Is the Business Cycle of Argentina "Different"?

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Nominal factors do not seem to be able to account for any significant fraction of the business cycles of Latin American countries in general, and of Argentina in particular. Perhaps for this reason it is time to give real factors their fair chance to do the job.

Societies would prefer a steady growth path for their national income of, say, 3 percent every year to one that delivers a 3 percent growth rate on average, but with zigzags from, say, 12 percent one year to –6 percent the next. Consequently, they typically demand that policymakers eliminate undesired economic fluctuations.[1] It is not surprising, then, that the understanding of business cycles has always captured the interest of economists and has inspired some of their best work.

The work of John Maynard Keynes and Milton Friedman went a long way in defining the terms and identifying the issues that a successful theory of economic fluctuations ought to address. Despite the much-advertised difference between the schools of thought inspired by these scholars, their work agrees on something very important: nominal factors, such as the money supply, interest rates, and price rigidities, play the most important role in explaining economic fluctuations.

As is well known, the 1970s were not kind to the Keynesian interpretation of business cycles. This interpretation predicts that the rising inflation rates of that decade should have been associated with declining unemployment rates, not with the rising rates actually observed. Empirical and theoretical research did not treat the "rival" school much better. Sims (1980), for example, showed evidence that seems to contradict some versions of the monetarist theory.

Initially, the theoretical developments inspired by these failures kept nominal factors as the paramount force behind economic fluctuations. In fact, in Lucas (1972), the first and perhaps most celebrated application of the novel approach to macroeconomic analysis for which Robert Lucas received the 1995 Nobel Prize, the money supply still plays a crucial role for the business cycle. Thus, economists were surprised when Kydland and Prescott (1982) showed that one could account for two-thirds of the U.S. economic fluctuations with a dynamic stochastic general equilibrium model from which nominal variables were totally absent—that is, a model without any money in it.

Kydland and Prescott obtained this result using a variation of the same basic theoretical model economists had been using time and again to study economic growth issues. Unifying theories—that is, theories that can simultaneously explain seemingly unrelated phenomena—are usually welcome in science. What many economists found attractive about the Real Business Cycle (RBC) theory proposed by Kydland and Prescott was that, for the first

time, a business-cycle theory pointed to the possibility that the same analytical tools used to address economic growth issues could be used to address business-cycle questions as well. This may explain why these economists regarded Kydland and Prescott's findings persuasive enough to begin seriously exploring the hypothesis that "real" factors, rather than nominal ones, are a prevalent driving force behind economic fluctuations.[2] Although real or supply-side factors, such as the amount of resources used by the government, tax policies, technological changes, government regulations, modifications of financial intermediation rules, and even political shocks signaling possible changes in property rights, may appear to be the obvious candidates to explain business cycles, this was not that clear a short while ago.

The process of verifying, sharpening, or refuting the real-shock account of business cycles has generated a large body of theoretical and empirical research concentrated, so far, on developed countries. This is unfortunate, because the evidence suggests that economic fluctuations are particularly severe in developing countries. Understanding why this occurs could lead to ways to make the business cycles of these countries at least as smooth as those of developed ones. What makes the study of Latin American countries' business cycles particularly interesting is the claim that economic fluctuations in those countries have been driven by nominal factors. Science makes progress precisely when it encounters observations that the prevailing paradigm cannot explain. Therefore, there seems to be a compelling need to confirm the alleged anomalies by answering the question, Are business-cycle regularities in Latin America really all that different from those in the United States and in Organization for Economic Cooperation and Development (OECD) and other European countries?

This article focuses this question on Argentina, with the hope of making a modest contribution to the understanding of the business cycles of Latin American countries in general. For example, if Argentina's business-cycle regularities are similar to those of the United States or Europe, then the business cycles of all these countries may be manifestations of essentially the same phenomenon. Therefore, real factors could play an important role in accounting for Argentina's business cycles, just as, according to recent research, they do in the United States and Europe.

By contrast, if Argentina's business cycles show important anomalies with respect to the evidence available for other countries, then the possibility of real factors playing an important role in its business cycle diminishes. In this case, existing interpretations emphasizing the role of nominal variables in Latin America may regain the prominence they had in business-cycle theories until the 1970s. Allowing for comparisons with the empirical evidence for other countries, this article examines the Argentinean business-cycle regularities with the same methodological approach used in previous studies for the United States and several European countries.

In the following section, we present the evidence other authors have used to support the contention that nominal factors have driven the business cycles in Latin America and provide reasons to doubt the robustness of those findings. We also suggest that the data require further systematic scrutiny before economists can conclude with some confidence that business cycles in Latin American countries, and particularly in Argentina, differ in nature from those observed in the United States and in OECD and other European countries. Next, we undertake one such systematic study by presenting, as the availability of data permits, the Argentinean counterpart of the statistics researchers have used to describe the business cycles of the United States and several European countries. We then compare the statistics for Argentina with those of other countries and state the implications that result from analysis of cross-country similarities and differences. The last section summarizes our conclusions.

The state of the business-cycle debate in Latin America

The understanding of the Latin American business cycles has not escaped the view that nominal shocks are the predominant cause of economic fluctuations. This view still influences the thinking on many Latin American economic problems. This thinking is particularly noticeable in the inflation stabilization literature.

One of the most serious economic problems many Latin American countries have faced in past decades has been persistent, high inflation.[3] Therefore, the quest to find the best anti-inflation policies has inspired a large body of research on this problem. The monetarist influence in that literature is evident in its contention that nominal factors (such as changes in the nominal exchange rate regime) were the only systematic force driving economic fluctuations around the time the stabilization programs were implemented. For example, the conventional

wisdom in Latin America is that anti-inflation programs using the exchange rate as a nominal anchor (exchange-rate-based stabilization, or ERBS, programs) have been able to reduce the inflation rate without causing the initial output losses associated with programs that use some monetary aggregate as a nominal anchor (money-based stabilization programs).[4]

Of course, a theory for stabilization programs is not the same as a theory for the business cycle. But there should be some consistency among them. For example, a finding that nominal shocks do not have important real effects during Latin American stabilization programs would make it harder to maintain the monetarist view that such factors may have been important at any other point of the business cycle. And this is precisely what we find problematic: a reexamination of the evidence on ERBS programs shows that it is far from clear that the adoption of the exchange rate as a nominal anchor has been responsible, as the literature claims, for the economic fluctuations observed during those programs.

Figure 1 illustrates the consumption growth rates for the ten ERBS programs studied by Végh (1992). The vertical line indicates the year or quarter in which the ERBS program started.[5] Casual inspection of the plots suggests that only in the first four cases did consumption experience the upward jump that theory predicts should occur upon announcement of ERBS programs.[6] However, this theoretical prediction did not materialize in the remaining six cases. In particular, in none of these six did consumption grow faster than in the immediately preceding period. Instead, in four of the six cases, consumption growth was basically the same immediately before and immediately after the announcement of the corresponding ERBS program. In two of the four, the so-called consumption boom preceded the announcement. In the other two, there was no consumption boom whatsoever: consumption continued falling at approximately the same rate as before the ERBS programs began. Furthermore, in the last two cases, the ERBS program was followed instead by a consumption bust.

Therefore, the timing, intensity, or direction of consumption growth for the countries in Végh's study, after most ERBS programs began, appears to differ from that implied by the ERBS theory.

In this sense, at least four of the plots in Figure 1 (Chile, February 1978; Argentina, December 1978; Argentina, June 1985; and Israel, July 1985) could be interpreted using the non-monetarist approach: the dynamics of output immediately after the announcement of an ERBS program were mere continuations of upswings or downturns that had begun earlier. In these four cases, forces other than the adoption of a fixed or pegged exchange rate were already driving the business cycle when the ERBS programs began. But such conclusions from the casual reading of two-dimensional plots would be premature.[7] We are more persuaded, instead, by the more thorough empirical effort of Rebelo and Végh (1995), who conclude that monetarist-inspired theoretical models of ERBS programs are quantitatively incapable of replicating any significant fraction of the economic fluctuations associated with such programs.

The evidence on ERBS programs, both from casual plot readings and from the work of Rebelo and Végh, poses a serious challenge to monetarist theories of Latin American business cycles: if nominal exchange rate shocks in Latin America seem to have failed to produce the noticeable and consistent effects on consumption and other real variables predicted by monetarist-inspired theories precisely when they were given the best shot at it, how could they have significant real effects at other times?[8]

A natural next step in the research agenda is to pay more attention to real shocks as a potentially important source of the economic fluctuations observed in Latin American countries, including fluctuations observed during inflation stabilization programs.[9] In principle, there is no reason the assessment of the quantitative importance of such shocks in Latin America could not be accomplished with the same kind of dynamic stochastic general equilibrium models the RBC tradition has used to that effect for the United States and other developed countries.

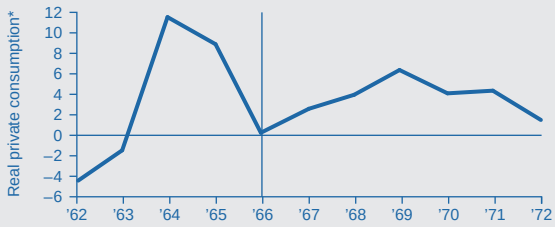
But such a research program must start by describing the data with a systematic, atheoretical methodology.[10] The remaining sections of this article make a modest attempt in that direction by describing the business-cycle regularities of Argentina without imposing theoretical priors to the data.[11]

Business-cycle regularities for Argentina

Some caveats about the data. National account data in Latin America are not as reliable as their U.S. and OECD counterparts.[12] In fact, because of frequent methodological changes and corrections of previous errors, the reported series may change substantially from one national account estimate to the next. This is indeed the case for Argentina. For example,

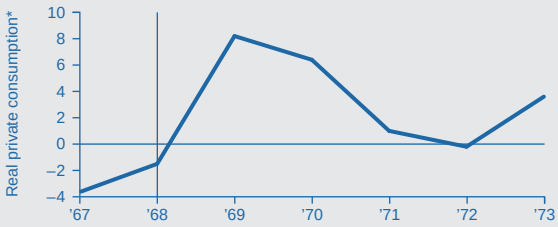
Figure 1
ERBS Programs

Argentina, March 1967



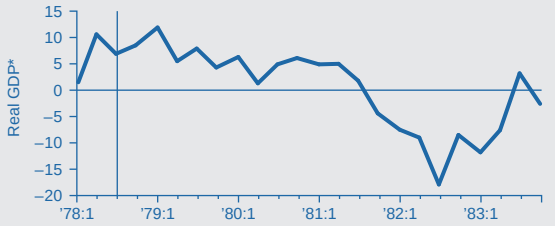
SOURCE: Table 5 in Végh (1992).

Uruguay, June 1968



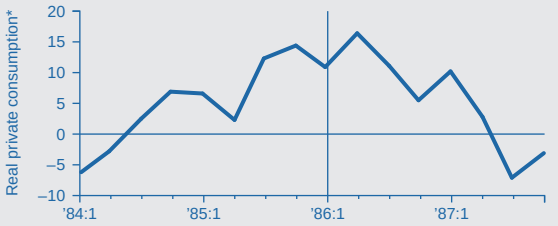
SOURCE: Table 7 in Végh (1992).

Uruguay, October 1978



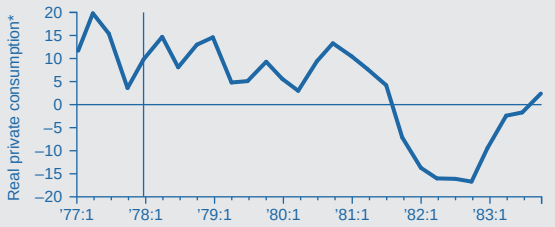
SOURCE: Table 10 in Végh (1992).

Brazil, February 1986



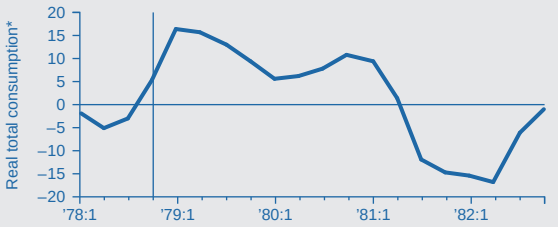
SOURCE: Table 12 in Végh (1992).

Chile, February 1978



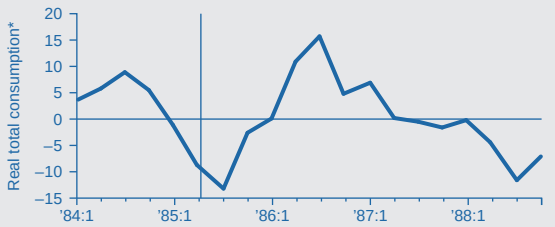
SOURCE: Table 9 in Végh (1992).

Argentina, December 1978



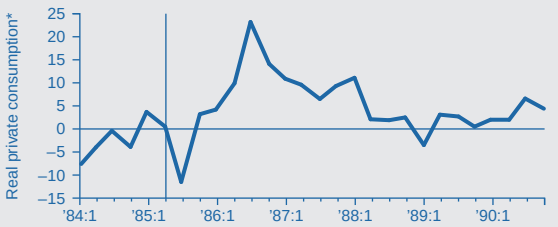
SOURCE: Table 8 in Végh (1992).

Argentina, June 1985



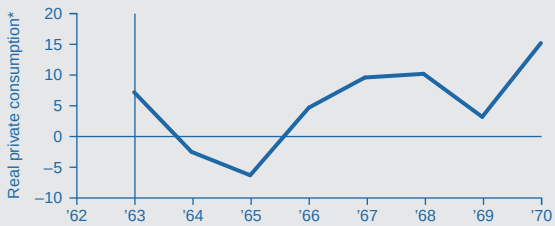
SOURCE: Table 11 in Végh (1992).

Israel, July 1985



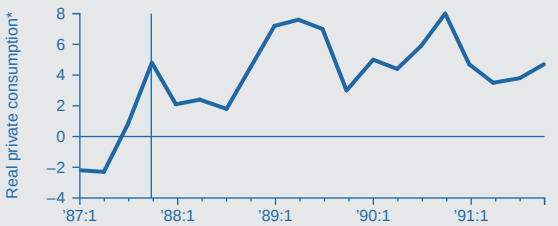
SOURCE: Table 13 in Végh (1992).

Brazil, March 1964



SOURCE: Table 6 in Végh (1992).

Mexico, December 1987



SOURCE: Table 14 in Végh (1992).

* Growth in percent with respect to the same period of the previous year.

volatility of consumption relative to output is substantially lower in the national accounts estimate at 1986 prices (released at the end of 1996) than in the previous estimates at 1970 prices.

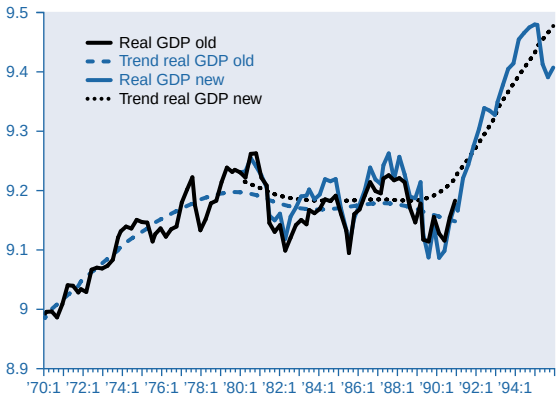
The example above emphasizes that in dealing with countries such as Argentina, researchers should heed the usual warning to appropriately weigh the quality of the data before taking for puzzles anomalies that in reality may be mere statistical artifacts. For that reason, we report the business-cycle regularities obtained from using two different estimates of GDP and its components. The comparison of the results from each data set will eventually give some idea of the confidence one should place on the business-cycle regularities of Argentina reported here or elsewhere (for examples, see Kaufman and Sturzenegger 1996 and Carrera, Féliz, and Panigo 1996).

One estimate (the "old" estimate), in constant prices of 1970, covers the 1970:1–90:4 period and was prepared by the Central Bank of Argentina. We obtained this estimate from the FIEL (Fundación de Investigaciones Económicas Latinoamericanas) data bank. The other estimate (the "new" estimate), in constant prices of 1986, covers the 1980:1–95:4 period. The figures for this estimate were taken from the publication *Oferta y Demanda Globales, 1980–1995*, prepared by the Dirección Nacional de Cuentas Nacionales. Notice that these two estimates overlap only during the 1980:1–90:4 period.[13]

Methodology. We characterize the business-cycle regularities of Argentina using Kydland and Prescott (1990) as a guide. Their procedure is inspired by Lucas (1977), who defines the business-cycle component of a variable as its deviation from trend. Kydland and Prescott define the trend of a variable as that which results from applying the Hodrick–Prescott filter (HP filter) to the raw data. Informally, this filter produces trends that are "close to the one that students of business cycles and growth would draw through a time plot" (Kydland and Prescott 1990).[14] Application of the HP filter to Argentinean GDP, for example, produces the trend represented by the smoother curves in Figure 2.[15,16]

Except for net exports, all variables in the tables of this article are expressed in natural logarithms, as is standard in the business-cycle literature.[17] Since it is not possible to compute the logarithm of negative values, variables that can take on such negative values, such as net exports, were expressed instead as ratios to GDP. All the variables were seasonally adjusted using the X-11 procedure.

Figure 2
Real GDP, Old and New Estimates



* For visual effect, the old estimates have been rescaled so that their level is the same as for the new estimates in 1980:1.

SOURCES: Dirección Nacional de Cuentas Nacionales for new estimates; FIEL for old ones; authors' calculations for trends.

The tables report statistics that measure (1) the direction of the movements of a variable compared with that of real GDP (*procyclical*, in the same direction; *countercyclical*, in the opposite direction; *acyclical*, when there is no clear pattern); (2) the degree to which the variable follows the movements of real GDP (contemporaneous correlation); (3) the amplitude of fluctuations (volatility or relative volatility); and (4) the phase shift—that is, whether a variable changes before or after real GDP does (leads or lags the cycle, respectively.)

The statistics *volatility* corresponds to the standard deviation of the percentage by which the cyclical component of a variable deviates from trend. The statistics *relative volatility* is the ratio between the volatility of the variable of reference and the volatility of real GDP.

Real facts for Argentina

Output and its components: GDP. Table 1 reports statistics for real GDP and its major components. The first striking feature of the table is the high volatility of real GDP. According to the new national account estimates, the percentage standard deviation from trend of Argentina's real GDP is roughly 2.5 times larger than for the United States. Real GDP volatility is also high in the old national account estimates, but within the range observed in European countries such as Greece (2.85), Portugal (3.05), and Luxembourg (3.2).[18,19]

Total consumption. An important caveat in interpreting the consumption evidence is that in Argentina's national account, consumption is computed as a residual, which casts consider-

Table 1
Cyclical Behavior of Real GDP and Its Main Components in Argentina and Other Countries

	Argentina (new national account estimates) 1980:1–95:4	Argentina (old national account estimates) 1970:1–90:4	United States[1]	OECD, G–7, and other European countries[2]
Real GDP volatility[3]	**4.59**	3.06	1.71	.90 to 3.20
Total consumption	Procyclical	Procyclical	Procyclical	Procyclical
Contemporaneous correlation	**.96**	.84	.82	.1 to .83
Relative volatility[4]	1.19	**1.69**	.73	.66 to 1.46
Phase shift	Coincidental	Coincidental	Coincidental	Coincidental[5]
Gross fixed investment	Procyclical	Procyclical	Procyclical	Procyclical
Contemporaneous correlation	.94	.71	.90	.15 to .90
Relative volatility[4]	2.90	3.44	3.15	2.30 to 5.63
Phase shift	Coincidental	Coincidental	Coincidental	Coincidental
Government consumption indicator	Acyclical[6]	Acyclical[7]	Acyclical	Acyclical
Contemporaneous correlation	.20[6]	.24[7]	.05	–.23 to .27
Relative volatility[4]	**3.19**[6]	**4.43**[7]	1.21	.36 to 1.28
Phase shift	Lagging[6]	Lagging[7]	Lagging	—
Net exports[8]	Countercyclical	Countercyclical	Acyclical	Acyclical/countercyclical
Contemporaneous correlation	–.84	–.62	–.28	–.01 to –.68
Volatility[3]	**2.28**	**3.27**	.45	.5 to 1.33
Phase shift	**Coincidental**	**Coincidental**	Leading	—
Imports	Procyclical	Procyclical	Procyclical	—
Contemporaneous correlation	.81	.71	.71	—
Relative volatility[4]	**4.05**	**5.61**	2.88	—
Phase shift	Coincidental	Coincidental	Coincidental	—
Exports	**Countercyclical**	**Countercyclical**	Procyclical	—
Contemporaneous correlation	**–.61**	**–.21**	.34	—
Relative volatility[4]	**1.68**	3.21	3.23	—
Phase shift	**Coincidental**	**Coincidental**	Lagging	—

[1] Statistics are from Kydland and Prescott (1990).
[2] Statistics are from Backus, Kehoe, and Kydland (1995) and Christodoulakis, Dimelis, and Kollintzas (1995).
[3] Percent standard deviation from trend.
[4] Ratio of volatility of the variable and the volatility of real GDP.
[5] Except in France, where, according to Christodoulakis, Dimelis, and Kollintzas (1995), it leads the cycle.
[6] For the period 1980:1–89:4.
[7] For the period 1970:1–89:4.
[8] Trade balance as percentage of GDP.

NOTE: Seemingly anomalous statistics are in bold type.

SOURCES: Authors' calculations, using the sources reported in the text.

able doubt on the nature of the anomalous behavior of consumption that we discuss below.

The volatility of real GDP and the relative one for consumption imply that the volatility of this real GDP component is higher than that for the United States or European countries. But this anomaly is not all that remarkable because it results directly from the reported high volatility of real GDP and the fact that consumption and GDP are highly correlated.

Perhaps what is remarkable is that the volatility of consumption is larger than that of output. Although theoretically the opposite should hold, this excess relative consumption volatility is within the ranges observed in Japan and some European countries.[20] More specifically, according to the new national account estimates in Table 1, Argentinean consumption is 19 percent more volatile than GDP. This is not uncommon by international standards. Backus, Kehoe, and Kydland (1995) report that the corresponding figure is 14 percent for Austria and 15 percent for Japan. According to Christodoulakis, Dimelis, and Kollintzas (1995), it is as high as 46 percent for the Netherlands.[21]

By contrast, relative consumption volatility does exceed international standards for the old national account estimates. A consumption volatility 70 percent larger than that of output is indeed hard to explain. Some studies have attributed this excess volatility to the presence of credit constraints.[22] However, there are reasons to be skeptical about this explanation because in models with credit constraints, con-

sumption is not as smooth as it would be otherwise, but it is still typically smoother than income.[23]

In considering the correlation between output and consumption, it is the figure for the old national account estimates that is normal and the one for the new national account estimates that is abnormal. The correlation of 0.84 for the old national account estimates is about the same as the 0.83 correlation reported for Canada—the highest correlation among the countries reported in Backus, Kehoe, and Kydland (1995) and Christodoulakis, Dimelis, and Kollintzas (1995). This means that the 0.96 correlation between deviations from trend of consumption and GDP reported for the new national account estimates is unusually high by international standards. It seems to be high even by Latin American standards, as that correlation is 0.91 for Mexico (our own estimates for the 1980:1–95:4 period) and 0.88 for Uruguay (for the 1976:1–93:4 period; see Kamil Saúl 1997).

Theory predicts that such correlation should be higher the more permanent the shocks are to income. Therefore, the high correlation observed for Argentina might be an indication that its business cycle is indeed different in the sense that shocks are more permanent there than in other countries. We suspect, however, that most business-cycle models, monetarist or real, will have a hard time accounting for this high correlation without, at the same time, failing to accommodate other key regularities of the Argentinean business cycle. Nonetheless, there are reasons to be cautious about the magnitude of the contemporaneous correlation between detrended consumption and GDP in Argentina. One reason, of course, is that the significant discrepancy between the correlations obtained with the two national account estimates points to the possibility of important measurement errors. This possibility becomes even more apparent when we recall that consumption in Argentina, as in many developing countries, is calculated as a residual. This residual includes government consumption—for which Argentina produces no separate quarterly estimates—and, in the case of the new national accounts estimate, changes in inventories, for which there also is no separate estimate.

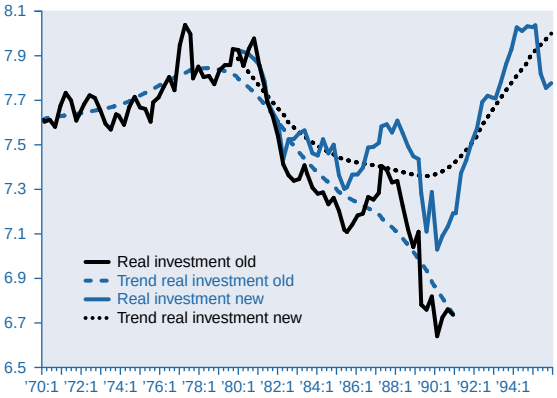
An additional methodological source of spurious correlation between consumption and output is the way output in Argentina is allocated between consumption and investment. Many goods—such as automobiles, electronics, furniture, computers, and telecommunications equipment—may be used for consumption or investment purposes. Unfortunately, Argentina does not have the information necessary to determine the categories in which these goods are being applied. To circumvent this problem, the production of many items is imputed to both consumption and investment according to fixed coefficients constructed with information available only for the base year. For example, 80 percent of automobile production is always imputed to consumption and 20 percent to investment. The same procedure is applied to imports and to the output of many other industries that produce goods that can be used for both investment and consumption purposes.[24]

Of course, the proportions in which many goods are purchased for consumption or investment purposes change over the cycle. As a result, the fixed-proportion methodology used for Argentina's national account estimates will distort the true underlying features of the business cycles. In particular, with this imputation method, part of the investment booms will show up misleadingly in the data as consumption booms.[25] Because investment is highly correlated with output, the fixed coefficients method of imputation can artificially increase the measured correlation between consumption and GDP. This problem could be especially serious in the new national account estimates that include the unusual investment boom of the 1990s (*Figure 3*).

In summary, there are reasons to be cautious about the interpretation of the high correlation between consumption and output for

Figure 3
Real Gross Fixed Investment, Old and New Estimates

Thousands of 1986 pesos (log scale)*



* For visual effect, the old estimates have been rescaled so that their level is the same as for the new estimates in 1980:1.

SOURCES: Dirección Nacional de Cuentas Nacionales for new estimates; FIEL for old ones; authors' calculations for trends.

Table 2
Cyclical Behavior of Argentinean and U.S. Labor Inputs and Productivity

	Argentina (new national account estimates) 1980:1–90:4	Argentina (old national account estimates) 1970:1–90:4	United States[1]
Industrial real GDP volatility[2]	5.57	5.84	4.18
Real GDP	Procyclical	Procyclical	Procyclical
Contemporaneous correlation	.95	.90	.86
Relative volatility[3]	.69	.52	.36
Phase shift	Coincidental	Coincidental	Coincidental
Total hours	Procyclical	Procyclical	Procyclical
Contemporaneous correlation	.76	.77	.86
Relative volatility[3]	.89	.70	.73
Phase shift	Coincidental	Coincidental	Coincidental
Employment	Procyclical	Procyclical	Procyclical
Contemporaneous correlation	**.55**	**.49**	.79
Relative volatility[3]	.66	.56	.60
Phase shift	Lagging	Lagging	Lagging
Hours per worker	Procyclical	Procyclical	Procyclical
Contemporaneous correlation	.70	.68	.77
Relative volatility[3]	.43	.38	.20
Phase shift	Coincidental	Coincidental	Coincidental
Productivity	Procyclical	Procyclical	Procyclical
Contemporaneous correlation	.48	.72	.71
Relative volatility[3]	.66	.65	.52
Phase shift	Coincidental	Coincidental	Coincidental

[1] The statistics correspond to the 1959:3–94:4 period and were constructed by the authors using a series of value added by the manufacturing sector and a corresponding series of employment and hours worked in that sector published by the Bureau of Labor Statistics (BLS) until 1994. The quarterly measure of industrial value added was taken from CITIBASE and corresponds to the "fixed-weighted gross product originating" series for manufacturing produced by the BLS (see Gullickson 1995 for details).
[2] Percent standard deviation from trend.
[3] Ratio of volatility of the variable and the volatility of real industrial GDP.

NOTE: Seemingly anomalous statistics are in bold type.

SOURCES: Authors' calculations based on sources in the text for national account estimates and on FIEL for labor market data.

the new national account estimates reported in Table 1. Better data are needed before one can confidently establish that this unusually high correlation is indeed an anomaly by international standards.

Gross fixed domestic investment. The magnitude and sign of the statistics for this component (plotted in Figure 3) are in line with those observed in other countries. It is particularly noteworthy that the relative volatility of this real GDP component is close to that for the United States.

Government consumption. As stated, Argentina does not have separate quarterly national account estimates for government consumption. The disorganization of public accounts in combination with the high inflation rates that prevailed during the period have made estimation of such a series very difficult.

However, the same high inflation that prevents the construction of reliable government consumption estimates also suggests that fiscal policies may have played an important role in the Argentinean economy. Therefore, we believe it is important to report statistics—albeit partial—for an indicator that shows the government consumption contribution to GDP at quarterly frequencies. Figures for treasury payroll payments are available on a monthly basis for the 1970–89 period, so we choose this variable as a potential indicator of fiscal policy. We must emphasize, however, that these disbursements represent only a fraction of all such payments in the Argentinean public administration.

The statistics in Table 1 show that the relative volatility of our real government consumption indicator is well above international standards. It is also acyclical, a feature that characterizes government purchases in the United States as well. This acyclicality seems to be anomalous by Latin American standards (see Talvi and Végh 1996).

Trade balance. Some of the statistics for Argentinean net exports (trade balance as a percentage of GDP) are in line with the international evidence: net exports are countercyclical,

as in several OECD countries, although the Argentinean contemporaneous correlation with output is on the high end of the range. By contrast, the volatility of this component seems to be abnormally high by international standards. A similar situation arises with imports: they are procyclical, as in the United States, but exhibit a much higher volatility relative to output. Finally, almost all of the statistics for exports are out of line with those for the United States.

One caveat in analyzing the trade balance components of GDP is that Argentinean imports and exports are subject to considerable measurement errors because Argentina used open or hidden forms of exchange rate controls during substantial portions of the period under analysis. During these periods, the private sector had incentives to understate exports and overstate imports in order to exploit the differential (which eventually became large) between the often multiple official exchange rates and the higher exchange rate usually prevailing in the black market.

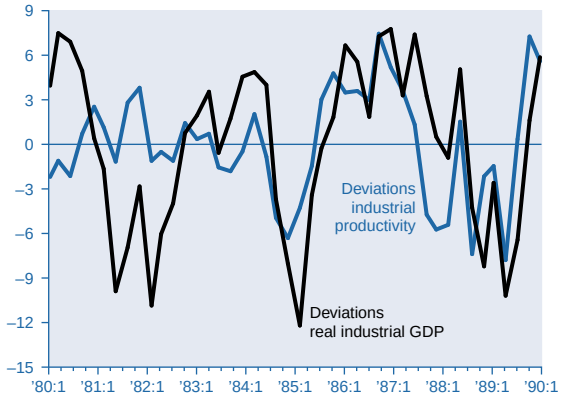
Labor inputs. Table 2 presents facts on aggregate production and labor input for the old and new national account estimates. Because we are trying to follow the methodological approach in Kydland and Prescott (1990) as closely as possible, we would like to replicate in our Table 2 all the statistics those authors report in their Table 1. Unfortunately, lack of data has prevented us from achieving the same results so far: there are no reliable quarterly estimates of capital input. And information on employment and hours worked is available only for the manufacturing sector, whose value added represents a 25 percent average of total GDP in the 1980–95 period.

For these reasons, we report in Table 2 the correlation and relative volatility of labor inputs with respect to real industrial GDP, rather than aggregate overall real GDP, used in Tables 1 and 3. We also construct similar measures for the United States. To give some idea of how well these series eventually approximate the relationship between labor inputs and real GDP for the whole Argentinean economy, we report the correlation and relative volatility of aggregate and real industrial GDP.

Another serious limitation of the data is that there are no reliable estimates of average worker compensation. Also, the relevant series for labor markets have not been updated since 1990. Thus, these series overlap the new GDP estimates only during the 1980:1–90:4 period.

With these caveats about the data in mind, Table 2 suggests that total hours worked, employment, and hours per worker are strongly procyclical. The statistics for those variables are similar across the different national account estimates. Except for employment, this similarity extends also to the correlations for the United States for both periods.

Figure 4
Argentina, Productivity Is Procyclical
Percent standard deviation from trend



SOURCES: Authors' calculations using new national account estimates from Dirección Nacional de Cuentas Nacionales and index of total hours worked in the manufacturing sector from FIEL.

The correlation of employment in the industrial sector with real industrial GDP is lower in Argentina than in the United States. This finding is not surprising given the much more stringent labor market regulations in Argentina. Because of high firing costs, firms will postpone hiring and firing decisions. So changes in employment will not trace changes in output as closely as they would in the absence of labor market restrictions.

Relative volatilities are remarkably similar across the countries, although volatility tends to be higher in Argentina for the number of hours per worker. This finding, again, likely reflects the labor market restrictions: when confronted with the high costs of firing workers, firms tend to expand or contract the labor hours of those already employed, rather than hire or lay off more workers.

Finally, it is worth noting that productivity in the Argentinean industrial sector is procyclical (*Figure 4*), with correlations and relative volatilities on the same order of magnitude as those for the United States.

Overall, the business-cycle features of Argentinean labor inputs are reasonably similar to those in the United States.

Nominal facts for Argentina

Table 3 summarizes the statistical properties of the business-cycle component of several

Table 3
Cyclical Behavior of Monetary Aggregates and Price Level Indices in Argentina and Other Countries

	Argentina (new national account estimates) 1980:1–95:3	Argentina (old national account estimates) 1970:1–90:4	United States[1]	OECD, G–7, and other European countries[2]
M1	**Countercyclical**	Acyclical	Procyclical	Acyclical/procyclical
Contemporaneous correlation	**–.36**	–.09	.31	–.06 to .42
Relative volatility[3]	**15.13**	**15.68**	1.00	.49 to 2.93
Phase shift	**Lagging**	No clear pattern	Leading	Leading (when countercyclical)
M2	**Countercyclical**	Acyclical	Procyclical	Acyclical/procyclical
Contemporaneous correlation	**–.40**	–.07	.46	–.03[4] to .39
Relative volatility[3]	**12.51**	**13.08**	.88	.59 to 5.56
Phase shift	**Lagging**	No clear pattern	Leading	No clear pattern
M2–M1	**Acyclical**	**Acyclical**	Procyclical	—
Contemporaneous correlation	**–.23**	**.01**	.40	—
Relative volatility[3]	**11.42**	**13.76**	1.12	—
Phase shift	No clear pattern	**Leading**	No clear pattern	—
Velocity M1	**Countercyclical**	**Countercyclical**	Procyclical	—
Contemporaneous correlation	**–.46**	**–.26**	.31	—
Relative volatility[3]	**3.20**	**4.58**	1.18	—
Phase shift	**Leading**	**Leading**	Coincidental	—
Velocity M2	**Countercyclical**	Acyclical	Acyclical	—
Contemporaneous correlation	**–.37**	**–.24**	.24	—
Relative volatility[3]	**5.06**	**7.08**	1.08	—
Phase shift	Lagging	Lagging	Lagging	—
CPI	Countercyclical	Acyclical	Countercyclical	Acyclical/countercyclical
Contemporaneous correlation	–.47	–.20	–.57	–.55 to –.03
Relative volatility[3]	**16.92**	**17.54**	.82	.18 to 1.82
Phase shift	**Lagging**	No clear pattern	Leading	Leading
ER	Countercyclical	Countercyclical	—	—
Contemporaneous correlation	–.61	–.49	—	—
Relative volatility[3]	16.04	18.29	—	—
Phase shift	Lagging	Lagging	—	—

[1] From Kydland and Prescott (1990).
[2] From Christodoulakis, Dimelis, and Kollintzas (1995).
[3] Ratio of volatility of the variable and the volatility of real GDP reported in Table 1.
[4] Only Spain exhibits a large negative correlation (–.30).

NOTE: Seemingly anomalous statistics are in bold type.

SOURCES: Authors' calculations, based on sources reported in the text for national accounts and on FIEL for monetary aggregates and price level indices.

nominal and monetary aggregate series. This table presents information analogous to that in Table 4 of Kydland and Prescott (1990), with the necessary modifications to incorporate some idiosyncracies of the Argentinean economy.

First, we do not report statistics for the monetary base. Because of the frequent and cumbersome changes in financial regime that Argentina experienced in the period under analysis, the concept of monetary base does not have the meaning it has in the United States or in the OECD and European countries we use for comparison in this article.[26]

Second, the implementation of different forms of price controls during the analysis period may have distorted the true business-cycle price features. Therefore, as proxy for the true underlying nominal price level, we also report statistics for the exchange rate in the black market.

The intense inflationary process that Argentina experienced in the 1970s and 1980s is responsible for the unusual high volatility of all variables in Table 3. However, to correctly interpret this volatility and other statistics in the table, it is important to stress that monetary policy in Argentina during most of the 1970–95 period was not monetary policy in the sense that it is in the United States, but rather a form of implementing fiscal policies financed with money creation.[27]

One striking similarity with international evidence stands out from the table: whether measured by the consumer price index or the black market exchange rate, the price level has been countercyclical (*Figure 5*), as it is in the

United States and in most European countries (Christodoulakis, Dimelis, and Kollintzas 1995). The countercyclicality of prices for the United States was pointed out in Kydland and Prescott (1990) at a time when economists commonly held the opposite view. Not surprisingly, this finding created considerable debate because it went against the predictions of most Keynesian or monetarist-inspired theories of business cycles.[28]

For nominal M1, however, the comparison with other countries is not that clear cut. The pattern of correlation for this monetary aggregate depends in an important way on the national account estimates used. For the old estimates, M1 is acyclical and all correlations are similar in sign and magnitude to those reported for the Netherlands in Christodoulakis, Dimelis, and Kollintzas (1995). By contrast, according to the new national account estimates, M1 is countercyclical, whereas in the United States and the European countries in Christodoulakis, Dimelis, and Kollintzas (1995), it is acyclical or procyclical.

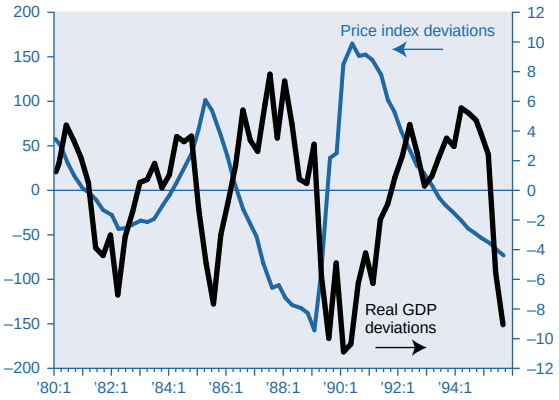
The differences between the two national account estimates should serve as a note of caution to researchers working with nominal monetary aggregates for Argentina. It is possible that some of the regularities taken for granted in the past were derived using the old estimates, but now those regularities have disappeared or become less obvious with the new national account estimates.

In any case, both national account estimates suggest that the monetary aggregate of savings accounts and time deposits (M2–M1) is acyclical. This is in contrast with the United States, where, according to Kydland and Prescott (1990), this monetary aggregate is procyclical and leads the cycle. But it would be wrong to conclude that this evidence suggests that credit arrangements could play a more significant role in U.S. business cycles than in those of Argentina, because during most of the analysis period, there was a considerable degree of financial repression in the latter country. As a result, part of the credit market was channeled through the informal financial sector, whose transactions by its very nature are not captured by the official monetary statistics.

Finally, velocity of all monetary aggregates, whether using the consumer price index (reported in Table 3) or the exchange rate (not reported) as a deflator, is countercyclical, whereas Kydland and Prescott (1990) reported it is procyclical for the United States.

Figure 5
Argentina, Prices Are Countercyclical

Percent standard deviation from trend



SOURCES: Authors' calculations using new national account estimates from Dirección Nacional de Cuentas Nacionales and the consumer price index from Instituto Nacional de Estadísticas y Censos (INDEC) as reported by FIEL.

Conclusion

Is the business cycle of Argentina really different from that of other countries? We hope this article shows other researchers how difficult it is to answer this simple question. One reason for this difficulty is that the business-cycle features of Argentina can change substantially from one national account estimate to the next. As we indicate, the commonly held view that absolute volatility of output is abnormally high in Argentina is a myth by the old national account estimates but a fact by the new ones.

Similarly, the correlation of the cyclical component of real total consumption with that of real GDP is within the range observed in other countries, according to the old national account estimates, but unusually high by the new ones. We have given reasons, however, to consider this last feature as partly a figment of the data.

The statistics related to production inputs (labor and investment), which play a crucial role in RBC models, display remarkable similarities with the international evidence. In particular, except for absolute volatilities, all the statistics for investment, labor inputs, and productivity are within the range observed in the United States or European countries.

Based on these statistics, the only challenge for an RBC model of Argentina would be to explain the larger volatility of output. But a study by Mendoza (1995) suggests that an RBC model could accomplish that if properly adapted to deal with the idiosyncracies of the Argentinean economic environment. By that, we do not mean a model that incorporates only

technology shocks, but one that uses other real factors or economic policies whose effects can be captured through the aggregate production function of the economy. More specifically, Mendoza's study adds terms-of-trade shocks to an RBC model with technology shocks and shows that such a model can replicate about the same proportion of GDP variability—50 percent for G–7 and developing countries—even if the absolute volatility of GDP is substantially larger in the developing countries. Interestingly, according to the Mendoza study, the variability of Argentina's terms of trade is twice that for the United States, which is the order of magnitude by which the variability of Argentina's GDP exceeds that of U.S. GDP (using the new national account estimates).[29]

A host of other empirical studies confirm the potential of RBC models to mimic a large fraction of the economic fluctuations observed in Latin American countries. For example, using a structural vector autoregression model (VAR), Hoffmaister and Roldós (1997) find that supply shocks are, even in the short run, the main source of the output fluctuations in these countries. Sturzenegger (1989) also reports VAR estimates, according to which supply shocks account for 90 percent of the Argentinean output fluctuations.

The results in Table 3 are unfavorable to the hypothesis that nominal factors play the most important role in economic fluctuations. In particular, the price level is countercyclical. Monetary theories of business cycles have had a hard time accommodating this empirical regularity within an empirically successful (by some measure) dynamic stochastic general equilibrium model. Furthermore, the Argentinean monetary aggregates display, in general, a very different cyclical (countercyclical) pattern than those of the United States and Europe (procyclical). Yet, these differences do not seem to translate to the relative volatilities and other features of real variables, which behave more similarly in Argentina and these other countries.[30]

In addition, our analysis of the business-cycle debate in Latin America suggests that nominal exchange rate shocks, even during ERBS programs, do not seem to have had the clear real effects the literature has alleged. In fact, the evidence we have presented—circumstantial as it may be—and the few available studies that have attempted to analyze it in a more systematic way all point in the same direction: nominal factors do not seem to be able to account for any significant fraction of the business cycles of Latin American countries in general, and of Argentina in particular. Perhaps for this reason it is time to give real factors their fair chance to do the job. Therefore, it is essential that a research agenda first specify the empirical regularities that real factors must account for.

To that end, we have presented the facts about the Argentinean business cycle, following a well-defined, systematic approach that does not impose on the data any strong *a priori* belief on a particular theory of business cycles. We hope that our atheoretical description of empirical regularities will motivate further empirical and theoretical work that will ultimately lead to a better understanding of the economic fluctuations and of the real effects of inflation stabilization programs in Latin American countries in general, and in Argentina in particular.

Notes

The authors are grateful to David Gould, Carlos Végh, and Mark Wynne for substantive and useful comments. We are also thankful to Anne Coursey, whose editorial suggestions contributed to a clearer exposition of our ideas.

1 This distaste for economic fluctuations is implied by the assumption that economic agents have concave preferences. An old joke illustrates the meaning of this economic jargon. An economist is informed that a fellow citizen, with one leg freezing in ice and the other boiling in hot water, is in pain. "Why?" the economist asks. "On average, he is OK." Actually, this joke doesn't do justice to the economics profession, whose members know very well that the citizen has concave preferences: he would prefer to have both feet in lukewarm water. Likewise, economists know that consumers would prefer an economy in which output and consumption grow at the same steady rate, quarter after quarter, to one whose growth is the same on average but varies from high (a hot economy) in some quarters to slow (a cold economy) in others.

2 So much so that a prominent monetarist like Lucas himself recently asserted, "Monetary shocks just aren't that important. That's the view I've been driven to…. There's no question, that's a retreat in my views." (*The New Yorker*, December 1996, 55.)

3 For an excellent summary, see Végh (1992).

4 For details, see Kiguel and Liviatan (1992), Végh (1992), Calvo and Végh (1993), and citations therein.

5 The vertical line is drawn on the tick corresponding to the period in which the program was announced, unless the announcement was made in the first third of the period. In this case, the vertical line is drawn on the tick corresponding to the immediately preceding period. The implicit assumption is that the real effects of ERBS programs did not have time to show up in the

period of the announcement if it came too late in the period.

[6] This prediction arises from the intertemporal substitution effect originally emphasized by Calvo (1986): the temporary (by assumption) reduction of the devaluation rate translates into a temporary reduction in the nominal interest rate that increases the demand of current tradable goods relative to future tradable goods. The empirical relevance of this mechanism, however, has been questioned by Reinhart and Végh (1995a).

[7] "Witty" analysis of plots is a valid and widely used method of analyzing economic evidence, especially in the early stages of a theoretical development. However, this casual empiricism presents serious problems (see Easterly 1996). To avoid ambiguities and imprecisions, plot analysis should be complemented with more formal quantitative methods whenever possible. In our case, it would be important to construct measures establishing whether the consumption growth rate immediately after the announcement of ERBS programs was significantly different (by some criteria) than immediately before. The ERBS literature has yet to provide such a measure. The few formal quantitative studies in that literature that have attempted to go beyond the plot analysis (Reinhart and Végh 1994, 1995b, and Hoffmaister and Végh 1996) are concerned, instead, with the dynamics of real variables *within* different inflation stabilization programs.

[8] It is true that nominal factors deliver important real effects in the nominal wage rigidity version of the monetarist-inspired models examined by Rebelo and Végh (1995). However, that success is achieved at the expense of generating countercyclical real wages, which goes against the available evidence. For example, Carrera, Féliz, and Panigo (1996) report that real wages in Argentina and Brazil are procyclical.

[9] In fact, none of the stabilization programs reported in the literature has been a "pure" monetary experiment. They were always associated with other policy measures, such as financial liberalization, changes in taxes and tariffs, and so on, all factors that would fall in the category of "real" in the analytical framework of real-business-cycle theory. The omission of these factors from the analysis may lead to serious misinterpretations of the evidence on stabilization programs. For example, as pointed out by Calvo (1986), "…if expected to be temporary, a banking liberalization policy will tend to have effects similar to the type of exchange rate policies analyzed above [in reference to ERBS programs]."

[10] In this sense, we enthusiastically agree with Calvo and Végh (forthcoming, 14) that "too little empirical work—relative to theoretical work—has been done in the area."

[11] This methodology is "theory free" in the sense that it does not take any stand with respect to the causes of economic fluctuations.

[12] Heston (1994) provides a very thorough discussion of all the measurement problems typical of the national accounts of developing countries like Argentina.

[13] The change in the base year is not the only difference between the two series. There were also important methodological modifications and other adjustments in the new estimates. The magnitude of the corrections should be apparent from the fact that the level of annual real GDP for 1980 is 36 percent higher in the new estimates than in the old estimates. Jumps of this size in the level of GDP between subsequent national account estimates are not unusual in European countries as well (see Maddison 1995, 124).

[14] A technical presentation of the HP filter can be found in Hodrick and Prescott (1997).

[15] Because we are dealing with quarterly data, we follow Kydland and Prescott (1990) in setting the "smoothing parameter" $\lambda = 1600$.

[16] We acknowledge that the statistical properties of the detrended components measured with the HP filter remain somewhat controversial (see, for example, King and Rebelo 1993). But it is important to keep in mind that our main goal is to compare the business-cycle regularities of Argentina with those of the United States and Europe. Several recent studies for such countries have indeed detrended the data with the HP filter as well. Moreover, no detrending technique is free from criticism.

[17] The reason for this transformation of the data is that the business-cycle literature is concerned with percentage (rather than absolute) deviations from trend in growing series.

[18] As an exercise, we extended the GDP series from each national account estimate to the entire 1970:1–95:4 period by applying to each estimate the growth rates of the other during the nonoverlapping period. The cyclical volatility of GDP from the series constructed this way is 3.9 for the new estimates and 3.65 for the old ones.

[19] See table A2 in Christodoulakis, Dimelis, and Kollintzas (1995).

[20] According to the permanent income hypothesis, the series for consumption should be smoother than that for income (or GDP). However, this prediction is valid only for consumption of nondurable goods, and the series for consumption typically includes durable goods.

[21] The conjecture that the excess volatility of consumption relative to that of output most likely reflects a mismeasurement problem, as hypothesized in note 20, is reinforced by the finding in Backus, Kehoe, and Kydland (1995) that consumption volatility is indeed lower than that of GDP in the U.K. once expenditures on consumption durables are excluded from aggregate consumption.

[22] See, for example, "Overcoming Volatility," Inter-American Development Bank (1995, 191).

[23] Intuitively, in an economy incapable of transferring wealth between periods, economic agents will use up all they produce in every period—that is, consumption will be exactly equal to income period after period. Although there is absolutely no credit in this economy, the volatility of consumption cannot exceed that of output (or income).

[24] Heston (1994, 43) discusses a concrete case in which allocating imports between consumption and investment, with procedures analogous to the one outlined above, may lead to significant errors in consumption. The new national account estimates used information from the National Economic Census of 1985 to impute imports as consumption or investment goods, and data from the National Economic Census of 1973 for the same imputation of domestically produced goods. For more details, see CEPAL/ECLA, final report, 1991. The particular example in the text about the allocation of automobiles between consumption and investment was provided in an interview with staff members from the Subsecretaría de Programación Económica del Ministerio de Economía of Argentina.

[25] This may have serious implications for the prolific literature inspired by reported consumption booms in Latin American countries: it may well be the case that these booms, or at least a part of them, are in reality capturing mismeasured investment booms.

[26] For example, in July 1982 all Argentinean deposits were "nationalized"—that is, from that month on, all deposits in financial institutions were considered deposits at the central bank. Since these deposits are by definition part of the money base, this base became almost identical to M2 and therefore experienced an increase equal to the difference between these two monetary aggregates previous to the reform. Almost all of the resulting jump in the money base that month was, then, an artifact of accounting procedures rather than the result of a change in monetary policy. For these and other details on the institutional features of the Argentinean financial system over the 1900–95 period, see Zarazaga (1996).

[27] Monetary policy in the United States is closer to what economists would regard as "pure" monetary policy. In particular, U.S. monetary policy is carried out through open-market operations that exchange one form of government debt (fiat money) for another (government bonds), leaving the overall level of outstanding government debt unchanged. In Argentina, by contrast, the typical monetary policy consisted of handing over fiat money directly to the treasury, which used it to finance its deficit and not to retire other forms of government debt as in the United States. Thus, monetary policy in Argentina has typically increased the overall government debt by expanding the money base. It is in this sense that Argentina's monetary policy has really been a hidden form of fiscal policy.

[28] Abel and Bernanke (1992) provide an excellent, balanced discussion of the business-cycle facts and their consistency with RBC or Keynesian theories (see especially Sections 11.2, 12.4, and 12.5).

[29] A recent paper by Crucini and Kahn (1996) shows that tariffs can have a larger impact on GDP than generally believed. This is relevant in the light that substantial implicit or explicit changes in tariffs were a usual ingredient of the many stabilization programs implemented in Argentina during the sample period.

[30] Gavin and Kydland (1996) have recently reported a related finding for the United States. They found that real variables in that country seemed to have been invariant to the changes in the cyclical behavior observed in the nominal variables after 1979. They showed that these observations can be generated by a business-cycle model with impulses to technology in which monetary policy affects the cyclical behavior of nominal variables but not that of real variables.

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