles micro- and macroeconomic theory.

[3] Assume a two country model with one internal and one external policy objective per country. In total they have four instruments (assume government expenditure and the interest rate) at their disposal. If the target is an equilibrated balance of payments, it has to be balanced for both countries. Thus, four instruments are at disposal and only three targets are present. If there are *n* countries and *n-1* countries have their balance of payments in equilibrium the *n*th country will also find its balance of payments in equilibrium without having done anything. The remaining target could then be defined by common consensus.

[4] Compare Hamada [1974], the seminal work in game theory.

[5] A single monetary policy of a monetary union, however, is not equal to a coordinated monetary policy between a group of economies. If the various members of a monetary union are char1acterized by a different financial market structure of the single members, by varying regulations in the national financial markets, a single monetary policy might prove not to be optimal for all members of a monetary union.

[6] Compare Niehans ([1980] p. 130). Theoretically it is relatively demanding to integrate scale economies of monetary transactions into a general theory of money.

[7] For an extensive treatment of money externalities see Caravelis ([1994] pp. 190).

[8] The institutional aspect should not be underestimated. Even though it is easy to switch the currency in the private sector, the authorities may insist on receiving tax payments and may affect transfers in the domestic currency despite its perceived utility.

[9] The neo-classical growth model conjectures diminishing returns on capital. Additional output per worker will decrease with a rising capital-labor ratio. As increased investment is equal to postponed consumption additional output growth at a certain point will not suffice to maintain investment. The capital-labor ratio will return to its initial level.

[10] See EG Kommission ([1990] pp. 86), De Grauwe ([1992] pp. 71) or Barro and Sala-i-Martin [1995] which graphically analyze the differences between the two growth models concerned.

[11] Some authors, inter alia, Bencivenga and Smith ([1991] p. 196) take financial development as an exogenous factor, which is determined by legislation and government.

[12] However, the application of policies dampening aggregate demand (for example, a tight monetary policy) could at least reduce the upward pressure on nontradables, but at the expense of output growth in the short run (possibly in the long run too).

[13] Ricci ([1997] p. 34) formalized an OCA model where one criterion is the negative correlation of monetary disturbances. Compare also Buiter ([1999a] p. 26).

[14] Compare Argy(1994) and Gandolfo(1995) for the different model settings.

[15] In developing/emerging countries devaluations may even prove to exert a depressing effect on output (compare – inter alia – Lizondo and Montiel [1989] Agènor and Montiel [1996] pp. 248).

[16] Government stands here for either the central bank or for the treasury; e.g., it is the French Treasury who fulfills the function as a lender of last resort for the African central banks of the CFA-Franc zone (Berrigan and Carré [1997]).

[17] Various works try to shed light on the implications of fiscal flows for monetary unions, inter alia, Eichengreen and von Hagen [1995], and Dornbusch [1997].

[18] Taking the European Union as a reference, redistributive flows would correspond, inter alia, with the so called *'Cohesion Funds'*. Bayoumi and Masson [1994] report that in the EU a decline of approximately US $1 in national income is compensated for by an increase of US $0.03 of the structural funds for the period of 1989 to 1993. Stabilizing transfers are almost negligible in the EU. In Canada and in the US redistributive flows compensate US $0.39 and US $0.22 respectively for a US$1 decrease in per capita income.

[19] When considering long-term capital movements in a small open economy the equation for the trade balance or net foreign investment respectively for Argentina and Brazil can be written:

$S_A - I_A = NX$

$S_B - I_B = -NX$

If at the same time when Argentina suffers the negative demand shock, incentives to saving S_A are less relative to investment I_A and the reverse development can be observed for Brazil; the current account of Argentina would continue to deteriorate. Again, under the assumption of rigid wages and rigid prices unemployment in Argentina would increase (Fleming [1971]).

[20] However, Mundell [1961] does not clearly distinguish between the two factors labor and capital in his analysis.

[21] As a recognized study EG Kommission [1990] is one of the first to refer to real wage flexibility in the context of the OCA Theory. Mundell [1961] assumed rigid wages.

[22] Zero capital mobility, as assumed by Mundell [1961] for his OCA approach, yields the same result. Regarding fiscal policy with zero capital mobility in the extended MF model, fiscal policy becomes completely ineffective, too. Fiscal policy will become more effective, the more the capital account opens.

[23] They argue that, under the assumption of imperfectly substitutable domestic and foreign assets, devaluation triggers wage increases through the imported input channel that in turn augments credit demand, therefore increasing domestic interest rates and depressing domestic output.

[24] The validity of this link was questioned by Kenen ([1967] pp. 52) himself. Investment depends, inter alia, on the perception of the investors. If they perceive a decrease of external demand only as temporary, they might not reduce domestic investment. However, it could also be the other way round.

[25] The findings of the *'new'* trade theory, that not only goods are traded when a country possesses a comparative advantage, but also that differentiated goods are traded (intra-industry trade) added a further aspect to OCA theory. Countries possessing a high share of intra-industry trade are more likely to face a symmetrical shock, since it is more probable that similar products will be affected by the same disturbance.

[26] While the previously listed criteria focus on adjustment to predominantly temporary disturbances the latter criterion envisages rather permanent disturbances, for example lasting productivity shocks.

[27] An in-depth analysis regarding political factors influencing the creation and continuity of monetary unions can be found in Theurl ([1992] pp. 291). Important theses are: (1) Political visions and their marketing are essential in providing momentum to deepening integration. (2) Left sovereignty to the member states of an integration scheme bears potential for intra-union conflicts, thus, jeopardizing a smooth continuance of an integration project. (3) Money has never ceased to be political. (4) Missing coordination rules in the monetary unions of the 19th century, led to the existence of temporary disequlibria, the infringement of agreements and also to the dissolution of monetary unions. (5) Adjustment processes in past monetary unions often led to the dissolution of monetary unions based on inter-government institutions and international law.

[28] Barro and Gordon ([1983] p. 114) identify the following cases in which inflation is less costly: (1) in the presence of high natural unemployment rate (2) during a recession (3) facing a huge real stock of nominally denominated public debt.

[29] As one key determinant for the giving up of the fixed exchange rate, they could identify real appreciation. Another study by Martinez Peria [1997] demonstrates by means of a logit analysis that most forced devaluations in Latin America are of a Krugman-type. Bad fundamentals, as, for instance, foreign reserves, current account balance, domestic credit, overvalued exchange rates, etc. force the exchange rates out of fixity. The author, however, failed in operationalizing the credibility variables. The number of exits during the last 12 months and the durability in months of an exchange rate peg obviously do reflect the credibility effect only insufficiently. An alternative measure would be the indication of a simple loss of competitiveness in terms of an overvalued exchange rate. This condition obviously augments the likelihood of a future devaluation. Compare Agènor and Mélitz ([1996] pp. 196).

[30] Exchange-rate based stabilization has often been implemented in Latin American economies, sometimes successfully and occasionally this type of stabilization attempt was deemed to failure. The probability of success augmented with the perceived commitment of the authorities to the rules and accompanying measures in the fiscal area. For various analysis on stabilization attempts see, inter alia, Bruno et al. [1988].

[31] A flexible exchange rate regime which is accompanied by consistent macroeconomic management can be perfectly credible, too. Nonetheless, in this work the viability of monetary union for a set of developing/emerging countries is analyzed.

[32] Of course this does not apply to any debt level. If the debt level is too high, the interest rate also reflects default risk, etc. This component, however, cannot be eliminated by a monetary union. Rather, if the high interest rate results from inflation expectations, augmented credibility through the joining of a monetary union will likely result into a reduced interest rate.

[33] In fact, the Brazilian maxi-devaluation seems worthy of discussion in the context of endogeneity. Under the assumption that large fiscal deficits resulted from economic mismanagement and the current account deficit from an overvalued currency that gave impetus to the maxi-devaluation, at least the large fiscal deficit could have been avoided by proper economic management without altering the exchange rate regime. Maybe the devaluation would not have occurred under a more convergent and consistent economic policy, e.g. more convergent fiscal policies. It seems to be – at least to some extent – as if the provision of a stable macroeconomic environment itself would render a currency area more optimal. One could speak, so to say, of a twofold endogeneity: one resulting, from trade opening and converging monetary policy, and one resulting from a stabilized economic environment.

[34] Further, it has to be taken into account that liberalization will change the behavior of the respective economies, again rendering the analysis of past shocks less valuable.

[35] Examples for an asymmetrical exchange rate union would be the CFA-Franc zone (Boughton, 1991). In the dollar region, for a more institutionalized exchange rate union, the Argentinean currency board until 2001 and for an asymmetrical monetary union, inter alia, Panama can be mentioned.

[36] Agénor ([2000] p. 19) points out that - in particular for emerging markets - inflation targeting proves to be superior to a monetary targeting regime. A successfully functioning monetary targeting regime requires the appropriate knowledge of the parameters for money demand. In economies that face structural changes, i.e., financial (de)liberalization this parameters may be highly unstable.

[37] For a more detailed analysis of the economic cost of the Brazilian devaluation, including the presentation of stylized facts of the devaluation, the behavior of various trade sector variables and the induces uncertainty by the devaluation see Kronberger [2001a]. At the moment of writing the Argentinean debt an currency crisis was to recent for a similar analysis as applied to Brazil.

[38] Clearly the Argentinean government discarded the application of tariffs, since it obviously contradicted the spirit of the customs union.

[39] A loose exchange of statistical data and meetings within SWG 10 exists.

[40] On 13 January 1999 the Argentinean press was still talking about rumors concerning a possible devaluation of the real vis-à-vis other currencies (Ambito Financiero, 1999a). The following day, the public as well as the officials of the MERCOSUR countries, were confronted by the facts without prior information (Gerschenson [1999]).

[41] The Bonex Plan represents a debt rescheduling program adopted in one of the previous stabilization attempts in Argentina (Almansi and Rodriguez [1997]). It converted domestic debt to convertible debt that was denominated in US dollar.

[42] Own calculations based on data from Central bank of Brazil and Instituto Brasileiro de Geografia e Estatística/IBGE.

[43] The CEI [1999] analysis provides data only until September 1999. The author is conscious that a longer observation period would allow for a more extensive and valuable analysis. More recent material similar to the CEI study on the topic was not available.

[44] From the Argentinean devaluation to the moment of writing the time series available would have been much too short for sensibly computing the effectiveness index for Argentina.

[45] Although the Brazilian devaluation was relatively successful in terms of the effectiveness indicator by Edwards [1989], effects on the fiscal balances were not taken into account. In December 1999 22,8% of domestic federal government debt was indexed in foreign currency (Source: Brazilian National Secretariat Treasury, *http://www.federativo.bndes.gov.br/bf_bancos/estudos/e0001773.ppt* (29.08.2002).

[46] The below cited numbers are all drawn from the Global Development Network Growth Database (Worldbank). Although real GDP would have been more desirable it was not provided by the World Bank. Instead the adjustment of GDP to PPP in USD had to be taken. It allows for the comparison between the respective countries. Nonetheless, since Argentina, Brazil and Paraguay were highly inflationary economies it cannot be taken for sure that all distortions were eliminated by this relatively aggregate adjustment operator. As of August 2002 the most recent observations dated until 1999.

[47] For a small survey on economic growth and liberalization see Edwards ([1997] pp. 119).

[48] Standard data sources like IFS, national statistical institutes, World Bank and many more were consulted for large samples of continuous time series data. Moreover, it was already indicated earlier in this work that in the case of Paraguay, if statistical data is available at all, this data does not reflect the black market economy that represents up to 50% of the Paraguayan economic activity.

[49] A series is said to be integrated of order one – this denotes $I(1)$ – if after taking the first difference a stationary process results.

[50] For a short introduction on unit-root testing see Greene ([1997] pp. 847) or Kennedy ([1992] pp. 265). The augmented Dickey-Fuller test is more appropriate for small samples in the case of non-normal errors and heteroskedasticity whereas the Philips Perron test displays better properties when applied to large samples and if the errors are autocorrelated. Since the sample size was intermediate both tests were used for the time series at hand.

[51] The GDP and CPI time series used in this section were drawn from the sources as follows: International Financial Statistics/IFS, International Monetary Fund, Washington D.C.; Instituto Nacional de Estadística y Censos, Buenos Aires; Instituto Brasileiro de Geografia e Estatística/IBGE, Rio de Janeiro; Instituto Naciona de Estadística, Montevideo; Banco Central do Brasil, Brasilia; Banco Central de la República Argentina, Buenos Aires, Banco Central del Uruguay, Montevideo. Quarterly observations for the Paraguayan GDP and CPI were not available.

[52] In Kronberger [2001a] alternatively the Beverdige-Nelson [1983] method was applied. However, as the sample was extended the Beveridge Nelson decomposition did not deliver sensible results. Whatever parameter used the cycle ranges appeared the be excessively large.

[53] According to Tichy ([1976] pp. 45) GDP is easily justifiable as a single business cycle indicator as changes in GDP reflect changes in many of the variables suggested by NBER.

[54] A significantly positive correlation here is defined to be within the range of 0.5 and 1.0.

[55] Compare also Carrera et al. [1998] and Kronberger ([2001a] pp. 174).

[56] Compare also (Maguid [1997] p. 3). In addition, Argentina is an expeller of

professional, technical and qualified labor that heads mainly to the US, Canada and Europe.

[57] 1,392 Brazilians emigrated to Argentina and 1,031 Argentineans emigrated to Brazil.

[58] Paraguay receives a large share of Brazilian immigrants. The reasoning, however, is different. Brazilians hold a considerable share of territory in Paraguay (Heikel and Rojas Bahr [1993]).

[59] For an application to Argentina see Kronberger [2001a]. The Engle-Granger cointegration method applied to the period from 1980:1 to 1991:1 - proceeding the Convertibility Plan - indicated a closed financial sector. The saving and investment ratio were cointegrated. An extended range from 1991:2 to 2001:4 (compared to 1991:2 - 1994:4 in Kronberger [2001a]) could not be computed since, the two ratios were of different orders, the saving ratio was *I*(1) and the investment ratio was *I*(0). The application of the Engle-Granger cointegration method requires these time series to be of the same order. Thus, cointegration during the extended period can be discarded suggesting a more open financial sector during the nineties.

[60] For a discussion on the three different measures see Garcia and Valpassos ([1998] pp. 14).

[61] The Merval index already comprises shares, which are also quoted on the New York Stock Exchange. One example is YPF (its listing can be confirmed by typing *'YPF'* at the website of the New York Stock Exchange *http://www.nyse.com*) The same holds true for the Brazilian stock market. Examples for listed Brazilian enterprises are TELEBRAS, EMBRAER, etc. The double quotation in two stock markets also represents a cause for a closer comovement of the respective stock indices.

[62] Levy Yeyati and Sturzenegger [1999b] provide an overview regarding tests on financial integration which correspond by and large with the findings presented before in the case of Argentina and Brazil. For the Brazilian financial markets Garcia and Barcinski [1996] and Garcia and Valpassos [1998] provide a better benchmark for recent years.

[63] Far reaching commercial bilateral agreements, already concluded in the eighties between Uruguay and Brazil might have reduced trade barriers between these two countries considerably before the creation of MERCOSUR. Trade between the two countries might have caught up to levels of trade usually observed between neighbor countries with low trade barriers. Thus, later in the nineties the development of trade responded less to the elimination of trade barriers than to, for example, the business cycles of the neighboring countries. The same argument would be valid for Paraguay. The effects of its large black market and smuggling might be similar to that of the trade agreements.

[64] For a more detailed analysis on tariffs and remaining trade protection in MERCOSUR see Laird [1997].

[65] In the study of Frankel and Rose [1996] the time interval used for the econometrical analysis was 34 years and thus could grasp a number of subsequent cycles. For MERCOSUR, at the time of writing, the respective time interval would be seven years.

[66] Eichengreen [1998] discusses three monetary options for MERCOSUR: (1) a currency board for all, (2) a single currency for MERCOSUR, and (3) no exchange-rate coordination.

[67] Central bank independence is an important ingredient for a well functioning central

bank independent from its monetary regime: "One precondition regarded as essential [for inflation targeting] is *central bank independence.* There is broad agreement that instrument independence is desirable for good monetary policy, whatever the exact policy framework." Amato and Gerlach [2002] p. 783).

[68] These 16 variables are: Term of office *(too)*; Who appoints CEO *(app)*; Provision for dismissal *(diss)*; Another office held *(off)*; Monetary policy formulation *(monpol)*; Conflict resolution *(conf)*; Active role in the formulation of government's budget *(adv)*; CB's objectives *(obj)*; Limit on advances *(lla)*; Limit in securitized lendings *(lls)*; Who decides on lending terms *(ldec)*; Width of circle of borrowers *(lwidth)*; Type of limit *(ltype)*; Maturity of loans *(lmat)*; Limit on interest rate *(lint)*; Lending in primary market *(lprm).*

[69] These selected variables are *too*(0.25/0.75), *obj*(0.0/0.6), *diss*(0.83/0.83), *app*(0.25/0), *off*(1.0/1.0), *lla*(0.33/0.66), *lls*(0.33/0.66), *lwidth*(1.0/1.0), *lmat*(1.0/0.33), *monpol*(0.33/0.66), *lint*(0.5/1). The first value in parenthesis represents the 1989 value drawn from Cukierman [1992] and the second value in parenthesis own assignments according to the Organic Charter 1992 including amendments until 2002.

[70] For reasons of comparability the monetary policy formulation variables had to be left out which in the Cukierman calculus were very low. Monetary policy formulation did not figure in the Organic Charter 1992. This explains why the own calculus delivers a somewhat higher degree of legal independence than in Cukierman [1992]. On rather speculative grounds it could be argued that the calculus for 2002 would result in a lower degree of legal independence if the monetary policy formulation variables were included. Indicative for such an assumption are recent changes in the exchange rate regime with the stipulations of the Laws 25.561 by the Congress, the change of the fixed exchange rate to a dual exchange rate regime (BCRA [2001] p. 50) and its subsequent change over to a unified flexible exchange rate system by the Decision 260/2002 *http://infoleg.mecon.gov.ar/txtnorma/72193.htm* (08.08.2002).

[71] I1n the dawn of the Argentinean Crisis Pedro Pou was forced to resign from his post as governor to the Argentinean central bank (Krueger [2002]).

[72] The specialists had to assign a value between 0 and 1 to the following questions: Tenure overlap with political authorities; Limitations on lending practice; resolution of conflict; Who determines the budget of CB?; Who determines the salaries of high CB officials and the allocation of CB profits?; Are there quantitative monetary stock targets?; Are there formal or informal interest rate targets?; What is the actual priority assigned to price stability?; Does the CB function as development bank that grants credits at subsidy rates?

[73] Germany was first with a value equal to 1.

[74] The determination for real independence according to the Cukierman questions was not possible. At the moment of writing the amendments of Organic Charter and the laws concerning the exchange rate regime had been in force only for several of months.

[75] Although this happened at the expense of elevated interest rates (Godfajn and Baig, [2000] p. 12).

[76] For a more detailed description of the Brazilian IT regime and discussion see - inter alia - Bogdanski et al. [2000]), Bogdanski et al [2001] and Dias Carneiro [2000]).

[77] For an analysis on the Argentinean crisis see Hausmann [2002] and Krueger [2002]. For an analysis on the Argentinean exchange rate regime see Kronberger [2001b] and Kronberger [2002].

[78] Krueger [2002] estimates a 15% GDP loss for Argentina for 2002 whereas the projections for Brazil are an increase of 1.1% for the same year (Economist.com [2002]).

Table 1

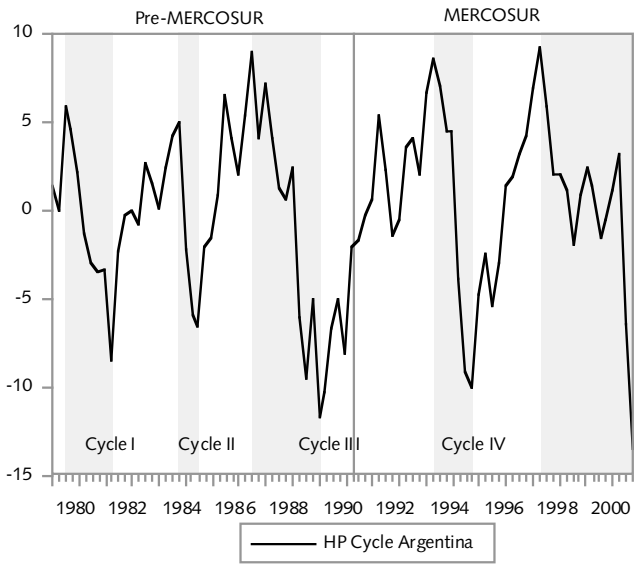
TASAS ANUALES DE CRECIMIENTO DE LOS PAÍSES DEL MERCOSUR
(En porcentajes)

Annual growth	Real GDP *per cápita* - geom. average	Real GDP *per cápita* - geom. average	GDP adjusted to PPP in US$ - geom. average	GDP adjusted to PPP in US$ - geom. average
	1975-1999	1991-1999	1975-1999	1991-1999
Argentina	0.28%	2.62%	5.46%	5.53%
Brazil	0.92%	1.08%	6.68%	4.16%
Paraguay	1.12%	0.16%	8.15%	4.11%
Uruguay	1.29%	2.47%	5.94%	5.57%
Arithmetic average	0.90%	1.58%	6.56%	4.84%
Growth difference (highest - lowest)	1.01	2.46	2.69	1.46
Standard Deviation	0.44	1.18	1.18	0.81

Source: Own calculations based on the Global Development Network Growth Database, World Bank, Washington, D.C.

Diagram 1

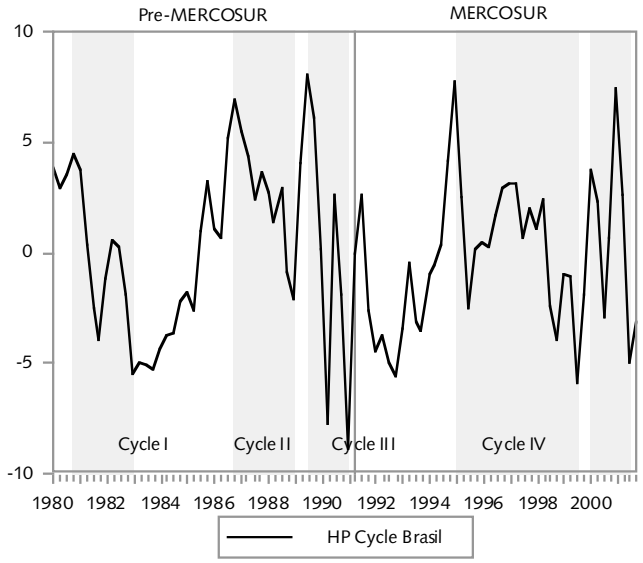
HP CYCLE OF THE ARGENTINIAN GDP (1980:1 - 2001:4)



HP start	HP end	Duration
1980:3	1984:3	4.25
1984:4	1987:2	2.75
1987:3	1994:1	6.50
1994:2	1998:1	4.00
1998:2	2001:4+	2.75+

Diagram 2

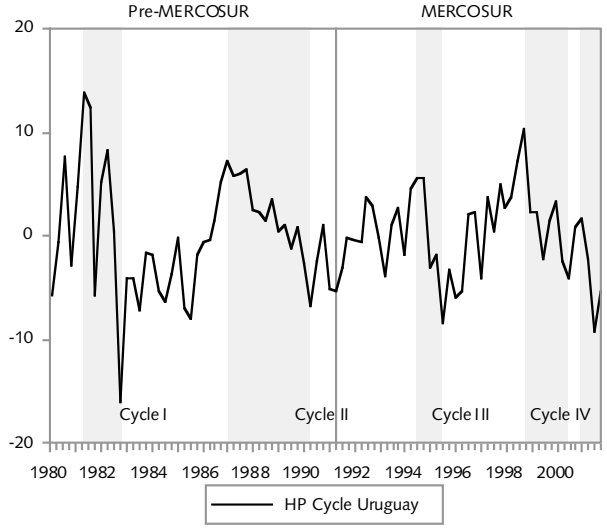
HP Cycle of the Brazilian GDP (1980:1 - 2001:4)



HP start	HP end	Duration
1980:4	1986:3	6.00
1986:4	1989:2	2.75
1989:3	1994:4	5.50
1995:1	1999:4	5.00
2000:1	2001:4	2.00+

Diagram 3

HP Cycle of the Uruguayan GDP (1980:1 - 2001:4)



HP start	HP end	Duration
1981:2	1986:4	5.75
1987:1	1994:2	2.75
1994:3	1998:3	4.25
1998:4	2000:4	2.25
2001:1	2001:4	+1.00

Table 2

CORRELATION MATRIX OF *c* [1]

Correlation Matrix *c*		GDP_{Arg}	GDP_{Bra}	GDP_{Ugy}
Whole period 1980:1 - 2001:4	GDP_{Arg}	1.000		
	GDP_{Bra}	0.202	1.000	
	GDP_{Ugy}	0.371	0.288	1.000
Pre-MERCOSUR 1980:1 - 1991:1	GDP_{Arg}	1.000		
	GDP_{Bra}	0.224	1.000	
	GDP_{Ugy}	0.221	0.425	1.000
MERCOSUR 1991:2 - 2001:4	GDP_{Arg}	1.000		
	GDP_{Bra}	0.201	1.000	
	GDP_{Ugy}	0.602	0.057	1.000

Note: [1] Calculated by the RATS 4.0 ® @BNDECOMP procedure.

Table 3

ARGENTINA: IMMIGRANTS FROM BORDERING COUNTRIES

					Employed	Total population	Unemployed
	1980		1991		1991	1991	1991
Country of birth	abs.	%	abs.	%	%	%	%
Brazil	42,945	16.33	35,351	8.09	0.05*	0.02	4.8
Paraguay	262,946	62.65	261,767	59.92	52.84	6.03	5.1
Uruguay	113,767	27.11	139,721	31.98	12.38	4.48	8.9

Note: * 1990.

Source: Maguid [1997] and Inter-American Development Bank, Washington D.C.

Table 4

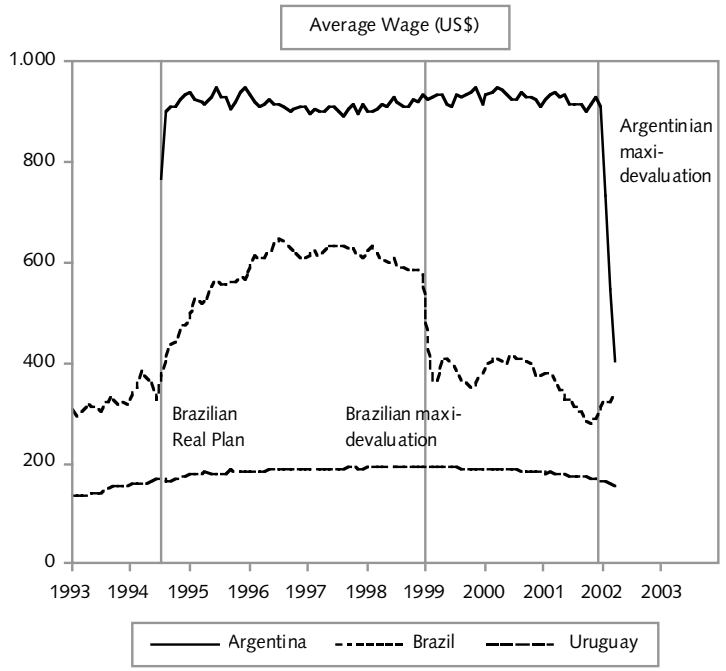
Intra-Regional migration in MERCOSUR

	Emigrants			Immigrants			*Stock* balance1990
	1980	1990	(% of total 1990)	1980	1990	(% of total 1990)	
Argentina	89,640	99,570	14.54	411,307	418,326	61.10	net recipient
Brazil	152,257	154,516	22.57	65,431	66,627	9.73	net expeller
Paraguay	278,430	271,660	39.68	143,438	158,327	23.12	net expeller
Uruguay	133,273	158,823	23.20	33,424	41,289	6.31	net expeller
MERCOSUR	*653,600*	*684,569*	*100.00*	*653,600*	*684,569*	*100.00*	

Source: Baeninger ([2002] p. 35).

Diagram 4

MERCOSUR: Seasonally adjusted average wage indices in US$ deflated by US CPI



Source: MERCOSUR SWG 4 Comisión de Indicadores Macroeconómicos, Montevideo

Table 5

ARGENTINA, BRASIL AND URUGUAY: COVERED INTEREST RATE DIFFERENTIAL
(60C.F - 60C) OR (60P.F - 60P), 1995:1 - 2002:2

Covered Interest Rate Differential	Argentina lending rate (60p.f-60p)	Uruguay lending rate (60p.f-60p)	Brazil Treasury Bill (60c.f-60c)	Uruguay Treasury Bill (60c.f-60c)
Observations	86	86	53	51
Average %	3.15	4.69	9.59	0.51
Standard Deviation %	5.31	0.97	3.18	0.61

Source: IFS; IMF, Washington, D.C.

Table 6

ADJUSTMENT COEFFICIENTS INDICATING STOCK MARKET INTEGRATION IN MERCOSUR

Coefficients of adjustment	Argentina	Brazil	USA
No dummy (1976-1998)	-0.0202	-0.0033	0.0040
With dummy (1976-1998)	-0.0188	-0.0032	0.0029
Pre-October 1987 (1976-1987)	Rejection of single cointegrating vector		
Post-October 1987 (1987-1998)	-0.487	0.0712	0.0581

Source: Sánchez Valle [1998].

Table 7

MERCOSUR: INTRA-REGIONAL TRADE / TRADE OPENNESS
(% of GDP)

Arg X	1990	2001	Bra X	1990	2001	Ugy X	1990	2001	Pgy X	1990	2000
Brazil	1.01	2.38	Argentina	0.16	0.98	Argentina	0.98	1.65	Argentina	1.06	0.92
Paraguay	0.10	0.18	Paraguay	0.09	0.14	Brazil	6.06	2.30	Brazil	5.93	3.28
Uruguay	0.19	0.28	Uruguay	0.07	0.13	Paraguay	0.07	0.43	Uruguay	0.23	1.12
Arg M	1990	2001	Bra IM	1990	2001	Ugy IM	1990	2001	Pgy IM	1990	2000
Brazil	0.51	1.98	Argentina	0.34	1.22	Argentina	2.62	3.69	Argentina	3.27	7.35
Paraguay	0.03	0.11	Paraguay	0.08	0.06	Brazil	3.95	3.28	Brazil	4.22	7.13
Uruguay	0.06	0.12	Uruguay	0.14	0.10	Paraguay	0.13	0.09	Uruguay	0.19	1.04
Intra-MERCOSUR	1.90	5.06		0.87	2.62		13.81	11.45		14.89	20.82
Extra-MERCOSUR	9.00	13.74		11.13	16.78		23.49	15.25		28.91	41.38
Total trade	*10.90*	*18.80*		*12.00*	*19.40*		*37.30*	*26.70*		*43.80*	*42.20*

Source: Centro de Economía Internacional, Ministerio de Relaciones Exteriores, Comercio Internacional y Culto, Buenos Aires.

Table 8

DEGREE OF LEGAL CENTRAL BANK INDEPENDENCE IN ARGENTINA, BRAZIL AND URUGUAY, FROM 1972-1989 AND 2002

			Reduced var. set	Reduced var. set
Country	1972-1979	1980-1989	1980-1989	2002
Argentina	0.43	0.43	0.53	0.62
Brazil	0.20	0.20	0.20	n.a.
Uruguay	0.22	0.22	0.19	n.a.

Source: Cukierman ([1992] p. 396) and author's own calculations 2002.

Table 9

DEGREE OF REAL CENTRAL BANK INDEPENDENCE IN BRAZIL AND URUGUAY

	Uruguay	Brazil	Brazil	Brazil	Brazil	Brazil
	1980-1989	1980-1985	1986	1987-1989	1990-1992	1994-1996
Weighted average	0.49	0.29	0.33	0.33	0.45	0.64
Non weighted average	0.49	0.25	0.35	0.35	0.46	0.68

Sources: Cukierman [1992] and Zagari Rigolon [1997].

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