

REACTIVATING THE DYNAMISM OF MERCOSUR: A MONETARY APPROACH

Jose U. MORA*

Alberto J. HURTADO

Sadcidi ZERPA DE HURTADO

Abstract: Considering the monetary approach, this article analyzes the feasibility of creating a new currency in the Southern Common Market (MERCOSUR) as an option to recover the dynamism observed in the previous decade. The hypothesis suggests that the creation of a new currency is desirable if it is possible to increase the growth rate of real gross domestic product (GDP) and to reduce price volatility. Empirical evidence suggests that the alternative of creating and implementing a new currency in the bloc is desirable and highly feasible due to the positive correlations observed among their countries' business cycles and domestic currency depreciation rates, as along with the possibility of creating a central bank responsible for the common monetary policy with low inflationary bias.

Keywords: monetary integration, monetary policy, exchange rate, MERCOSUR

JEL: E52, E61, F15, F33, F41.

1. Introduction

The Southern Common Market (MERCOSUR, in Spanish) is experiencing one of its worst periods since its creation in 1991. MERCOSUR is stagnant because there are no dynamic forces that can improve its outward growth. Furthermore, these growth opportunities seem to have faded (Hurtado and Mora, 2018), despite Brazil's efforts to insert itself into the negotiations for the Trade in Services Agreement (TiSA), which is based on the General Agreement on Trade in Services (GATS) of the World Trade Organization (WTO) (Ramírez, 2017).

In particular, the Brazilian economy's isolation from the global economy's main production chains, caused by a loss of competitiveness with China and other countries and by the appreciation of the Brazilian real from 2010-2015, have caused the dynamics that Brazil experienced from 2000-2010 to stagnate. This isolation is evident in the lack of new North-South free trade treaties or agreements (Veiga, Rios and Naidin, 2013; Giacalone, 2015; Mora, 2016).

Consequently, MERCOSUR must reinvent itself and make important decisions that enable it to recover this lost dynamism and establish itself as a stronger, integrated bloc in a globalized world (Hurtado and Mora, 2018), a world in which the hegemonic position of the United States is changing.

----* Jose U. Mora, Departamento of Economics, Pontificia Universidad Javeriana, Cali, Colombia; E-Mail: jose.mora@javerianacali.edu.co. Alberto J. Hurtado, Centro de Pensamiento Global, Universidad Cooperativa de Colombia, Bogotá, Colombia. E-mail: Alberto.hurtado@campusucc.edu.co. Sadcidi Zerpta de Hurtado, Department of Economics, Universidad de los Andes, Venezuela. E-mail smzerpa.@ula.ve

Thus, this article considers the political changes in Brazil and Argentina over the last four years and analyzes other alternatives, such as monetary integration, which could reinforce the integration of the MERCOSUR member countries. This is not the only option; in contrast, the need for the common market to insert itself into the dynamics of integration will surely bring about new possibilities, and monetary integration is one of them.

With the signing of Protocol No. 20 between Brazil and Argentina on currencies and finance on July 17, 1987, the Southern Cone took the first step was taken to standardize the criteria around monetary and financial issues. Through the creation and use of a common currency called the Gaucho, this protocol aimed to minimize the cost of trade, increase intraregional trade, encourage the dedollarization of the region, ensure exchange rate stability, and force the convergence of the economic cycles of this trade bloc as an initial step toward a single currency.

However, the progress of trade integration and the discussions on issues of what would later be called MERCOSUR hindered the implementation and development of the Gaucho alternative (Lavagna and Giambiagi, 1998). Negotiations resumed between 1997 and 2006, when agreements on economic policy coordination mechanisms and the convergence of macroeconomic indicators were discussed. At the time, structuralist concepts dominated the academic and political spheres (Hurtado, Zerpa and Mora, 2018, 2019). However, the radicalization and resurgence of leftist ideas in Latin America, the 2008 international financial crisis and its effects on Latin American economies, and the subsequent European Union crisis practically halted the progress that had been made in the first few years of the previous decade, with the consequences mentioned above. For the MERCOSUR countries, the evidence shows that the option of convergence from a structuralist approach has not been effective in achieving the proposed objectives and has also been a very slow process.

Therefore, this article proposes an economic convergence based on a monetary union that fully aligns with the criteria established in the optimum currency area theory advocated by Mundell (1961), McKinnon (1963) and Kenen (1969). The creation of a monetary union and a common regional currency would produce stability and exchange rate discipline that would foster commercial and financial integration, thereby eliminating asymmetric shocks and enabling the convergence of economic cycles without the need to adjust exchange rates (Nogueira, 1998).

The change in strategy of MERCOSUR to a monetary integration could be considered as an option for eliminating exchange rate volatility, correcting price instability, reducing asymmetries in economic cycles, and facilitating progress toward the coordination of macroeconomic policies in the region. This could be viewed as a way of advancing the regional integration process, as it would lead to lower costs in the exchange of goods and services, increased credibility for the anti-inflation policies of the member countries, and zero exchange rate risk (Hurtado, 2014).

To analyze whether this plan is suitable for MERCOSUR, we need to weight the costs and benefits of a monetary integration. This analysis must first consider the relative weight that each local government gives to employment and price stability objectives. The higher the priority to control inflation, the greater the preference for exchange rate

anchoring. Next, we require an assessment of the effectiveness of the adjustment mechanisms. The more skeptical the authorities are about the ability of the nominal exchange rate to influence the economy, the more priority will be given to exchange rate rigidity. Last, we need to carry out an analysis of the perceptions that authorities have of price and wage flexibility and of the factor mobility for achieving internal, nonexchange-rate, adjustments (Purroy, 2014).

The decision to create and sustain a currency area in MERCOSUR requires assessing the viability of two alternatives: 1) each country maintains an independent currency regime; 2) a single currency regime replaces national currencies with a common, regional currency that is not a currency of a member country or the U.S. dollar (for example).

In this sense, it is theoretically acknowledged that exchange rate rigidity resulting from the creation and adoption of a single currency regime also entails the minimization of the cost of transactions conducted in the region due to the elimination of exchange rate and currency exchange risk. Likewise, it facilitates a better allocation of financial system resources since the system stabilizes interest rates and inflation. Last, it creates an environment that promotes the development of trade and investment flows, stimulates economic growth, improves the credibility of public management of the economy, and strengthens the political stability of countries.

However, some of the costs associated with the adoption of a common currency (unlike an independent monetary regime), are that central banks no longer have the discretion to implement monetary and exchange rate policy because this function now pertains to a monetary authority (the central bank of the monetary union), responsible for issuing and circulating the new common currency. This would increase losses for countries when there are asymmetric shocks that affect economies in different ways or in different time periods.

This article is organized as follows: the next section presents a theoretical model that compares the costs and benefits of adopting a common currency with those of an independent currency policy. Section 3 describes the data and section 4 discusses the main results of the empirical study. The last section presents the main conclusions.

2. Theoretical discussion

The empirical analysis in this article is based on the model presented by Clarida, Galí and Gertler (1999) and has more recently been used by Karras (2002, 2003, 2003b, 2005, 2012), Mora (2006), Furceri and Karras (2008) and Hurtado and Mora (2018). This model allows discerning the characteristics of an optimum currency policy, acknowledging that it significantly influences the evolution of the real economy in the short-term and that a country's (or group of countries') choice of currency management options has significant consequences for aggregate activity.

The model enables the identification of the costs and benefits of being part of a monetary union, taking into account the variability in the product of the group of countries interested in moving toward a single currency regime, compared to the costs and benefits of conducting a discretionary monetary policy. Considering the effects of economic

integration on the autonomy and independence of monetary policy, this methodological approach, unlike other methods of assessing the possibility of creating an optimum currency area, includes an aggregate supply with greater specificity and a broader dynamic structure (Karras, 2002, 2003, 2003b, 2005).

Thus, per Karras (2002, 2003, 2003b, 2005, 2012), Mora (2006), Furceri and Karras (2008) and Hurtado and Mora (2018), it has been assumed that there are N economies ($i = 1, 2, \dots, N$) and in each economy the loss function for the monetary authority has the following form:

$$L_i = \frac{1}{2} E_t \left\{ \sum_{j=0}^{\infty} \beta^j [a_i (y_{i,t+j} - k_i)^2 + \pi_{i,t+j}^2] \right\} \quad (1)$$

where y_i is the real output (in deviations from its trend), π_i is the inflation rate, a_i is the relative weight given to deviations from the product ($a_i > 0$), and k_i is the distance from the production goal of each country i . For this last item, $k \geq 0$ is assumed when distortions are seen due to market imperfections and the impact of taxes on the real economy, and E_t and β are the expected value and discount factor, respectively.

For each economy, we assume that the aggregate supply is given by the following Phillips curve, augmented by expectations:

$$\pi_{i,t} = \lambda_i y_{i,t} + E_t \pi_{i,t+1} + u_{i,t} \quad (2)$$

where $\lambda_i > 0$, $u_{i,t} = \phi_i u_{i,t-1} + z_{i,t}$, $0 < \phi_i < 1$ y $z_{i,t} \sim iid(0, t_i^2)$. This equation can also be written in terms of aggregate supply as:

$$y_{i,t} = \vartheta_i (\pi_{i,t} - E_t \pi_{i,t+1}) + v_{i,t} \quad (3)$$

where $\vartheta_i = 1/\lambda_i$ y $v_{i,t} = -u_{i,t}/\lambda_i$. Considering that $v_{i,t} = \phi_i v_{i,t-1} - \lambda_i^{-1} z_{i,t}$, this means that:

$$\sigma_i^2 \equiv Var(v_{i,t}) = t_i^2 [\lambda_i^2 (1 - \phi_i^2)]^{-1} \quad (4)$$

With this information, the theoretical implications of the effects of exercising an independent monetary policy versus the effects of adopting a common currency in the region are described below.

2.1 Independent monetary policy

For the first alternative, central banks maintain their independence and autonomy to implement monetary policy. Within the context of the model outlined above, this implies minimizing equation (1) subject to constraint (2), which enables deriving the following function for discretionary actions by monetary authorities:

$$\pi_{i,t}^{IND} = a_i q_i u_{i,t} + \frac{a_i}{\lambda_i} k_i = -a_i q_i \lambda_i v_{i,t} + \frac{a_i}{\lambda_i} k_i \quad (5)$$

and

$$y_{i,t}^{IND} = -\lambda_i q_i u_{i,t} = \lambda_i^2 q_i v_{i,t} \quad (6)$$

where the *IND* superscript describes the inflation and production results achieved when using an independent monetary policy, and $q_i = [\lambda_i^2 + a_i(1 - \beta\phi_i)]^{-1}$. The behavior of the economy is explained by the average (trend) of the inflation rate, which is equal to:

$$\bar{\pi}_i^{IND} = \frac{a_i k_i}{\lambda_i} \quad (7)$$

and real output volatility (economic cycle) is given by:

$$Var(y_i^{IND}) = \lambda_i^4 [\lambda_i^2 + a_i(1 - \beta\phi_i)]^{-2} \sigma_i^2 \quad (8)$$

Based on these results, inflation bias is expected to increase with the relative weight assigned to output deviations (a), the production target of the authorities (k), and the slope of aggregate supply ($\phi_i = 1/\lambda$). Thus, there is a trade-off here between the inflation rate and output variability: if a is very low (indicating that the central bank is very conservative in the sense of giving greater weight to inflation over real product), then average inflation will be very low, but real output will be very unstable. In contrast, when the monetary authority gives greater weight to real product, a will be high, implying that production will evolve more stably but with a higher inflation rate.

2.2 Common currency

Suppose that the MERCOSUR member countries decide to move toward a monetary integration. This article proposes the creation of a new currency—let us call it the *Sureño*¹ (Southern)—and the delegation of monetary policy to a supranational monetary authority, a common central bank for all member countries.

Implementing this proposal and generalizing equations (1) and (2) produces a loss function for the common central bank that can be written as:

$$L_M = \frac{1}{2} E_t \left\{ \sum_{j=0}^{\infty} \beta^j [a_M (y_{M,t+j} - k_M)^2 + \pi_{M,t+j}^2] \right\}$$

where the subscript M indicates the values of the MERCOSUR variables and parameters. The regional aggregate supply then becomes:

$$\pi_{M,t} = \lambda_M y_{M,t} + E_t \pi_{M,t+1} + u_{M,t}$$

Thus, for country i , in equilibrium, equation (5) can be reduced to:

$$\pi_{i,t}^{NM} = \pi_{M,t} = a_M q_M u_{M,t} + \frac{a_M}{\lambda_M} k_M = -a_M q_M \lambda_M v_{M,t} + \frac{a_M}{\lambda_M} k_M$$

which, when substituted in equation (3), becomes:

$$y_{i,t}^{NM} = -a_M q_M (1 - \phi_M) v_{M,t} + v_{i,t} \quad (9)$$

¹ At the end of the 1980s, monetary unification was first proposed with a currency called the Gaucho (Protocol No. 20 on currency and finance between Brazil and Argentina, July 17, 1987).

where the NM superscript describes the results of adopting the *Sureño* as the bloc's new, common currency. Thus, with a MERCOSUR common central bank, the product of each bloc country is affected by its own shocks ($v_{i,t}$), and by regional shocks ($v_{M,t}$). This is because shocks affecting the region are transmitted to all of the bloc countries through the common central bank's monetary policy. Therefore, the inflation rate of each country participating in the monetary union would be given by:

$$\bar{\pi}_i^{NM} = \frac{a_M k_M}{\lambda_M} \quad (10)$$

while product volatility would be given by:

$$Var(y_i^{NM}) = a_M^2 q_M^2 (1 - \phi_M)^2 \sigma_M^2 + \sigma_i^2 - 2a_M q_M (1 - \phi_M) \rho_{i,M} \sigma_i \sigma_M \quad (11)$$

where $\rho_{i,M} \equiv corr(v_{i,t}, v_{M,t})$. These equations enable identifying the costs and benefits of implementing the *Sureño* within the framework of creating a MERCOSUR monetary union.

Thus, it is noteworthy that when comparing equations (7) and (10), the monetary unification would reduce the average inflation rates of the participating countries if the MERCOSUR common central bank follows a conservative policy ($a_M < a_i$ and $k_M < k_i$) compared to the inflation rate of each country if monetary policy were conducted independently by local central banks.

Furthermore, what stands out from equation (11) is that the product variability of each country participating in the monetary union is inversely related to the correlation of the economic cycles of the various countries in the region. Thus, monetary integration can increase each country's product volatility providing the countries have large differences in their economic cycles.

Reducing this cost of monetary unification involves recognizing a greater correlation of the economic cycles of the participating countries, while the benefits of this type of economic integration are its effect on inflation rates and greater price stability for these countries. From a monetarist perspective, the creation of a monetary union, in addition to the exchange rate and transaction cost benefits, can convert costs into benefits by reducing the asynchronies of economic cycles, thus promoting economic convergence.

3. Data description

To quantify the costs and benefits of MERCOSUR's various monetary integration alternatives, we use data for per-capita real gross domestic product (GDP_{pc}), nominal exchange rate (e), and inflation rate (π). These are available in the World Development Indicators of the World Bank Group's DataBank², and in the International Financial

² Composed of the International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA), the International Finance Corporation (IFC), the Multilateral Investment Guarantee Agency (MIGA), and the International Centre for Settlement of Investment Disputes (ICSID). This DataBank is available at: <http://databank.bancomundial.org/data/home.aspx>

Statistics database of the International Monetary Fund (IMF)³. The data set compiled from these sources for the 1980-2017 period includes four economies: Argentina, Brazil, Paraguay, and Uruguay. Bolivia and Venezuela are not included because the former is not yet a full member of the organization and the latter has been suspended by MERCOSUR since 2017.

The traditional method was used to develop the depreciation and inflation rates, using the simple growth rate $(x_{i,t} - x_{i,t-1})/x_{i,t-1}$ to obtain the annual data for inflation rates and the depreciation rates of local currencies against the US dollar, Δe . The cyclical component of the GDP_{pc} was estimated in two ways: 1) using the growth rate, g , of GDP_{pc} by simple-difference $(GDP_{pc,i,t} - GDP_{pc,i,t-1})/GDP_{pc,i,t-1}$; and 2) using the Baxter-King (1999) bandpass filter. Since these are annual frequency observations, we used a value of 2 for low frequency, 8 for high frequency, and 3 as an order of approximation to extract the cyclical component using this filter.

4. Results

The creation and use of a new common currency that is not the US dollar or one of the legal currencies of the bloc economies implies that MERCOSUR member countries must make sacrifices within each economy and reach political agreements and economic consensus with the other countries. Therefore, all monetary and economic policy coordination decisions must be delegated to the common central bank, which is the institution responsible for issuing the new currency. This bank is also in charge of ensuring economic growth and price stability in every one of the participating economies.

Table 1. Economic growth, economic cycle, nominal exchange rate and inflation, 1980 – 2017.

Country	g	$\sqrt{var(g)}$	C_{B-K}	$\sqrt{var(C_{BP})}$	Δe	$\sqrt{var(\Delta e)}$	π	$\sqrt{var(\pi)}$
Argentina	0.74	5.51	0.68	291.0	454.	2,180	216.	589
	0		7		0		0	
Brazil	0.86	3.33	19.9	184.0	272.	547.0	317.	682
	9				0		0	
Paraguay	1.60	3.46	3.16	78.2	13.4	28.4	12.5	8.79
Uruguay	1.89	4.79	3.41	241.0	28.8	40.1	31.1	30.7

Source: Calculations made by the authors based on statistical information from the World Bank and International Monetary Fund databases.

g : Average growth rate of the GDP_{pc} .

Δe : Average depreciation rate of the local currency against the US dollar.

π : Average inflation rate.

C_{B-K} : Cyclical component calculated using the Baxter-King (1999) bandpass filter.

Table 1 presents the averages and standard deviations of the variables that measure the economic cycle, the depreciation of local currencies against the dollar, and price

³ <http://data.imf.org/?sk=4C514D48-B6BA-49ED-8AB9-52B0C1A0179B>

behavior in each country from 1980-2017. These results indicate that MERCOSUR member countries have not generally exhibited high average economic growth from year to year. However, it is noteworthy that Uruguay and Paraguay have the highest economic growth rates for per capita GDP (gross domestic product). Brazil and Argentina alternately exhibit the least price stability and the highest currency depreciations, while Paraguay has exhibited the most price stability and lowest currency depreciation rate for the period.

There is a clear division of the group into two blocs resulting from the domestic impacts of the low inflation and economic growth objectives. Uruguay and Paraguay share a history of price and exchange rate stability and economic growth, while there is little credibility in the execution of anti-inflationary policies by Argentina and Brazil. Therefore, the adoption of the *Sureño* will have high costs for Uruguay and Paraguay as they surrender their monetary policy independence to a common central bank, while Argentina and Brazil, in contrast, could benefit greatly.

Table 2. Correlation of the *GDPpc* growth rates between the MERCOSUR countries, 1980 – 2017.

	Argentina	Brazil	Paraguay	Uruguay
Argentina	1.000			
Brazil	0.305	1.000		
Paraguay	0.217	0.380	1.000	
Uruguay	0.548	0.451	0.590	1.000

Source: Calculations made by the authors based on statistical information from the World Bank and International Monetary Fund databases.

Table 3. Correlation of the cyclical component of the *GDPpc* between the MERCOSUR countries using the Baxter-King filter, 1980 – 2017.

	Argentina	Brazil	Paraguay	Uruguay
Argentina	1.000			
Brazil	0.297	1.000		
Paraguay	0.220	0.512	1.000	
Uruguay	0.559	0.511	0.572	1.000

Source: Calculations made by the authors based on statistical information from the World Bank and International Monetary Fund databases.

For a new common currency to be effective, another consideration is related to the symmetries of the economies. Adopting the *Sureño* can lead to synchronous economic cycles and shocks that affect all countries, which can be of great benefit. Tables 2 and 3 present the correlations between growth rates and cyclical variations of the per capita real product.

These tables highlight the following: first, all countries exhibit positive correlation coefficients; second, Uruguay has the highest correlation coefficients with the other countries; and third, Argentina exhibits the lowest correlation coefficients with its neighbors. Accordingly, it is noteworthy that, because the cyclical fluctuations are positively correlated, these economies tend to face common shocks. Therefore, the adoption of a common currency could represent significant benefits for all.

Table 4 shows the inflation rate correlations for the South American common market countries. The results show: 1) High and positive correlation rates; 2) Uruguay, Paraguay, and Brazil have inflationary cycles that are more correlated with each other than with Argentina; and 3) Paraguay and Uruguay have the highest inflation rate correlations. These results suggest that regional management of monetary policy reduces the area's vulnerability to asymmetric shocks.

Table 4. Inflation rate correlations between the MERCOSUR countries, 1980 – 2017.

	Argentina	Brazil	Paraguay	Uruguay
Argentina	1.000			
Brazil	0.582	1.000		
Paraguay	0.587	0.663	1.000	
Uruguay	0.583	0.659	0.923	1.000

Source: Calculations made by the authors based on statistical information from the World Bank and International Monetary Fund databases.

Table 5. Depreciation rate correlations between the MERCOSUR countries, 1980 – 2017.

	Argentina	Brazil	Paraguay	Uruguay
Argentina	1.000			
Brazil	0.349	1.000		
Paraguay	0.664	0.249	1.000	
Uruguay	0.265	0.339	0.384	1.000

Source: Calculations made by the authors based on statistical information from the World Bank and International Monetary Fund databases.

Regarding the correlation of local currency depreciation rates against the US dollar, Table 5 shows that all countries have positive correlation coefficients. Paraguay and Uruguay are one pair that stand out as having nominal exchange rate cycles that are highly correlated, while Argentina and Brazil are another pair that are highly correlated. This leads to the conclusion that the region is susceptible to the same disturbances in the nominal exchange rate.

The comparative analysis of costs and benefits highlights that there are positive correlations in economic cycles, inflation rates, and currency depreciation rates of the MERCOSUR countries. This reinforces the viability of creating a single currency and a regional central bank within the framework of the monetary integration of the bloc. To leverage the benefits that this monetary unification would bring, it is necessary to emphasize that the common shocks that symmetrically influence the region's economies must be addressed through a regional central bank with a low inflation bias that is capable of correcting differences in inflationary cycles of the bloc, thereby ensuring low inflation and price stability for all member countries. These results demonstrate that this measure is desirable and potentially feasible.

The results presented above are based on a 38-year sample period during which the economies of the bloc have been severely affected by various problems, especially during the first decade and most of the second decade of the period studied. We believe that these phenomena could be negatively influencing the results obtained, and therefore a deeper examination of specific periods is required. As a result, the sample has been divided into two time periods of equal length. The first period is 1980-1998 and the second period is 1999-2017.

1980 – 1998. Instability, hyperinflation and low economic growth.

Table 6 presents results that are very similar to those in Table 1: low growth. Uruguay and Paraguay exhibit the highest average growth rates, the lowest currency depreciation rates, and the lowest inflation rates. Argentina and Brazil, on the other hand, exhibit high price variability and profound currency crises during the period.

Table 6. Economic growth, economic cycle, nominal exchange rate and inflation, 1980 – 1998.

Country	g	$\sqrt{\text{var}(g)}$	C_{B-K}	$\sqrt{\text{var}(C_{BP})}$	Δe	$\sqrt{\text{var}(\Delta e)}$	π	$\sqrt{\text{var}(\pi)}$
Argentina	0.559	5.08	- 18.30	253.0	909.0	3110.0	414.0	795.0
Brazil	0.524	3.8	8.23	223.0	551.0	687.0	645.0	873.0
Paraguay	1.52	3.42	14.00	82.90	22.6	35.40	18.7	8.51
Uruguay	1.58	5.49	-6.11	269.0	51.9	42.50	55.3	27.8

Source: Calculations made by the authors based on statistical information from the World Bank and International Monetary Fund databases.

g : Average growth rate of the *GDPpc*.

Δe : Average depreciation rate of the local currency against the US dollar.

π : Average inflation rate.

C_{B-K} : Cyclical component calculated using the Baxter-King (1999) bandpass filter.

Regarding the correlation coefficients of the economic cycles for this period (see Tables 7 and 8), first, it is evident that not all correlation rates are positive. Paraguay and Argentina have a correlation rate of -0.298 (-0.276 in the case of the cyclical component). Second, the positive correlation rates are relatively low, with the exception of Uruguay and Paraguay (above 0.50). Last, Uruguay's economy has the highest correlation coefficients with the other countries.

Table 7. Correlation of *GDPpc* growth rates between the MERCOSUR countries, 1980 – 1998.

	Argentina	Brazil	Paraguay	Uruguay
Argentina	1.000			
Brazil	0.145	1.000		
Paraguay	-0.298	0.401	1.000	
Uruguay	0.391	0.448	0.540	1.000

Source: Calculations made by the authors based on statistical information from the World Bank and International Monetary Fund databases.

Table 8. Correlation of the cyclical component of the *GDPpc* for the MERCOSUR countries, 1980 – 1998.

	Argentina	Brazil	Paraguay	Uruguay
Argentina	1.000			
Brazil	0.174	1.000		
Paraguay	-0.276	0.521	1.000	
Uruguay	0.366	0.569	0.639	1.000

Source: Calculations made by the authors based on statistical information from the World Bank and International Monetary Fund databases.

Regarding the correlation rates between the inflation rates shown in Table 9, it is evident that these are very low and insignificant, with the exception of Paraguay and Argentina. However, the opposite is observed regarding the correlation coefficients between the local currency depreciation rates (see Table 10). These coefficients are all positive and statistically significant, a pattern that matches the results presented in Table 5.

Table 9. Inflation rate correlations between the MERCOSUR countries, 1980 – 1998.

	Argentina	Brazil	Paraguay	Uruguay
Argentina	1.000			
Brazil	0.290	1.000		
Paraguay	0.710	0.107	1.000	
Uruguay	0.200	0.071	0.118	1.000

Source: Calculations made by the authors based on statistical information from the World Bank and International Monetary Fund databases.

Table 10. Depreciation rate correlations between the MERCOSUR countries, 1980 – 1998.

	Argentina	Brazil	Paraguay	Uruguay
Argentina	1.000			
Brazil	0.504	1.000		
Paraguay	0.550	0.564	1.000	
Uruguay	0.531	0.528	0.889	1.000

Source: Calculations made by the authors based on statistical information from the World Bank and International Monetary Fund databases.

1999 – 2017. Political changes.

During this period, political changes dominated the Latin American scenarios and the MERCOSUR member countries in particular. This delayed the negotiations for the course and changes needed for a much tighter integration of the common market. Thus, this is the context for the following assessment of how these political changes could have affected the conditions that are important elements for the creation of the bloc's monetary union today. The results presented in Table 11 show that average growth rates and economic cycle behaviors improved substantially over the previous period, although Uruguay continued having the largest rate of increase, and Argentina continued having the lowest rate of increase. The variability of this growth also decreased. Similarly, inflation rates and currency depreciation rates for the MERCOSUR member countries dropped to two digits or less, despite Argentina's currency crisis in the late 1990s and early 2000s.

Regarding the economic cycle correlation coefficients (see Tables 12 and 13), it is noteworthy that the correlation rates are positive and much higher than during the first period; i.e., the economic cycles of these economies are fairly well synchronized. Second, Uruguay and Argentina have cycles that are more aligned with the cycles of their neighbors. Third, Brazil has the lowest correlation coefficients, most notably with Paraguay (under 40%).

Table 11. Economic growth, economic cycle, nominal exchange rate and inflation, 1999 – 2017.

Country	g	$\sqrt{\text{var}(g)}$	C_{B-K}	$\sqrt{\text{var}(C_{BP})}$	Δe	$\sqrt{\text{var}(\Delta e)}$	π	$\sqrt{\text{var}(\pi)}$
Argentina	0.92	6.05	-11.8	333.0	22.60	53.00	18.40	12.10
Brazil	1.21	2.85	25.9	161.0	7.77	23.60	6.56	2.53
Paraguay	1.68	3.58	-18.4	74.2	4.72	16.50	6.55	3.21
Uruguay	2.21	4.10	-17.4	203.0	6.93	21.60	8.23	3.48

Source: Calculations made by the authors based on statistical information from the World Bank and International Monetary Fund databases.

g : Average growth rate of the *GDPpc*.

Δe : Average depreciation rate of the local currency against the US dollar.

π : Average inflation rate.

C_{B-K} : Cyclical component calculated using the Baxter-King (1999) bandpass filter.

Table 12. Correlation of the *GDPpc* growth rates between the MERCOSUR countries, 1999 – 2017.

	Argentina	Brazil	Paraguay	Uruguay
Argentina	1.000			
Brazil	0.499	1.000		
Paraguay	0.628	0.365	1.000	
Uruguay	0.754	0.447	0.672	1.000

Source: Calculations made by the authors based on statistical information from the World Bank and International Monetary Fund databases.

Table 13. Correlation of the cyclical component of the *GDPpc* for the MERCOSUR countries, 1999 – 2017.

	Argentina	Brazil	Paraguay	Uruguay
Argentina	1.000			
Brazil	0.477	1.000		
Paraguay	0.564	0.569	1.000	
Uruguay	0.687	0.516	0.448	1.000

Source: Calculations made by the authors based on statistical information from the World Bank and International Monetary Fund databases.

Unlike the correlation between inflation cycles of the previous period, Table 14 shows that Argentina's inflation rate is not significantly correlated with the rates of the other countries. Moreover, there are significant changes in the signs of these correlations, as is evident with the -0.298 coefficient between Paraguay and Argentina. Uruguay still has the highest correlation rates with the other countries, although it is very low with Argentina. Last, the story is completely different when looking at the correlation coefficients between the currency depreciation rates of these countries, as shown in Table 15. These are all positive and quite high, with Uruguay having the highest coefficients.

Table 14. Inflation rate correlations between the MERCOSUR countries, 1999 – 2017.

	Argentina	Brazil	Paraguay	Uruguay
Argentina	1.000			
Brazil	0.055	1.000		
Paraguay	-0.298	0.453	1.000	
Uruguay	0.304	0.768	0.463	1.000

Source: Calculations made by the authors based on statistical information from the World Bank and International Monetary Fund databases.

Table 15. Depreciation rate correlations between the MERCOSUR countries, 1999 – 2017.

	Argentina	Brazil	Paraguay	Uruguay
Argentina	1.000			
Brazil	0.547	1.000		
Paraguay	0.735	0.782	1.000	
Uruguay	0.886	0.731	0.824	1.000

Source: Calculations made by the authors based on statistical information from the World Bank and International Monetary Fund databases.

5. Conclusions

The empirical analysis performed enabled us to identify the costs and benefits of the several monetary unification alternatives for MERCOSUR regarding the possibility of adopting a common currency, such as the *Sureño*. Creating and implementing a regional common currency is a desirable and highly feasible option due to the positive correlation between economic cycles, the low inflationary bias observed in the second period of the sample, and the high positive correlation between the bloc countries' currency depreciation rates.

The creation of a supranational institution responsible for a common monetary policy could produce more benefits than costs for the countries of the region due to the low inflationary bias, the low exchange rate volatility, and the better synchronization of economic cycles. These benefits could translate into increased economic growth and intrabloc trade due to reduced exchange rate risks and transaction costs. However, it is important to note that these measures require that political agreements and the design of institutions be carefully studied and developed.

The Euro crisis and the recent weakening of the European Monetary Union should be benchmarks to consider in the design and creation of strong regional institutions that emphasize the need for greater fiscal control by member countries. Moreover, it is absolutely necessary to coordinate macroeconomic policies within MERCOSUR to reduce the impacts of asymmetries on the region.

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