Current Account, GDP Growth, Terms of Trade and Exchange Rate in Argentina

Cuenta corriente, crecimiento del PIB, términos de intercambio y tipo de cambio en Argentina

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Abstract

The article explores the relationship between Argentina's current account and its likely determinants in the light of macroeconomic and international trade theories. The analysis focuses on three key explanatory variables: the real effective exchange rate, the terms of trade and GDP-growth. The periods considered are the time under the currency board (1991-2001) and that with a flexible exchange rate (2002-2017). The statistical analysis is based on the databases of the IMF, the World Bank and UNCTAD. Results lead to discarding GDP-growth, whereas the real exchange rate and the terms of trade correlate strongly or very strongly with the current account result. As regards causality, the terms of trade seem to exert influence on the real exchange rate, which in turn determines the current account balance. The article does not elaborate on individual balances such as merchandise or services trade, this remaining a matter for further research.

Keywords: current account, exchange rate, terms of trade, gross domestic product
JEL codes: F41, F14, F31, F32

Resumen

El artículo explora la relación entre el balance de la cuenta corriente de la Argentina y sus probables determinantes a la luz de las teorías macroeconómicas y del comercio internacional. El análisis se centra en tres variables explicativas: el tipo de cambio real efectivo, los términos del intercambio y el crecimiento del PBI. Se consideran los períodos de la convertibilidad (1991-2001) y del tipo de cambio flexible (2002-2017). El análisis estadístico se basa en datos del FMI, del Banco Mundial y la UNCTAD. Los resultados per miten descartar el crecimiento del PBI, mientras que el tipo de cambio real y los términos del intercambio se correlacionan fuertemente o muy fuertemente con el resultado de la cuenta corriente. Respecto a la causalidad, los términos del intercambio parecen ejercer influencia sobre el tipo de cambio, el que, por su parte, determina el balance de la cuenta corriente. El artículo no profundiza en balances individuales, como el comercio de mercancías o de servicios, lo que requeriría investigación adicional.

Palabras clave: cuenta corriente, tipo de cambio, términos de intercambio, producto bruto interno
Códigos JEL: F41, F14, F31, F32

1. The Research Question and its Relevance

This article deals with Argentina's recurrent problems with its current account balance. Emphasis is laid upon the relative importance of its possible determinants in accordance with standard macroeconomic and international trade theories. Specifically, the role of economic growth, the exchange rate and the terms of trade is considered. The study is basically conducted by applying multivariate statistical analysis to data relating to two recent periods of Argentine economic development. Said periods involve, however, very different policies as regards both the general economic order and the variables affecting the balance of payments. To begin with, a theoretical framework is presented, which includes the definitions of and the relationships between those variables to be considered in the empirical part. A short description of the two periods in question is followed by the statistical analysis, which encompasses the analysis of volatility, of the correlation matrix as well as single and multiple regression analysis. The last part sums up the results and offers a number of conclusions as regards the effectiveness and stability of the country's exchange-rate policies and other related issues.

2. Theoretical Considerations

2.1. Current Account

The current account of the balance of payments records all economic transactions between the national economy and the rest of the world. The current account balance results from the nation's net trade regarding merchandise and services, its net earnings on cross-border factor hiring such as labour and capital, and its net transfer payments (Daniels & Van Hoose 1999; Carbaugh, 2004). In a more restricted sense, the current account balance can be interpreted as a balance between exports and imports, e.g. a deficit means that the country is importing more goods and services than it is exporting, a surplus, exactly the opposite. In this restricted sense, net income, such as interest and dividends, as well as transfers, such as foreign aid, are neglected (Ghosh & Ramakrishnan, 2017).

From a macroeconomic point of view, the current account is considered an indicator as to the ability of the domestic economy to develop within the constraints of its own resources. While a deficit indicates a net utilization of foreign savings to finance domestic expenditure, a surplus is regarded as meaning that the domestic

economy saves in excess of its needs, thus putting part of its savings at the disposal of other countries.[1]

If more is saved than invested, then the current account will yield a positive result. If the contrary occurs, the respective balance will be negative. The result is an indication of the country's international competitiveness (Focus Economics, 2018). While the absolute figures of the balance are of little practical interest if no further information is available, the relative importance of the balance in comparison with the size of the national economy bears great significance when evaluating the risks to the financial stability of both economy and currency. Thus, the use of the current account balance as a percentage of gross domestic product (GDP) has become standard in monitoring macroeconomic development and tendencies through rating agencies and international organizations.[2]

2.2. Current Account, Income and Public Finance

Of special relevance in this context is the macroeconomic import function. *M* (total imports) is assumed to consist of two elements. The first one corresponds to a certain level of supply of imported goods which is regarded as absolutely necessary for the society in question (e.g. energy or food imports) and can be called autonomous and represented by M_a. Below this level of supply, either the economy or the survival of the population might be in danger. M_a is thus generally thought of as a constant value (Bird, 2007; Brooman & Jacoby 2009; Dwivedi, 2005). The second element is variable and depends on the level of income *(Y)* and the marginal propensity to import *(m)*. Thus: $M = Ma + m \cdot Y$.

Exports being regarded as independent of income, the trade balance $(X - M_a - m \cdot Y)$ will, *ceteris paribus*, tend to improve with a reduction of income while it worsens when income grows. In a dynamic economy, this can be interpreted as follows: if the domestic economy grows faster than that of the trade partners, the trade balance will worsen, while in the opposite case, the trade balance will improve.

The current account is also related to the state of the government's finances: assuming *S = I* and introducing *G* (public expenditure) and *T* (public revenue), the sum of the demand side elements equals in equilibrium the sum of import and public revenue *(or X+G = M+T)*. If the current account is in equilibrium *(X = M)*, public finances will also be balanced *(G = T)* and the public sector borrowing requirement will be nil. But a current account deficit will be normally associated with a deficit

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[1] Assuming a given level of consumption (C), savings (S), investment (I) and current account inflows and outflows *(X-M)*, the expression: *I+X = S+M* reflects macroeconomic equilibrium in the open economy as given in national accounting. Simple transformation leads then to *X-M = S-I*.

[2] See a detailed account of this indicator including policy relevance, methodological description and institutional references in UN (2017).

in public finance or *G>T*, the so-called twin-deficits (Güida, 2007). This particular point is important for the case study of Argentina, but there is still little proof of causality either way. Theoretically, it is equally possible to state that a public sector deficit brings about a current account deficit as to state the contrary. Support for the first hypothesis is found in the ISLM-Model in macroeconomics: a deficit-spending policy and the Keynesian expenditure multiplier cause the IS-curve to move towards the right, in this case, income and imports increase. Support for the second comes from the export multiplier theory, in combination with the revenue function *T(Y)*, and is well documented in empirical observation, e.g. many financial crises in the emerging economies (such as the Asian, Russian and Brazilian crises): in this case, exports drop sharply following a foreign demand crisis or extreme appreciation of the national currency, thus generating a current account deficit, which reduces income and public revenues, while the government struggles or refuses to cut public expenditure accordingly (Fisher, 1998; Fisher, 2003). This was also the case in 1998 as Brazil allowed its currency to float, while Argentina kept the peg of the peso to the US dollar: the result was a drop of one-third in exports to Brazil and of 11 per cent in total exports, rapidly generating a trade balance crisis. As a result, Argentina fell in a deep recession which lasted until 2002 (Güida, 2007).

Theoretically, a current account deficit might spur output growth, as capital inflows and government spending mobilize demand for consumption and investment goods. On the basis of recent empirical research, however, it cannot be confirmed that developing countries running such deficits grow any faster than those running a surplus. A possible explanation for this would be the lack of development of their financial systems which generates an inefficient allocation of foreign capital (Ghosh & Ramakrishnan, 2017).

2.3. Current Account and Exchange Rate

The current account balance is also affected by the exchange rate. The so-called normal reaction states that a depreciation of the national currency results in an improved balance, as exports become more competitive and imports are negatively affected. The Marshall-Lerner condition for a normal reaction (originally presented by Alfred Marshall in 1924) states that the sum of export and import demand elasticity should be higher than one. An abnormal reaction occurs when the balance worsens in the case of depreciation due to low elasticity of imports (J-curve). Such a case has been shown to occur in Great Britain (Carbaugh, 2004) and in Brazil (Güida, 2007). Appreciation of the national currency normally leads to the inverse case: exports become more expensive and imports become cheaper, resulting in a worsening of the balance.

Exchange rate systems in general, as well as the comparative consideration of their respective advantages and disadvantages, are beyond the scope of this study.

However, a core point of conventional theory regarding fixed and flexible exchange rates should be briefly recalled. It concerns the fact that, with fixed exchange rates, fluctuations in foreign economies are passed through unfiltered to the domestic economy. Flexible systems, on the other hand, operate like a buffer: at least a part of those fluctuations is absorbed through an adjustment of the exchange rate, thus reducing their impact upon economic activity. In fact, as early as 1948 Gottfried Haberler noted that with a flexible exchange rate the currency bears the consequences of international instability, while fixed rates transmit foreign fluctuations to the domestic economy, a contagion through what he called the "boom and depression bacillus" (Haberler, 1948). This role of flexible exchange rates as opposed to fixed-rate systems has also been described as that of a "shock absorber". It is generally accepted that, while orthodox economic policies can work indistinctly with fixed or flexible exchange rates (as in the case of the Nordic countries of the eurozone), unconventional ones may require a flexible system and international cooperation to be successful.[3]

The relevant exchange rate in this study is the real effective exchange rate. As usual in economics, real is defined in terms of purchasing power and not in the sense of a certain amount of currency units.[4] The nominal exchange rate might fluctuate over time, but this may not affect the competitive position of the economy if the price level and the exchange rate move hand in hand. In this case, the real exchange rate remains constant. The exchange rate is called *effective* if it reflects the country's position against a basket of foreign currencies weighed according to the importance they possess in the country's foreign trade (CRS, 2017; Güida, 2007).

While inflation differentials between the domestic and the world economy act upon the exchange rate, nominal appreciation and depreciation do not always go hand in hand with the actual difference in inflation rates. In the context of a so called crawling peg, the rate of depreciation corresponds ideally to the excessive domestic inflation, thus keeping the real exchange rate constant over time. In other cases, however, a strong depreciation might go far beyond the recorded inflation differentials, thus making the country's exported goods much cheaper. A return to a path of equilibrium between exchange rate and domestic prices might require a longer period of time: this is the case of the overshooting exchange rates (Dorn-

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[3]   A two-country model which reflects the role of a flexible exchange rate as a shock absorber when using so-called unconventional policies and the need for international cooperation hitherto has been presented by IMF staff (IMF, 2017).

[4]   Consider the exchange rate between the two currencies Euro (€) and US dollar ($), and price levels of Pe and Pus. The real exchange rate ($/€) is calculated as RER = [$/€ · Pe/Pus]. If nominally 1€ = 1.16$ but the price level of a selected basket of goods in the euro region is 16 p.c. more expensive than the same basket in the United States, then the real exchange rate would be absolute parity (1€ = 1$) between both currencies.

bush, 1976). This case has been illustrated for a number of emerging and developing countries, like Brazil between 1998 and 2003 (Güida 2007).

2.4. Current Account and Terms of Trade

A further factor potentially influencing the current account is the development of the terms of trade, which are generally defined as the ratio of export prices to import prices (OECD 2018). Since several goods are exported or imported, their individual prices are weighed according to their importance in trade. The terms of trade can be regarded as indexes of the purchasing power of a fixed quantity of exports expressed in import units (UNSTATS, 1991):

$$Terms\ of\ Trade\ Index = \frac{Export\ price\ index}{Import\ price\ index} \times 100$$

The importance of the terms of trade lies in their development over time, which signals gains or losses exclusively due to price changes. An improvement occurs if a country can purchase more goods from abroad with a given quantity of exports than in previous periods. Calculations are normally made using the Laspeyres' price index. [5]

The index is especially important for countries specialized in the production and export of commodities, the prices of which are highly volatile, rather than for those exporting industrial goods, which tend to show a greater stability over time. Nevertheless, industrial countries are also affected by such changes in as much as they require raw materials like oil and gas for domestic industrial production, energy supply to the population, food, etc.

Changes in the terms of trade may affect currency stability, as can be shown by the relative strength of the Australian dollar, the Brazilian real or the Chilean peso during the commodity boom between 2003 and 2011. After the Brazilian crisis of 1998-2002 with its overshooting exchange rate, the Brazilian currency returned gradually, in real terms, to its original level during the period 2003-2010, a return due mainly to the strong improvement in the country's terms of trade (Paiva, 2006; Clark & MacDonald, 1998). [6]

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5   A problem both with the Laspeyres and the terms of trade indexes lies in the fact that they fail to account for changes in the patterns of demand. This is why the use of Laspeyres tends to overstate inflation. By purchasing less of those goods the prices of which increase the most, consumers offset part of the impact of inflation on their cost of living (INVESTOPEDIA, 2018). Equally, rising commodity prices only improve the trade balance of the exporting country if the exported volumes do not fall in the same proportion.

6   Nominal exchange rates: 2002: US$ 1 = 3.9 real, 2010: US$ 1 = 1.7 real.

Indirectly, the terms of trade also have a bearing on monetary variables such as the interest rate. Increasing terms of trade normally generate a larger inflow of foreign currency, allowing central banks to reduce interest rates. With falling terms of trade, on the other hand, rising interest rates might be necessary to ensure a net inflow of capital.

In summary, terms of trade effects on the current account are mainly indirect and occur through the exchange rate. However, the terms of trade should also affect economic growth, as past experiences in Latin America suggest, particularly in the post-war period (Furtado, 1976) and after 2003 (Güida & Marx, 2013), as well as more recently in Australia (Thompson, Murray & Jomini, 2012). The statistical analysis carried out in this article takes both hypotheses –a direct as well as an indirect impact– into consideration.

3. Definition of Variables and Data Sources

The four variables to be considered in the statistical analysis are abbreviated and defined below. Throughout the article they shall be referred to by the following abbreviations:

CAR: ratio of the Current Account Balance (surplus or, if negative, deficit) to Gross Domestic Product (GDP). Both are measured in current US dollar. It is considered in the context of this study to be the dependent variable.

GDPG: yearly growth rate of the real (inflation free) Gross Domestic Product in per cent.

REER: Real Effective Exchange Rate, where "real" means corrected by inflation and "effective" means weighed by a factor which represents the relative importance of the currency concerned (e.g. US$, €, etc.) in foreign trade.

TOTI: Terms of Trade Index.

The sources employed for the statistical analysis of the above mentioned variables are listed at the end of the bibliographical references under "Statistical Sources".

4. The Period Under Examination

The overall time frame considered comprises the years 1991-2017.[7] As to the type of economic policy followed by Argentina, this encompasses two different periods:

a) From 1991 until 2001, when the nominal exchange rate of Argentina's currency,

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7   An analysis of the period preceding the introduction of the currency board lies beyond the scope of this article. The interested reader is referred to Dornbusch & de Pablo (1988) for an able analysis of the macroeconomic conditions in the Argentina of the 1980s, which led to radical reforms from 1991 onwards. These encompassed the currency-board, privatization of public companies and capital-market based pension schemes.

the peso, was held constant at parity with the US dollar[8] in the context of what has been historically recorded as "Convertibility". This consists of replacing the central bank by a currency board designed to guarantee the peg of the domestic currency against a so-called anchor currency, in this case the US dollar. Said peg only concerns the nominal exchange rate of the domestic currency and has no influence on the development of the REER, which follows the difference between domestic inflation and inflation in the region dominated by the anchor currency. Since Argentina's inflation remained higher than US inflation in the first part of the 1990s, the REER tended to appreciate from a relatively low level —reflecting a degree of undervaluation in the choice of the original exchange rate— and stabilized later at a high level, where it remained for the rest of the decade.

b) The crisis of 2001, which ended in default, compelled Argentina to give up the currency-board and the peg between the peso and the US dollar. At the beginning of 2003, the nominal exchange rate had jumped from little more than 1 peso to more than 3 pesos for one US dollar. While the period 2002-2017 is by no means homogeneous regarding economic policy, it can be described as a period in which a flexible nominal exchange rate was adopted and, on the whole, stuck to. Central bank interventions, however, were usual in this period (see below).

It is worth mentioning that such shifts in exchange-rate policy tend to have considerable impact on the regional economies of Argentina —strong producers of wine, fruits, sugar, tea as well as touristic services— which normally profit from currency depreciation while facing hardship in periods of appreciation.

From 2003 and until 2011 the TOTI switched in favour of commodity producers. The boom was caused by an increasing demand from China and other rapidly industrializing Asian countries, for such industrial raw materials like copper and iron ore but also for agricultural commodities like soy beans and soy by-products as well as cereal crops like maize and wheat. By the end of 2007, the prices of cereal crops were approaching the support prices for crop farming as regulated by the European Common Agricultural Policy, making payments to the farmers in several regions redundant (Güida, 2008).

After the subprime crisis of 2007 in the USA, most South American governments resorted to setting up barriers against the transmission of negative impulses deriving from worsening international conditions, in an attempt to steer the domestic

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8   There is a strong similarity between the currency board and the case of a member country in a monetary union. Since the monetary authority is committed to sustain the peg, an autonomous monetary policy designed to promote economic growth and employment becomes impossible (Blank, Clausen & Wacker, 1998; Güida, 2007). This trade-off between currency stability and active, anti-cyclical policies also requires that the currency board or the central bank of the union refrains from financing public debt. As a consequence, the government is compelled to resort to the capital markets for financing.

economic process in relative independence. Specifically, controlled experiments in currency depreciation were carried out. Since currency depreciation tends to push inflation upwards, monetary policy in such context has to remain tight (Güida & Marx, 2013). However, while other countries continued with a mix of growth incentives, monetary restriction and market-based allocation policies, Argentina used the revenues from the commodity cycle to repay debt arrears, subsidize public services and finance an expansion of its social policies. The rising public sector debt was mainly covered by central bank loans to the treasury.

Throughout this period, the Argentine Central Bank acted according to a pattern known in literature as "managed exchange-rate float", a course of action directed towards avoiding extreme fluctuations and fulfilling both the need for competitiveness of national industry and that of counteracting on inflation.[9] Under this system, yearly inflation has been growing steadily and lies presently at over forty per cent. Currency depreciation has also continued, the nominal exchange rate fluctuating currently (November 2018) around 37 pesos/US dollar.

Like in any other country, the variables in question show a degree of volatility over time. This volatility can be measured by means of the Coefficient of Variation (CV), which is the quotient of the Standard Deviation (SD) to the Arithmetic Mean (AM) of the set of observed values[10]. In Argentina, volatility appears to be on the rise, especially as regards CAR. The abbreviation CV_1 stands for 1991-2001; CV2, for 2002-2017.

Figure 1. MEAN, STANDARD DEVIATION AND COEFFICIENT OF VARIATION FOR FOUR VARIABLES DURING TWO PERIODS. QUOTIENTS OF COEFFICIENT OF VARIATION VALUES FROM BOTH PERIODS.					
Period		CAR	REER	TOTI	GDPG
1991-2001	AM_1	-2.80	101.05	95.76	3.54
	SD_1	1.23	8.74	3.27	5.24
	CV_1	-0.44	0.086	0.03	1.48
2002-2017	AM_2	0.67	59.83	137.55	3.11
	SD_2	3.20	12.59	21.13	5.97
	CV_2	4.76	0.21	0.15	1.92
	CV_2/CV_1	10.79	2.43	4.49	1.29

Source: calculated from data contained in IMF-WEOD; WBDI; UNCTAD

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9   A detailed explanation of the nature and use of exchange-rate management is provided in CRS (2017). See also Williamson (1998), Summers (2000) for a discussion of the most recommendable mix of fixed and variable elements in the exchange-rate policies of emerging Asian countries. Most interesting for commodity exporters is also the PEP (peg the export price) strategy suggested by Frankel (2003).

10   While a hypothetical CV = 0 would indicate absolute stability, a value up to 0.25 indicates a fairly stable behaviour of the variable in question. Values around 0.5 are indicators of medium volatility, if CV = 1 there is high volatility. While there is no maximal value for CV, the higher it is, the less reliable the mean value as a measure of central tendency can be.

As shown in Figure 1, CAR, while being negative throughout the period 1991-2001, remained fairly stable on the whole with only moderate variation. REER was highly stable and the TOTI almost constant for the period, while individual GDPG-values deviated importantly from the mean. As opposed to the behaviour during the currency board, since 2002 CAR has become highly volatile, while the other variables' instability has increased to a lesser extent.

The CV figures for both periods are brought into comparison by using the quotient CV_2/CV_1 for all four variables. Since the sign is irrelevant for the purpose of the analysis, this is done in absolute values.

Firstly, it is apparent that the volatility of CAR has drastically increased. Between 2002-2017 it has reached a level almost eleven times as high as in 1991-2001. For REER this quotient is more than double the value of the first period. The TOTI, in turn, records a quotient four and a half times as unstable as previously, while volatility of GDPG is almost a third higher. In a way this is not surprising, since the absence of a currency anchor has consequences that go beyond the currency and financial markets, with expectations and risk-averting speculation increasing their role in the decision-making process of all economic actors, whether domestic or foreign.

5. Correlation Analysis

In this section, the correlation matrices of both periods shall be the object of analysis, before proceeding to an analysis of regression results where it appears appropriate. The results of correlation using Pearson's product-moment correlation coefficients are presented below (Figure 2) for both periods considered.[11]

Figure 2. CORRELATION MATRIX FOR FOUR VARIABLES IN TWO PERIODS (1991-2001 AND 2002-2017)					
Period		CAR	REER	TOTI	GDPG
1991-2001	CAR	1			
	REER	-0.51	1		
	TOTI	-0.26	0.32	1	
	GDPG	0.03	-0.76	0.11	1
2002-2017	CAR	1			
	REER	-0.84	1		
	TOTI	-0.84	0.74	1	
	GDPG	-0.08	-0.20	-0.16	1

Source: Calculated from data contained in IMF-WEOD; WBDI; UNCTAD

11   For the assessment of correlation data, the article follows the mainstream view that the Pearson correlation coefficient (in absolute values) is negligible when <0.20, weak between 0.20-0.29, moderate when 0.30-0.39, strong when 0.40-0.69 and very strong when equal to 0.70 and above (McClave, Benson & Sincich, 2014). Other sources distinguish between a near nil, a weak and a high value beside the perfect correlation case (Kriz, 1983), while others consider anything equal to or beyond 0.5 to be strong (Explorable, 2018). It should be recalled at this point that Pearson's r is best suited for variables that are linearly related (Taylor, 2005).

In the period 1991-2001, the highest level of individual correlation among the selected variables corresponds to the pair GDPG:REER *(-0.76)*, followed by CAR:REER *(r = -0.51)*, and at a considerable distance by CAR:TOTI *(r = -0.26)*. The first pair's correlation shall be discussed in section 8, since it bears little connection to the main question. As regards the determinants of CAR, there is only one strong correlation, namely CAR:REER. The TOTI is only weakly correlated with CAR. More surprisingly, GDPG, with only *r = 0.03*, can be neglected as a possible determinant.

For the period 2002-2017, the correlation GDPG:CAR is yet again negligible. The correlation coefficients for CAR:REER and CAR:TOTI are equally strong at *r = -0.84*, with REER:TOTI following *(r = 0.74)*. This suggests the presence of moderate multicollinearity (McClave et al., 2014). While multicollinearity per se neither prevents the use of multiple regression nor does it preclude a discussion as to the correct interpretation of the type of relationship involved, it does cast a shadow on results obtained by regression on either predictor alone (in this case, REER or TOTI). In the case of extreme multicollinearity, neither REER nor TOTI can independently predict the value of the CAR. The degree of multicollinearity can be tested through the Variance Inflation Factor (VIF). In the case dealt with here, the result is a *VIF = 2.23*, a value which can be regarded as comparatively low. On these grounds, the use of regression techniques on one single predictor appears to entail little risk.[12]

The hypothesis of the TOTI influencing GDPG in any significant manner cannot be confirmed. The corresponding correlation values for both periods (0.11 and -0.16) are negligible by any standards.

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12   The VIF = 1/(1-r2) provides a measure of the degree of multicollinearity and thereby of the risk involved in undertaking single regression on one of the independent variables or predictors contained in the model. By regressing one predictor on the others, the determination coefficient (r2) is obtained. The higher the determination coefficient, the higher VIF: r2 = 1 leads to VIF = ∞, at the opposite extreme, r2 = 0 leads to VIF = 1. Different criteria to interpret a given VIF result have been offered by statisticians, but there is no universal agreement as to which cut-off values of VIF should be used. For example, a rule of thumb has been suggested by which VIFs exceeding 4 (corresponding to r2 = 0.75) require further investigation, while VIFs>10 are signs of serious multicollinearity in need of correction (PennState, 2018). Generally speaking, there is agreement that a VIF of 1-2 shows essentially no multicollinearity, while a value of 20 or higher shows extreme multicollinearity (Encyclopaedia Britannica, 2018). VIF greater than 5 or VIF greater than 10 have also been suggested as cut-off values for detecting mild or strong multicollinearity (Kutner, Nachtsheim & Neter, 2004). In the present case, the determination coefficient of regressing REER on TOTI and GDPG equals 0.55, thus leading to a VIF = 1/(1-0.55) = 2.23, which goes in line with the criterion that a correlation coefficient 0.20<r<0.80 lies within a range of moderate multicollinearity (McClave et al., 2014; Berry & Feldman, 1985).

6. Simple Regression Results

In this section, the results of simple regression of CAR on REER for both periods under consideration are presented and discussed. For the period 1991-2001 the regression equation of CAR on REER is:

R = 0.51	Coefficient	Standard error	t-statistic
Intercept	4.428	4,1117	1.0771
REER	-0.0715	0.0405	-1.7640

For the period 2002-2017 the regression equation of CAR on REER is:

R = 0.84	Coefficient	Standard error	t-statistic
Intercept	4.428	4,1117	1.0771
REER	-0.0715	0.0405	-1.7640

It is apparent that the importance of REER as a variable accounting for CAR variance increases sharply from the first to the second period. In the light of the theoretical consideration in section 2, this can be explained as follows: with a fixed nominal exchange rate, as used in the 1991-2001 period, a large part of the instability reflected by variations in the REER was passed through virtually unfiltered onto domestic activity (this point is taken up again in section 8.). From 2002 onwards, when the nominal exchange rate is allowed to float more or less freely, REER and CAR move very much hand in hand. The REER has thus become a paramount determinant of CAR.

As pointed out in section 5, the correlation matrix also shows a high degree of association between the TOTI and CAR for the second period, the correlation coefficients CAR:REER and CAR:TOTI being equal at 0.84. At the same time, the predictors show moderate multicollinearity. Why should then the hypothesis be discarded, that the TOTI and not the REER are at the heart of CAR variance?

A simultaneous look at both periods shall throw light onto this matter. In the first one, the correlation coefficient CAR:TOTI *(r = 0.26)* is weak and only half as high as that between CAR and REER. Furthermore, in this period, the TOTI and REER appear to fall apart *(r = 0.32)*, what can be explained by the constancy of the nominal exchange rate and lower volatility of REER. Consequently, over both periods, the REER and CAR are strongly linked, which is not the case between CAR:TOTI. Summarizing: when TOTI and REER fall apart, CAR follows REER, not TOTI. On top of these empirical arguments, the theoretical considerations given in section 2 support a causal chain of the type:

■ TOTI always has an influence on REER, but this influence is much greater under a flexible nominal exchange rate than under pegging.

■ REER determines CAR, but this effect is stronger in case of a flexible exchange rate.

Multiple regression analysis, as performed in section 7, shall contribute to determine this causal chain.

7. Multiple Regression Results

In order to determine to which extent the simultaneous consideration of both REER and TOTI as predictors improves the understanding of CAR variance beyond employing REER alone, multiple regression analysis is applied to both periods in question. The results are shown in the appendix. Such improvement normally includes a better correlation and determination coefficient, that is to say, the percentage of total variance explained by the independent variable(s) increases at the expense of the unexplained part.

The inclusion of the so-called "adjusted" correlation coefficient allows to examine whether the effort of enlarging the regression model through further variables pays off or not: if the value of the adjusted determination coefficient (r^{2adj}) is lower than the coefficient of determination (r^2), the increase in the explanatory capacity of the model does not match the additional effort of enlarging it. In this case, the additional effort does not pay off and the researcher should consider sticking to the simpler model.

For the currency-board period, the inclusion of the TOTI as a second explanatory variable takes r from *0.51* to *0.52*, a minimal increase promptly punished by an r^{2adj} of only *0.08* as against $r^2 = 0.27$. It is apparent that the TOTI adds nothing to the explanatory capacity of REER on its own.

For the second period, the combination of REER and TOTI takes multivariate correlation to over *0.90*, but $r^{2adj} = 0.79 < r^2 = 0.82$ warns that it might be better to take either TOTI or REER (themselves correlated at *r = 0.74)* as the explanatory variable. On the grounds explained in sections 2 and 7, REER should be chosen as the factor most directly determining CAR.

As a consequence, it can be stated that under both fixed or flexible nominal exchange rates, the Argentine CAR is primarily affected by the REER, but under flexible conditions the impact is much stronger than when fixed nominal rates apply. Taken as a whole, the results confirm the high exchange-rate elasticity of Argentina's current account flows. As a partial example of such elasticity, the large nominal depreciation of the peso at the beginning of 2002 was followed by a drastic fall in imports as compared with 2001 –from 20 billion US dollar to less than 9 billion– (see Annex 3 in the appendix).

Finally, it remains unclear why GDPG does not lead to any significant changes in CAR over time. The possible explanations of this phenomenon range from simply stating that this effect might be overshadowed by the larger impact of the other variables to a critical review of some principles of open economy macroeconomics.

A simpler but probably more effective explanation may lie in the structure of the transactions involved in the current account. If this hypothesis is anything to go by, GDPG would be more influential on merchandise trade alone than on the current account as a whole. An example can be easily found by taking a closer look at the deep recession of 1998-2001, which (fittingly to this analysis) occurred with little change in REER: it shows a steady fall in imports and a clear improvement of the trade balance, what would go some way to support this hypothesis.[13]

Further support comes from a closer look at other positions of the current account, most notably the net factor payments. Due to its high foreign debt, Argentina's balance is negative through interest payments abroad. These payments are largely inelastic as regards the economic cycle, since such payments do not necessarily fall when the economy experiences a recession. On the contrary, they often even rise, e.g. through refinancing of debt at higher interest rates as the country risks grow. A similar question mark concerns the balance of such services like international tourism and studying or seeking health treatment abroad. These services, if used mostly by that part of the population which is largely immune to economic ups and downs, do not depend much on economic growth.

A methodological question might also add to this effect: the CAR is calculated by obtaining the quotient of the Current Account Balance and GDP, both measured in current US dollars. GDPG, on the other hand, is a measure of real growth and therefore calculated in the national currency at constant prices of a base year. One alternative methodology would consist in measuring GDP in international dollars (so-called purchasing power parity or PPP methodology) or to employ nominal GDP in national currency. However, all these alternatives have their own pitfalls: comparisons in national currency are almost meaningless in an inflation-ridden economy like Argentina's. PPP calculations, for their part, are still largely experimental and may deviate strongly from market values. A deeper analysis of this question lies beyond the scope of this article and cannot be pursued here.
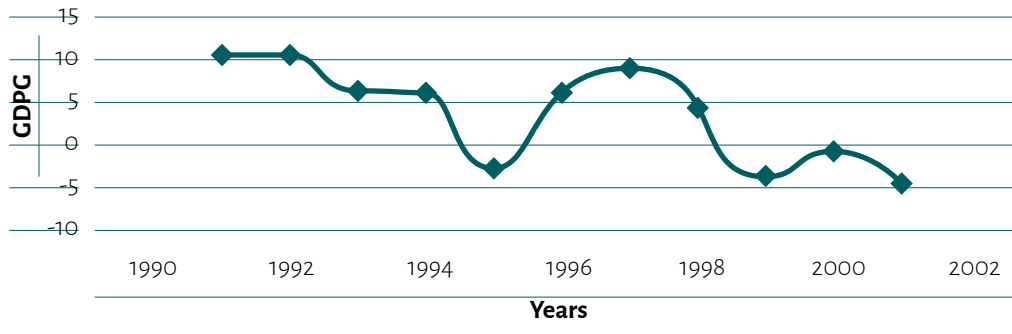
8. The Correlation GDP: REER for the Period 1991-2001

Recalling the theoretical considerations in section 2.3, it appears that in periods of nominal exchange rate stability and relatively stable REER, economic growth as represented by GDPG relates directly to REER. This would confirm Gottfried Haberler's bacillus hypothesis. As Figures 3 and 4 show, the years of stronger growth (especially the period 1991-1994) were also the years in which the peso was relatively undervalued and exports could grow strongly, regardless of the final CAR. The recession of 1995 reflects the so-called Tequila Effect and bears little connection with

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13   Figures in billion US dollar: Trade balance: 1998: -7.6; 1999: -5.5; 2000: -1.6; 2001: +6.8. See import and export values as regards merchandise trade for the years 1998-2002 in the appendix (Annex 3).
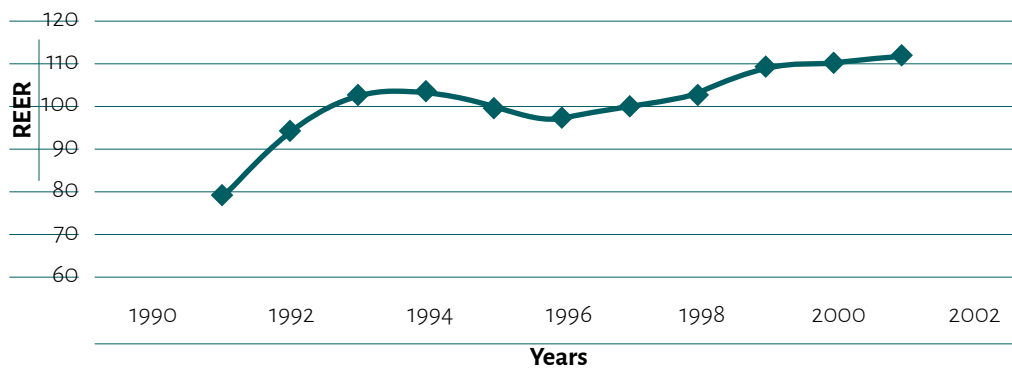
Argentina's domestic development. The more the peso appreciated in the last years of the currency board, the weaker economic growth became. From 1998 until 2001 GDPG was negative without exception.

Figure 3. ARGENTINA GDPG - 1991-2001

Source: Elaborated on the basis of Data contained in IMF-WEOD; WBDI

Figure 4. ARGENTINA REER - 1991-2002

Source: Elaborated on the basis of data contained in IMF-WEOD; WBDI

9. Conclusions

The article tests the empirical relevance of factors theoretically apt to influence the result and importance of Argentina's current account ratio during two recent periods: the currency board period between 1991-2001 and the flexible exchange rate period between 2002-2017, which is still valid. Its main conclusions can be summarized as follows:

1) With a dollar-pegged nominal exchange rate under the currency board, the CAR was throughout negative but relatively stable. Its variation during the period correlates at a moderately significant level with the REER, at a lowly significant one with the TOTI. No correlation with GDPG could be found.

II) With a flexible (though managed) exchange rate since 2002, the variation of the CAR has greatly increased. Years of positive results have been followed by extremely negative years. During the period, CAR shows significant correlation with both REER and TOTI, but (yet again) not with GDPG. REER and TOTI are themselves significantly associated with each other.

III) A closer look at these variables, in the light of economic theory and other cases, suggests that the TOTI influences CAR only indirectly. An increasing TOTI raises REER, thus acting negatively on CAR by encouraging import activity and out-flow payments. No immediate impact of high TOTI on exports –which should indeed be positive– can be statistically detected.

IV) Consequently, it is REER which influences CAR the most. Its impact is distinct and unidirectional, a high REER worsens CAR, a low one improves it.

V) The question as to the close association between GDPG and REER during the first period can (at least partly) be answered by recurring to conventional ex-change-rate systems theory: a fixed exchange rate, even if the REER may be var-iable, cannot protect the economy from international instability (Haberler's ba-cillus). The Asian, Russian and Brazilian crises of 1997-1998 were passed through almost unfiltered onto the domestic production of Argentina.

One important policy recommendation can be derived from the analysis: should Argentina stick to the current, flexible exchange-rate system in the future, exces-sive appreciation of the domestic currency with its predictable consequences for the current account must be avoided. The recurrent tendency to use the exchange rate as an anchor against inflation has brought no sustainable solution while, on the other hand, generating extreme costs in the way of default, confiscation of ac-count holders through conversion of US dollar denominated assets into peso assets and an aggravation of the recessive phases of the economic cycle. A drastic fall of real incomes coupled with unemployment and underemployment and, generally speaking, a multiplication of poverty have been the main result. Certainly, curren-cy dumping –the conscious policy of undervaluation of the domestic currency– is internationally no longer tolerated, as shown by the present conflicts between the United States and its main trading partners. However, it would seem that as long as inflation remains high, a form of crawling-peg might be more conducive to the pur-pose of smooth economic development than accepting overly appreciation. This, of course, can only be valid for a period of transition. As the examples of Chile, Peru and Colombia show, monetary and fiscal discipline fight inflation better and more sustainably than an artificially expensive domestic currency, supported only by as-tronomically high interest rates, which in turn act as investment killers.

Further research could help to clear the open questions remaining. Especially the low influence of GDPG on the CAR merits closer analysis, which could be made by separating the trade balance from other items which are included in the current

account, like tourism or factor payments and transfers. While merchandise trade probably reacts more promptly to changes in income through import-function related effects, other positions are less income-elastic and largely independent of the fluctuations typical of the economic cycle. Furthermore, attempts at repeating the tests carried out in this article by employing different measures of GDP (e.g. PPP or national currency instead of current US dollars, nominal instead of real growth rates) might also show a potential for improvement of the results obtained here.

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