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Economic Recovery from the Argentine Great Depression: Institutions, Expectations, and the Change of Macroeconomic Regime

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WORKING PAPER N° 52 (Bis)

**“ Economic Recovery from the Argentine Great Depression:
Institutions, Expectations, and the Change
of Macroeconomic Regime * ”**

**Gerardo della Paolera, *Universidad Torcuato Di Tella and Hoover Institution*[†]
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November 1998

ABSTRACT:

We ask how Argentina overcame the Great Depression and if macroeconomic interventions made any contribution to the recovery. Argentine macroeconomic policy deviated from gold-standard orthodoxy after the final suspension of convertibility in 1929. As elsewhere, fiscal policy in Argentina was conservative. Monetary policy became unorthodox after 1931 when the *Caja de Conversión* (Conversion Office, a currency board) began rediscounting to sterilize gold outflows and avoid deflation. This change of regime predated a later, and supposedly more significant, stage of institutional reform, namely the creation of the central bank in 1935. A wider literature links the interwar depression in the core economies to flaws in the gold standard and emphasizes the connection between active monetary policy and escape from deflation and slump; our work extends this idea to the periphery.

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The experience of Argentina during the Great Depression provides an ideal historical laboratory for the investigation of macroeconomic stability and policy choice in a small open economy under a fixed exchange rate regime. As in recent developing-country experiences—including examples of contemporary currency boards very similar to Argentina's institutions of the early twentieth century—the essential question is: what happens if you employ a currency board and there is an external crash or deflation threat? This was the nature of the crisis in the 1930s for many countries, and the same potential problem faces Argentina, Hong Kong, and other countries in the 1990s. What should they do today? To inform that question we ask: What did Argentina do in the past?

The Great Depression began in Argentina in the late 1920s. Like many countries of the periphery, Argentina was exposed to the commodity lottery and the terms of trade worsened in the 1920s.¹ By December 1929, the balance-of-payments crisis was severe and the exchange rate was left to float after a mere two-year resumption of the gold standard. Recovery began in 1931 as output grew for the first time in several years. By 1934–35 output had regained its 1929 level. Assigning fiscal policy any responsibility for the recovery is implausible: by any measure fiscal policy actually *tightened* during the early 1930s, as in many other Latin American countries and the United States. However, in monetary policy actions from 1929 to 1935 we see evidence of a change of regime. Many commentators see the creation of the *Banco Central* (Central Bank) in 1935 as the main monetary policy event of the 1930s in Argentina.

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¹ Díaz Alejandro, "Stories"; Kindleberger, *World*.

We instead emphasize the remarkable decision of the *Caja de Conversión* (Conversion Office, a currency board) to begin rediscounting and so forge an independent monetary policy. In many ways, the Central Bank merely rubber-stamped this new macroeconomic policy regime and continued its operations after 1935.²

The Argentine recovery was complete by 1935; and the only pre-1935 change in regime that could be assigned a role in ending the Argentine Great Depression was the action of the Conversion Office. Yet, did it make a difference? We argue that the change of monetary regime was essential to Argentina's recovery in that it helped avert a devastating collapse of prices, and, potentially, of output in 1931–33. Instead of following the United States and other countries into this abyss, Argentina's regime shift destroyed deflationary expectations. Previously extremely high real interest rates were permanently lowered. In other ways, though, policy was still limited by orthodox thinking. Sterilizations offset gold outflows but never counteracted them. This leads to an important distinction: Temin has argued that recovery from the Depression came through two channels. First, a direct injection of liquidity could lower interest rates and stimulate aggregate demand, something he termed the "Keynes effect." Second, a decisive change in monetary regime could convince agents to discard their pessimistic expectations of deflation, with favorable implications for economic activity via lower *ex ante* real interest rates, improved balance sheets and asset quality, and so on, termed the "Mundell effect."³

² In substantive terms, we would argue that the main contribution of the central bank was to put in place a rescue package for the financial sector—by saving the Banco de la Nación—using the proceeds of a large gold revaluation (depreciation). See Salama, "El orden", p. 21.

³ Temin (*Lessons*) noted the impact of these two effects in the 1930s recovery in the core countries, and he too stressed the importance of the Mundell effect and the change of expectations that followed the change of regime. See also Eichengreen, "Origins" and *Golden Fetters*. The United States' experience under Hoover and then FDR is a classic example of such a regime shift; see Temin and Wigmore, "The End"; and Romer, "What Ended?"

Although two escape routes existed, only one was used—but it was enough to avert disaster. Argentina was still a prisoner of its intellectual and economic history, and fear of inflation was still an issue in the midst of slump, as in other countries. The Conversion Office, though willing to follow Prebisch's plan, was not willing to push it as far as it might. There was no "Keynes" effect at work, no large money injection to stimulate aggregate demand as a device to end the Depression more quickly. The channel through which the change in monetary regime had real effects was via the destruction of deflationary expectations, the "Mundell" effect. Hence we think that the institutional change heralded by the rejection of an old orthodoxy was just as essential to recovery from the Great Depression in the periphery as in the core.⁴

CONTOURS OF THE ARGENTINE GREAT DEPRESSION

The Great Depression marked the end of an epoch where free trade and integration into external capital markets served as the main strategies for economic growth in Latin American countries.⁵ For Argentina, although economic problems had retarded economic growth since 1914, there was a pressure to stand by the old liberal orthodoxy. Even during and after the *worst* recession in Argentine history, during World War One, few policymakers seriously questioned the return to orthodoxy as the goal for the 1920s, to rebuild an economic order predicated on openness in markets and adherence to the gold standard as a monetary rule.⁶ This view was only broken as the threat of an even worse international economic collapse loomed in the early 1930s.

⁴ Cross-sectional reduced form analysis of the impact of devaluation on recovery was provided by Campa "Exchange Rates," following Eichengreen and Sachs, "Exchange Rates." Other studies in this vein include Bernanke and James, "Gold Standard," and Obstfeld and Taylor, "Great Depression." Our work is perhaps more ambitious, in that we focus on a single case-study and examine the structural details of monetary policy and transmission.

⁵ Díaz Alejandro, "Stories"; "Latin America."

⁶ On the post-1914 slowdown, see Taylor, "External Dependence."

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⁵ Díaz Alejandro, "Stories"; "Latin America."

⁶ On the post-1914 slowdown, see Taylor, "External Dependence."

Selected data in Table 1 show the impact of the Great Depression on the Argentine economy. From 1929 to 1932, Argentina imported severe deflationary pressures from the international economy. If one were to judge by its trade exposure, Argentina was one of the most vulnerable economies in the presence of such sizeable foreign shocks—shocks that, in addition to pure deflation, also included fierce terms of trade declines as countries took their hits in the “commodity lottery.”⁷ The external terms of trade declined by 24% and the foreign (U.S) price level fell by 26%.

In this context it is astonishing that the Argentine Great Depression was so mild and short-lived by international standards. Hence, the notion that an important change in economic policy took place—and saved Argentina from more pronounced suffering—deserves close scrutiny. As can be gleaned from Table 1, from peak to trough (1929 to 1932), the domestic real output fell by “only” 14% and had even surpassed its 1929 level already by 1935. Deflation, a curse to avoid in the inter-war period, was only about 6% (in *cumulative* terms) in the same period. The behavior of output and prices compares favorably, say, to North American gold-standard countries such as the United States and Canada: they had an overall decline from peak to trough of more than 30% in real activity, and more than 20% in price level.⁸ The Argentine performance was also very good by the standards of the periphery in general, and Latin America in particular. In the same 1929–32 period, Mexico’s prices and output fell by 19%, Chile’s real output by 27%, and Brazil’s by 28%. We note here that currency depreciations were not

⁷ On these deflations, see Kindleberger, *World*; Temin, *Lessons*; Eichengreen, *Golden Fetters*. On the commodity lottery see Díaz Alejandro, “Latin America.” For a discussion of the general experience of the periphery in the 1920s with terms-of-trade shocks see Kindleberger, *World*.

⁸ The data are from Mitchell, *International Historical Statistics: Europe and International Historical Statistics: The Americas*.

always directly correlated with the ability to avoid a slump.⁹ For example, in Brazil there was a 66% depreciation of its currency, in Mexico 47%, while the Argentine paper peso declined by 63% with respect to the gold dollar.

We think it is important here to distinguish between a country *choosing* to depreciate as a regime switch versus *being forced* to depreciate in a crisis. There is an enormous difference between: (a) letting the currency depreciate as a mean to restore equilibrium in the money market; and (b) installing a new policy regime *à la* Sargent that changes expectations and alters the course of economic decisions.¹⁰ If, in the 1930s, Argentina were free to choose (or not choose) a full-fledged change in her monetary regime, and if, as we argue, this was as a proactive political-economy decision, then policymakers must have had a lot of room for maneuver. Indeed they did. From Table 1 we note that around 1930, almost 80% of the money base was backed with gold—a backing ratio much higher than in any other gold standard country, and a symptom, as we shall see, of Argentina's thirty years of adherence to an especially strict currency-board regime. The inelastic relationship between gold and money finally broke in 1931 when the government decided to switch from targeting the backing ratio to targeting the nominal quantity of money itself in a bid to avert deflation.

The massive gold stock was critical, however, even *after* suspension. By using the gold to service external debt obligations the government could maintain a very orthodox fiscal policy. Argentina did not default on foreign debts in the 1930s: a very unusual feat for a peripheral country. In this way a new policy mix was chosen: "sound

⁹ In larger samples nominal devaluations were correlated with economic recovery in the 1930s. For the core this was shown by Eichengreen and Sachs ("Exchange Rates") and the idea was extended to Latin America by Campa, ("Exchange Rates").

¹⁰ See Sargent, "The Ends." He applied the idea of regime change to the end of large inflations in history. Temin and Wigmore ("The End") applied the idea to the end of deflationary episodes such as the Great Depression.

finance" in the realm of fiscal affairs, and, at the same time, an unorthodox fiduciary monetary regime. The domestic credit component of the money base, frozen for 32 years by the law of 1899, increased to such an extent that it already accounted for 62% of the money base by 1932.

Other macroeconomic responses stand out in Table 1. Investment fell by about one half in 1929–31 and by another third in 1932. Private consumption fell by about a quarter. Both shifts greatly exceeded the fall in output. As we shall see, agents began to clamor for a change in policies to redress the negative expectations that prevailed. The dramatic declines in output, investment, and consumption ceased, and then reversed, after 1932. It seems the authorities were successful in the regime change, stabilizing the price level and real exchange rate. Export growth and sustained import compression assisted recovery. In short, by 1933 Argentina had circumvented the most devastating effects of the World Depression.¹¹ Did policy choices make a difference?

THE INTERWAR GOLD STANDARD: ORTHODOXY AND HETERODOXY

Some authors characterize the Argentine Great Depression as a definite "blessing"—in the sense of creating an opportunity to adopt new economic policies and institutions in the face of widespread pressure from external governments and economic advisors to stick to orthodox policies. This new institutional regime, by deviating from the prevailing *mentalité* of the orthodox gold standard, is what could have insulated the domestic economy from the dismal global scenario.¹² Such a regime would have been hard to

¹¹ See della Paolera and Taylor, "Finance and Development."

¹² See, for example, Díaz Alejandro, "Stories"; and Ortiz, "Essays." Díaz Alejandro states: "...Once upon a time foreign money doctors roamed Latin America prescribing fixed exchange rates and passive gold exchange standard monetary rules. Bankers followed in their footsteps, from the halls of Montezuma to the shores of Daiquiri... This paper will chronicle some of the ways various Latin American economies coped with them. It will be seen that the performance of several [Latin American] economies was remarkably good, under the circumstances...."

envisage just a few years earlier given Argentina's position as a periphery economy and her struggle, over more than a century, to securely establish credible monetary, fiscal, and financial institutions. The long effort to adhere to orthodoxy followed from a political consensus in which few doubted the rewards that would (and did) accrue to Argentina in return for embracing globalization in the late nineteenth century and playing by the internationally-approved "rules of the game." Free movements of capital, labor, and goods were a key ingredient in Argentina's pre-1914 success. Against this backdrop, we can see what extraordinary intellectual and technocratic obstacles policymakers had to surmount in the 1930s before they could effect a change in the macroeconomic regime, and, in doing so, depart from the prevailing orthodoxy even ahead of most of the developed countries of the core.¹³

Fiscal Policy

We discuss fiscal policy first because of the important constraints it put on monetary policy, even though in itself it was not an area of regime change at all. The historical record shows no shift in Argentina's basic orthodox fiscal stance—of seeking to maintain budget balance—even during the worst years of the Great Depression. This is not a surprising discovery. Even in the economies of the core, the power of fiscal policy was not unleashed to insulate economies from the recession. For example, it is hard to find any evidence of *full employment* deficits in the United States during the 1930s. Indeed, for many years, the net fiscal impact appeared to be contractionary.¹⁴

¹³ Argentina was one of the first countries to suspend the interwar gold standard in December 1929. At around the same time Australia, New Zealand, and Uruguay suspended. The first suspensions in the core were Britain and Scandinavia in 1931, the same year other Latin American countries suspended. Eichengreen and Sachs, "Exchange Rates"; Campa "Exchange Rates."

¹⁴ Thus, for example, the classic Keynesian tool of macroeconomic management did not fail, but rather was never really used, as was famously pointed out by Brown, "Fiscal Policy." This finding was further reinforced by the work of Peppers, "Full-Employment Surplus"; and Romer, "What Ended?"

Moreover, if expansionary deficits were not an option for core countries in the 1930s—with their developed taxation systems and fiscal sophistication—they were, of course, still less of a feasible policy choice for countries at the periphery, given their much less developed government structures for managing, administering, and implementing large spending programs.¹⁵

The 1930s fiscal experience in Argentina accords with expectations.¹⁶ One simple measure is the fiscal action of the central government shown in Figure 1. At the start of the interwar period customs taxes constituted a large share of revenues, as is typical in all developing countries.¹⁷ Consequently, tax revenues were cyclically correlated with trade conditions: during recessions, import contraction was a standard response. Since government spending followed an upward trend, endogenous (though not, by definition *full-employment*) deficits appeared in some of these recessions; and, indeed, temporary deficits were run up in World War One and in 1921–22.

The fiscal response in the 1930s was not so forgiving. High expenditures were run up in 1928–30 and drastically cut back during 1931–33, generating a big contractionary effect just as the economy fell into the Great Depression. Although customs taxes were falling in line with the trade crisis, *total* taxes were increasing. President Uriburu, like Hoover in the United States, was a fiscal conservative and sought orthodox budget balance.¹⁸ So, far from pursuing expansionary fiscal policy via increased *full-employment* deficits, the Argentine fiscal response during the Great

¹⁵ This was true of Latin America, where few countries in the 1930s were capable of developing new fiscal programs in response to the Great Depression. Twomey, "1930s Depression."

¹⁶ Díaz Alejandro, "Stories," p. 21.

¹⁷ Such taxes accounted for \$199 million out of \$370 million pesos of tax revenues in 1913, or about 54%.

¹⁸ One important part of the package was a dramatic increase in direct taxes, in the form of income and wealth taxes, which rose from \$25 million pesos (less than 5% of all revenues) in the 1920s, to \$92 million (almost 15%) in 1933. With a broad array of

Depression was such as to generate not even increases in *actual* deficits, but rather a move toward surplus.¹⁹ So our search for a source of Argentine economic recovery must focus elsewhere; and we focus on the change in monetary regime.

Curiously, fiscal orthodoxy and monetary tensions were two sides of the same coin, and the link is critical to our understanding of Argentine policy choice. Intense fiscal pressure was felt in many Latin American countries in 1929–30. Tax revenues fell and foreign lenders refused to roll over debts in the worsening international climate. Deflations and depreciations raised the burden of foreign-denominated debt service. The Argentine deficit for 1930 stood at 4.3% of output, a marked increase from previous years; debt service had risen from 18% of the budget in 1930 to 29% in 1932.²⁰ Many countries chose to default in this situation, but Argentina never wavered from her external sovereign debt obligations.²¹ With default an anathema—and attempts to raise new borrowings, depress imports, and boost tax revenues proving insufficient in the short run—the only remaining option for servicing the debt was to draw on the last fiscal resource left to the government: the large gold stock sitting idle in the vaults of the Conversion Office. This course was taken, but the price for subscribing to this fiscally orthodox response was to draw down the gold stock and, *ipso facto*, the money base, given the mechanical rules of the currency board. Thus a deflationary money

aggressive tax programs, the government raised taxes consistently every year after 1930, and closed the deficit from \$240 million pesos in 1929, to just \$126 million in 1933.

¹⁹ We concur with Díaz Alejandro that “[i]n short, there is no evidence that during the early 1930s the Argentine government sought to increase the full employment budget deficit as a means to compensate for the fall in aggregate demand.” Díaz Alejandro, “Stories,” p. 22.

²⁰ See Table 1 and Díaz Alejandro, “Stories,” pp. 20–21.

²¹ Why? A conventional interpretation is that Argentina maintained debt service so as not to derail the Roca-Runciman trading pact with Britain, understanding that British creditors could not be let down or else severe trade penalties might result from a diplomatic crisis. We offer another, perhaps more compelling, explanation: Argentina sought to maintain her reputation with foreign creditors to maintain access to capital markets, and was indeed successful in this respect during the 1930s. We discuss this issue in a later part of the paper where we focus on contemporary evidence. See also Tomz, “Do Creditors?”

contraction was an inevitable but undesirable side-effect of the course chosen—at least so long as the Conversion Office played by its own rules.

Monetary Policy

From 1899 until the founding of the Central Bank in 1935, Argentina was under a currency-board regime (see Table 2). The *Caja de Conversión* (Conversion Office) was the institution responsible for the administration of the domestic monetary regime. The Conversion Office was just that: a window that mechanically and instantaneously swapped paper pesos for specie. By adopting the gold-standard system, the monetary authorities unilaterally anchored the external value of the currency. Hence, they could not control the nominal quantity of money in the economy, and this quantity became an endogenous variable that depended on domestic and world market conditions.

How closely did the Conversion Office adhere to these rules? In a pure gold standard regime, expansions and contractions of the nominal quantity of money should be exactly correlated with variations in the gold stock at the Conversion Office. For the 1900–1914 and the 1927–1929 gold-standard periods, there is just such a one-to-one and rigid association between money and gold as shown by the data in Figure 2. The correlation is exactly one and the sample monthly means of both money and gold stock changes are exactly equal for the prewar and the 1927–1929 gold-standard periods. More remarkably, there was even strict adherence to the rule from 1914 to 1927 during a long suspension of convertibility. In this period, many core countries witnessed inflations and hyperinflations, but Argentina maintained a key element of orthodoxy. There was no wild recourse to money printing—for example, to finance spending—even though suspension offered an easy excuse and the exchange rate had drifted away

from its anchor. Indeed, drift in the exchange rate was unavoidable as most other countries abandoned their pegs from after 1914 until the mid-1920s. The adherence to orthodoxy was all the more remarkable given the enormous economic contraction in the years 1914–19 already noted. Despite all the temptations to reach for the levers of macromanagement, changes in money tracked changes in gold for the entire period from 1900 to 1931.

Argentina unilaterally did what she could to stick to orthodoxy and suspension of convertibility in 1914 was seen as just a temporary measure. After 1914 there were occasional outflows of gold for official purposes but these were still accompanied by a strict application of the gold-for-peso rule. In this period 1914 to 1927 the Conversion Office worked in a kind of asymmetric fashion: the monetary base augmented automatically when gold reserves increased but gold extractions were rarely allowed. Consequently, in periods of demand pressure in the foreign-exchange market, notably in the recession of 1920–21, adjustment took another form. The quantity of base money remained unchanged and there was a depreciation of the exchange rate (Figure 3).²² However, it was the universal belief of policymakers and market players alike that resumption at par was the only possible steady-state solution to the turbulence in the monetary and financial markets. How could this tension be resolved?

A “one-way” gold standard, as this has been called, was still consistent with the long run goal of resumption at par, for a simple reason. During the boom years of 1900–14, Argentina had built up a huge gold backing for the currency; from 1914 to the mid-1920s Argentina husbanded that stock carefully via the “one-way” devices of the

Conversion Office. By the mid-1920s, resumption still looked credible because this strategy left Argentina with much stronger backing for the currency, at least as compared to many core countries, as the gold-exchange standard was built. Actions were geared to the monetization of gold inflows but officials were strict about keeping the gold-backing of money to a minimum of 78% in the turbulent 1920–25 years.²³ What price did Argentina pay for this curious “one-way” gold standard policy? Did the exchange rate rise well above par making resumption difficult? Not at all. The most dramatic crisis in 1920–21 saw sudden declines in exports and the terms of trade. Even so, the premium over par never went above 33%,²⁴ In contrast, core European countries could only achieve such close convergence to prewar parity by the mid-1920s as they started to resume the gold standard. Several observers noted that European experiences with floating rates after 1914 were dismal in the absence of a well-understood monetary “straight jacket” to limit expansionary monetary policies, with monetization often deriving from unsustainable fiscal gaps.²⁵ Conditions in Argentina could not have been more different. More orthodox than the core itself, this peripheral country, from 1914 through to resumption in 1927, in its rhetoric and actions, was intent on the idea of resumption at parity. The regime in place was still essentially a metallic monetary regime. The prevailing *mentalité* allowed no room for money issues not fully backed by gold. Historical experience with profligate monetary policies in the 1880s and

²² See della Paolera, “Experimentos,” pp. 34–36. Depreciation thus meant an increase in the paper-currency premium relative to the paper peso-gold peso par value.

²³ At the same time, core gold standard countries such as Italy, Netherlands, Norway, or the United States never surpassed a gold-cover ratio of 50% of the money base.

²⁴ In the opposite circumstance, of gold inflow pressure, Argentina was even more orthodox than other countries; in the 1918–19 postwar years, the paper peso strengthened well above par before the Conversion Office decided to permit and monetize incipient gold inflows. In 1918 and 1919, the paper peso in terms of the gold-peso was quoted at 2.14 and 2.2, well below the 2.27 par value.

²⁵ See the fascinating article by Eichengreen and Temin (“Gold Standard”) that analyzes the policy debates over the resumption of the gold standard in core European and North American countries in the 1920s.

before, and the inflation and economic chaos that resulted from such actions, lived on in the minds of Argentine policymakers. Fear of repeat inflation underpinned their strong faith in the religion of the gold standard, which they saw as an effective way for the Argentine authorities to tie their own hands. Even the severe 1914–19 economic downturn could not break this commitment.

Based on legal developments, some might dispute the idea that from 1900 to 1931 the country maintained a metallic regime. Emergency laws were passed in August 1914 to overcome the severe financial crisis. The purpose of the 1914 rediscount law was twofold. First, it established that the state-owned *Banco de la Nación* could rediscount commercial paper from other private commercial banks by using up liquid reserves (that is, by lowering its vault-cash-to-deposit ratio. Second, it established that, with the consent of the Executive Power, the Conversion Office could also effect emergency issues (that is, non-backed increases in the quantity of money) as long as backing never fell below 40%. The first measure was intended to delegate to the *Banco de la Nación*, a quasi-public bank, and the largest of all banks, the microeconomic responsibility to forestall liquidity problems in the financial system. In that sense, one might say that the *Banco de la Nación* was a forerunner of the Central Bank because it had a rediscount window. However, the action of rediscounting commercial paper through this first provision in the law could only effect a change in inside money, or banking money (M3), and not in the monetary base (M0) which was controlled by the Conversion Office. The second provision of the law allowed the Conversion Office to rediscount commercial and government paper so long as gold backing stayed above a lower bound. Here we see, as early as 1914, and just 15 years after the 1899

convertibility law, a clear innovation: the design of an institutional capability that would permit the Conversion Office to de-link gold and currency movements. Was it used at all? In the period to April 1931 the answer is: almost never. With the exception of three months in the economic crisis of 1925, the monetary authorities never issued fiduciary notes.²⁶

The evolution of the money base in Figure 4 clearly shows the actions of the monetary authorities during the years of the Conversion Office (January 1900 to April 1935) and the first years of the Central Bank (May 1935 to December 1940). The constancy of the fiduciary issue is immediately apparent as a component of the money base, and, above it we see the gold-backed component: the strict gold-money rule applied.²⁷ For this reason we found the very strict correlations between gold and money seen in Figure 2. Thus, we think of there being no significant change of monetary regime until 1931. But the deflationary pressures and fiscal strains unleashed by the World Depression were sufficient to dislodge the gold-standard "straight jacket." Moreover, given the circumstances, mere suspension of the gold standard did not suffice to provide release from gold standard *mentalité*. As we have noted, if gold had to be spent in a fiscal rearguard action, the traditional operations of the Conversion Office would have led to a major adverse monetary shock, unless the rules of the game changed. They did:

²⁶ The conservatism of the Conversion Office contrasts with the more activist behavior of the *Banco de la Nación*. The bank rediscounted commercial paper in a countercyclical fashion (Salama, "El orden"). However, at maximum, such rediscounts never represented more than 4% of a broad definition of money such as M3.

²⁷ Except for a small blip in 1925, and a few other months (where lags kept gold and money slightly out of synchronization) there were no money issues not covered by gold at the Conversion Office. Note that during World War One, and to a lesser extent in the early 1930s, difficulties in shipping gold out of Europe meant that incipient gold inflows to Argentina were held in European vaults (*Legaciones*), but were the property of the Conversion Office. These were counted as gold backing, and are denoted separately.

Maintenance of liquidity was not simply a matter of ending convertibility. On the one hand, even after the abandonment of the gold standard, some countries such as Argentina shipped gold abroad to service the external debt and sold foreign exchange to stem the currency depreciation. On the other hand, as early as 1931 South American monetary authorities began to adopt measures which Professor E. W. Kemmerer and Sir Otto Niemeyer would have found unsound. Thus, the Argentine Caja de Conversión, whose old and only duty was to exchange gold for domestic currency and vice versa, began in 1931 to issue domestic currency in exchange for private commercial paper. By 1931 the old Caja even issued domestic currency against treasury paper.²⁸

The association between money and gold totally breaks down for the period after April 1931. Gold inflows had long ceased at this point, but subsequent gold outflows for fiscal use were sterilized; and even when there were no gold movements the Conversion Office often unilaterally changed the nominal stock of money via rediscounts.²⁹

Accordingly, we consider this *the* decisive regime change for Argentine economic policy, certainly during the Great Depression and possibly for the twentieth century as a whole. The basis of the monetary regime shifted from metallic to fiduciary in 1931. By the end of the year, after just nine months, fiat notes rediscounted by the Conversion Office rose from zero to as much as 30% of the monetary base. By 1932 the gold backing had already fallen from the targeted 78% in 1929 to 43%, a ratio only slightly above the lower limit allowed by law.

In this context, it is instructive to examine expectations as revealed by the behavior of the foreign-exchange market. In 1930, the gold premium was never above 28%—still below the 1923 mark. However, after the authorities started to sterilize the fiscal outflow of gold in 1931 by rediscounting, the premium skyrocketed to 81% and never reverted to a lower value (Figure 3). The reaction of the foreign exchange market was a (very rapid) manifestation of beliefs that had changed: agents increasingly saw

²⁸ Díaz Alejandro, "Stories," pp. 16–17.

the delinking of gold and currency as a permanent phenomenon. Judging from Figure 3 they were right. For the 1931–35 period the average annual change in the gold stock was –6.7 million paper pesos, but the average change in the quantity of money was +0.6 million paper pesos.

We argue that this precocious heterodox approach by Argentina's policymakers helped avert a severe economic collapse. Yet it was remarkable that they could effect such a dramatic change in regime given decades of adherence to orthodoxy. Where did their bold ideas originate?

THE POLITICAL ECONOMY OF REFLATION IN ARGENTINA: A *DEJA-VU* IN 1929?

The very costly effects of deflation on the economy were nothing new in Argentine macroeconomic history.³⁰ In the aftermath of the 1891 Baring crash, the paper peso, previously equivalent to one gold peso, suffered a depreciation of 274%. Tense negotiations began with international creditors to settle the external debt situation. Despite such a severe misalignment the Argentine authorities assured international investors that convertibility would be resumed quickly and at par. It was not to be. There shortly arose a political-economy debate on whether a gold-standard regime should be restored at the original 1881 parity, or if, instead, a conversion should be pursued at prevailing market exchange rate, thus accommodating the devaluation. Sectoral tensions emerged: urban sectors and commercial interests favored a return to par; exporters and industrial sectors called for a higher nominal exchange rate.

²⁹ The rediscounts began under the auspices of the 1914 law and were augmented by a new series of rediscounts of treasury paper under the "Patriotic Loan" legislation of 1932. These are included in the figure.

³⁰ This section follows closely della Paolera, "Experimentos," pp. 28–29.

The most important argument denouncing the damaging effects of deflation originated with the little-known Argentine political economist Silvio Gesell (1862–1930). In an article entitled “Monetary Anemia” written in 1898, Gesell identified the problem of the debt-deflation trap, anticipating Irving Fisher’s famous work by almost thirty years:

If money gets more expensive, debts increase in exact proportion to the rise in the cost of money. Nominally nothing changes, but materially the debt load increases. With the prospect of having to pay triple what one received, who will dare go into debt to start a new industry in the country?....The increase in the value of money is the common cause for all the country’s economic troubles....³¹

Gesell’s fear of deflation came to be the dominant view, and the idea of resumption at the old par was abandoned. Finally, in 1899, Argentina regained the Gold Standard at a new par rate of 2.2727 paper pesos per gold peso.

The influence of Gesell’s ideas on negative expectations and deflationary traps was recognized a long time ago by Irving Fisher and John Maynard Keynes. In his book *Stamp Scrip*, Fisher acknowledges Gesell’s innovative idea:

Silvio Gesell, who died recently, was a German businessman and quasi-economist....In 1890, while in Argentina, he proposed essentially that particular substitute for money which now bids fair to sweep this country [the United States] under the name of Stamp Scrip. Gesell before he died, accumulated a considerable following abroad; but it took the tortures of a depression to bring about any practical efforts to make use of his Stamp Scrip idea.³²

John Maynard Keynes went even further in recognizing Gesell’s influence in the *General Theory*:

The great puzzle of Effective Demand with which Malthus had wrestled vanished from economic literature. You will not find it mentioned even once in the whole works of Marshall, Edgeworth and Professor Pigou, from whose hands the classical theory has received its most mature embodiment. It could only live on furtively, below the surface, in the underworlds of Karl Marx, Silvio Gesell or Major Douglas...

³¹ See Gesell “La plethora monetaria” (written in 1909) and “La anemia monetaria” (written in 1898). Note the discussion on pp. 20–23.

³² Fisher, *Stamp Scrip*, pp. 17–18.

In a later chapter Keynes remarked that “[i]t is convenient to mention at this point the strange, unduly neglected prophet Silvio Gesell whose work contains flashes of deep insight....”; he then expended a dozen pages explaining Gesell’s contribution to the theory of money and interest.³³

Gesell’s critique of a fixed nominal quantity of money as a sub-optimal monetary rule was certainly influential in the 1899 decision to resume convertibility at a new parity. Yet, interestingly enough, he is barely mentioned by the other main influential intellectual figure in our story, Raúl Prebisch. Prebisch was the most influential and respected economist and economic policymaker of the 1930s. He was, perhaps, the only one who could challenge the prevailing *mentalité*, and conceive of a policy change to avoid the severe consequences of deflation in line with Gesell’s ideas.³⁴ An important task for Prebisch was persuading other policymakers to come around to his position, and his recollection of one such lobbying effort shows how. A crucial figure he had to persuade was Federico Pinedo, a politician and economist who at first viewed deviation from monetary orthodoxy with suspicion. In an interview years later, Prebisch recalled the meeting:

Prebisch: I am going to give you an idea of how Federico Pinedo was converted to the idea of creating a Central Bank. As I have said, when the General Uriburu spoke about the convenience of studying the creation of a central bank, in the report I wrote, Pinedo, in a series of conferences, disputed the idea. And he did it in a harsh manner. At the time, I knew him very little. But during the world depression there was a situation, when I was the Undersecretary of the Treasury, a catastrophic situation. The banking system was on the verge of collapse and we decided—I had the idea—to invoke an old rediscounting law that was never applied. The law was approved during World War One, in the first week of panic that we experienced, and it allowed the Conversion Office to rediscount banking paper. We made it operational....we stated that the rediscount law was to be applied....Then Pinedo, who was in the opposition to the Provisional

³³ Keynes, *General Theory*, pp. 32, 353–58, 371–79.

³⁴ During the *de facto* government of General Uriburu (1930–31), Raúl Prebisch was the Undersecretary of Finance. Already, in 1921, he had written a brilliant article on the problems of the Argentine currency showing that he understood the costly effects of deflation. Prebisch, “Anotaciones.”

Government, in spite of having been a revolutionary, enrolled with the *Partido Socialista Independiente*....He came to see me, I have now a clear picture of that moment; he said: "Prebisch, what mistake are you going to make?" («¿Que barbaridad van a hacer?») He was agitated...so nervous that he did not want to sit down...I explained to him the critical situation of the *Banco de la Nación*. The *Banco de la Nación* was the institution that administered the Clearing House. The money that the *Banco de la Nación* had in the vaults was less than the cash at the Clearing House. That tells you about the gravity of the situation.

Q: In which period did this occur?

Prebisch: This was in the year 1932—no, in the year '31, in the depth of the world depression. I gave him a huge amount of confidential information....

Q: And at issue was the project to create the Central Bank?

Prebisch: No, no, no. It was putting in motion the rediscounting law to allow the Conversion Office to rediscount. And Pinedo believed that we would provoke inflation. I explained to him for two hours. I did not hide any secret....He asked me a few questions and he started to become more calm. After two hours standing up I said: "Ok, Doctor Pinedo, you now know how is the situation. What would you do if you were in my shoes in the cabinet of the Ministry of Finance?" And he had the loyalty of saying, and this is why I admired him so much: "the same thing that you are proposing". He said nothing more. His criticism of the government ceased. For the first time he understood in the dramatic crisis that engulfed the country and the financial system. And he started to support the measures of the government...He convinced himself that there was no backtrack, that the Argentine monetary system based on the automatic exchange of gold for paper and paper for gold could not function. But this was in the year 1931. Then 1932 and 1933 elapsed and, when he was minister of Finance in 1934 he called me, and he asked me to draft the proposal for the creation of the Central Bank....³⁵

In short, led by Prebisch, a consensus was reached by the economic intelligentsia in Argentina in which they clearly understood that the time had come to abandon the rigid constraints imposed by a metallic monetary regime. No one was to perceive this as a temporary political economy decision, but as a fundamental break from the past: but could it save the Argentine economy?

INSTITUTIONAL CHANGE: THE IMPACT OF MONETARY POLICY

In the discussion so far we have found strong *prima facie* evidence that if any policy actions mattered for Argentina's economic recovery from the Great Depression, it was most likely monetary policies and the change of regime that were central. Can we

³⁵ Our own translation from Magarinos de Mello, *Dialogos*, pp. 108–109 and 110. We also see here how very careful Prebisch was to distinguish the 1931 change in regime, as he saw it, from his later work in the 1935 creation of the Central Bank.

quantify the impact of these policies on the evolution of the macroeconomy in the 1930s using standard econometric techniques? We assess the link between monetary variables and nominally-denominated prices, by examining the evolution of prices and exchange rates using a vector-error correction model. We show that monetary policy, when finally used, did have the potential to effect transitory real devaluations to stimulate the home economy, though the impact of such policies was small. We also look at the credit channel, focusing on the real interest rate effects of a change in monetary regime. Counterfactuals show that absent any such change, the persistence of deflationary expectations would have implied much higher real interest rates for several years, diminishing the chances of recovery.

The Model

We construct a three-equation dynamic econometric model of exchange rates, prices, and interest rates. The system is estimated using OLS on annual data for the period 1884 to 1941, and is used for counterfactual simulations of alternative monetary policies in the 1930s. The equations are:

$$\Delta \ln E_t = a_1 + b_1(L) (\Delta \ln E_{t-1}, \Delta \ln P_{t-1}) + c_1(L) (\Delta \ln M_t, \Delta \ln P^*_t) + d_1(L) \ln q_{t-1} + e_{1t} \quad (1)$$

$$\Delta \ln P_t = a_2 + b_2(L) (\Delta \ln E_{t-1}, \Delta \ln P_{t-1}) + c_2(L) (\Delta \ln M_t, \Delta \ln P^*_t) + d_2(L) \ln q_{t-1} + e_{2t} \quad (2)$$

$$r_t = a_3 + b_3(L) (\Delta \ln M_t, \Delta \ln Y_t, \Delta \ln P_{t-1}, i_{t-1}) + e_{3t} \quad (3)$$

where

E = exchange rate in paper pesos per U.S. dollar;
P = price level;
M = money base (M0);
P* = U.S. price level;

q = $\ln (EP^*/P)$ = log real exchange rate;
i = nominal interest rate;
r = real interest rate = $i - \Delta \ln P$;
Y = real output.

Equations (1) and (2) model adjustments of the real exchange rate as being driven by two forces: endogenous adjustment via the lags of E and P and the error correction term q; and exogenous adjustments via forcing terms M and P*.³⁶ Equation (3) is a standard Mishkin interest rate forecasting equation of the type used by Romer in her analysis of the U.S. Great Depression. It is used here in a similar form, with three lags found significant in the polynomial $b_2(L)$ using a step down procedure.³⁷

The estimated model, shown in Table 4, looks reasonable. In equations (1) and (2), exchange rates and prices adjust in accord with PPP as they react to the lagged real exchange rate. There is fast pass through in one period from money to exchange rates (a coefficient of 0.25), but slower pass through to prices (a coefficient of 0.16), a common structure in open economy macromodels, reflecting fast adjustment in financial markets but more nominal rigidities in the economy as a whole. Foreign prices pass through to domestic prices quickly, as one would expect in a small open economy. With noninstantaneous adjustment there is scope for monetary policy to effect real devaluations. In equation (3) the real interest rate prediction is significantly affected by lagged money growth so monetary expansions can temporarily drive down real interest rates.

The Counterfactual

Did monetary policies under a new regime end the Argentine Great Depression? The question contains implicit counterfactuals that needs to be examined: essentially, had

³⁶ We treat the U.S. price level as exogenous to the Argentine economy, and we impose PPP so that q is the relevant error correction term. We also allow monetary policy effects, to the extent that they are orthogonal to q, and any serial correlation terms, to have an impact. This might be viewed as "independent" components of monetary policy; for example, money innovations not, say, predicted via the price-specie-flow rule (that is, via q). Since our sample is 1884 to 1941, the bulk of these years (excluding 1900–14 and 1927–29) are years of convertibility, and the assumption of complete exogeneity of money is reasonable.

³⁷ Romer "What Ended?"; Mishkin "Fisher Effect?"

the monetary regime not changed, what would have happened? Given the suspension of convertibility in 1929, and the imposition of exchange controls, the fiscal use of gold for debt service implies an exogenous path for the gold stock. This simplifies our analysis greatly as we do not have to model endogenous gold flows and stocks in an uncontrolled free market for foreign exchange. We just have to consider counterfactual paths of money, and we study two cases.

The basic counterfactual (CF1) examines what would have happened absent the expansion of domestic credit begun by the Conversion Office in mid-1931. In the counterfactual, the monetary authority would have worked passively in converting paper into gold at the parity rate. The sole movements of gold would have continued to be the fiscal use of gold by the central government to service external debt: the currency board would not break the rules and attempt to sterilize the gold outflows by rediscounting. In a second and less harsh counterfactual (CF2) we impose the same path for money, except that we permit the authorities to revalue gold, as actually happened, in 1935. But we allow no other forms of monetary expansion after 1935, and changes in money base are based on the actual path of gold and reserves at the Central Bank. Thus, in CF1, we effectively imagine a world without a Central Bank. In CF2, we effectively imagine a world without the Conversion Office rediscounts, but still allowing the Central Bank to revalue gold.

Both counterfactuals imply large shocks to the path of money (see Table 1). From 1929 to 1934, M0 held constant at around 1,200 million pesos. Gold stocks fell by almost half, from 954 million, to 561 million; but after 1931 domestic credit expanded from 293 million (its level since 1900) and reached 610 million in 1934, almost exactly

offsetting the gold loss. Thus, both counterfactuals would have implied a counterfactual decline in 1934 of about 28% in money base—a massive nominal shock. The two counterfactuals differ in what would have happened after 1935. In CF2 the impacts would have been small, since the revaluation in 1935 added almost a billion pesos to the gold backing, expanding it from 561 million paper pesos, to 1,354 million. Arithmetically, this overnight “expansion” of gold was enough to offset all of the unbacked domestic credit.³⁸ In CF1, conditions after 1935 would have been tougher. Absent revaluation, the path of reserves after 1935 would have been flat up to 1940. There would never have been a significant expansion the money base to compensate for the almost one third decline after 1929.

Figure 5 shows the paths for prices, exchange rates, and interest rates in the two counterfactuals, using the above estimated model. The results show movements in the various variables that accord with intuition as regards the direction of change.³⁹

Prices

In 1929–33 prices showed a cumulative decline of about 5%–10%. They rose markedly throughout the rest of the 1930s, except for a sharp deflation in the recession of 1938. The 1929 level was regained in 1935, and a further 20%–30% increase was seen by 1940. In the counterfactuals Argentina would have suffered a more severe and extended deflation in the early 1930s. Absent rediscounting in 1931–34, the price level would have fallen about 40% rather than a mere 5%–10%, a scenario which would

³⁸ This followed from the peso's loss of more than half its value relative to the old parity of 2.27. The “new” gold cover allowed the Central Bank to create an apparent reduction in domestic credit from 610 million pesos in December 1934 to just 293 million in December 1935 (See Table 1 and Figure 4). Note that the money injection was not instantaneous, as can be seen from the monthly data, so, for the first couple of months of the Central Bank's existence domestic credit was actually *negative*—that is, gold and reserve backing at the new parity exceeded the outstanding money base: backing was more than 100%. See Figure 4.

³⁹ Note that all fitted values are derived using one-step-ahead forecast—i.e., actual lagged values are used. For the counterfactuals, dynamic forecast are used, where current fitted values are saved and used as future lagged values.

have prolonged deflationary expectations. In the CF2, prices barely regain their 1929 price level after 1935 even with the huge gold revaluation. Significant pass-through of US deflation could only just be offset by the revaluation. Worse still would have been the outcome without a revaluation: CF1 shows a persistent 10% decline in prices below the 1929 level, raising the question as to whether deflationary expectations would have ever been erased in the 1930s under the old regime.

Exchange Rate

The exchange rate depreciated markedly after the end of convertibility in 1929, with a more than 50% loss of value by 1935. This development seriously undermined the credibility of a resumption at the prevailing par of 2.27 with two beneficial side effects. First, agents began to doubt the idea of deflation as a future possibility as it would have had to be very severe to reestablish par. Second, the large move in the exchange rate encouraged Prebisch to plan a revaluation of the Central Bank's gold stock, thus cementing expectations even more firmly after 1935. Once par was unilaterally adjusted from 2.27 to 4.96 in May 1935 there was no turning back (Figure 3). Absent rediscounting, the exchange rate would have been 15%–20% stronger in 1931–34.⁴⁰ It is thus not clear whether, in the counterfactual world, agents would have been sure of a permanent regime shift. Without the revaluation of gold the mild depreciation would have persisted into the late 1930s, and, with it, the prospect of a deflation to regain the old par, as in the 1920s. In contrast, the actual story for the exchange rate makes clear the regime shift. Once the paper-gold exchange rate had risen into the range of 5 to 6,

⁴⁰ This should not be dismissed as trivial: the reversibility, via deflation, of a 15% depreciation is a lot more plausible than the reversal of a 50% depreciation. Indeed, such movements in the paper-gold exchange rate had been reversed in the 1920s to permit resumption in 1927 (see Figure 3).

agents suspected that the government would not embark on a deflationary attack to reactivate the old regime. The costs, political and economic, would have been too high, and the action thus highly implausible. Instead, drawing on their own history, Argentines would see a parallel to the resumption in 1900 after the inflation of the 1890s, when a sufficiently large devaluation of the paper peso relative to gold (from 1.0 to 2.27) required a shift to a new parity to escape the deflation trap.⁴¹

Real Exchange Rates

We also take the above data on prices and exchange rates, and the U.S. price series, and derive the path of log real exchange rates. The real depreciation of 1929–31 is apparent, but the reversion to PPP is also clear in the figure. Further, the impact of monetary policy in the counterfactual experiments appears weak. Certainly, absent the rediscounts, there would have been less real depreciation after 1931, but only by 5%–10%. Similarly, after 1935, the real exchange rate would have deviated little from its fitted value. We conclude that the real exchange rate channel was only a weak conduit for the impact of Argentine monetary policy.⁴² So, does this imply that recovery was largely external in origin? And did Argentine policymakers have no real impact through their supposedly radical change of regime? We think not—but if the real exchange rate effects were weak, then we are forced to consider an alternative channel.

⁴¹ Or in the international context of the 1920s and 1930s, agents could look overseas for comparisons in the event that orthodox thinking should return: at 300–400 pesos a strategy akin to British deflation in the mid-1920s was conceivable, if a reversal of course was to be contemplated. At over 500 to the dollar, agents would see the situation as closer to the French scenario of the mid-1920s, with resumption at a new par or no resumption at all.

⁴² This, in part, reflects the counterbalancing impacts of foreign monetary policy in 1929–31. The real and nominal exchange rate effects of Argentina's policy might be expected to be small, as compared to the much bigger effect of U.S. monetary policy on U.S. prices and exchange rates. In this view of the world, mistakes by the U.S. monetary authority helped other countries recover because of their *enrich-thy-neighbor* impact on real activity via the real exchange-rate channel.

Interest Rates

Real interest rates were high in 1929–1931, at about 10%. Although nominal rates were much lower (Table 1), *ex post* deflation and *ex ante* expected deflation contributed to high real rates. IREALHAT, an estimate of *ex ante* real interest rates constructed using the Mishkin regression technique, adds to this sense of a deflationary regime before 1931. The turning point was the start of rediscounts, as indicated by IREALCF1. Absent this action by the Conversion Office the real interest rate would have risen dramatically to 20%–30% in the years 1931–34, largely as a result of worsening deflation (Figure 6(a)) and persistence in the forecasting equation. Such painfully high real interest rates would have had devastating effects on real activity, particularly investment, killing any chance of recovery.⁴³ In actuality investment recovery began in 1932 (Table 1) just after real interest rates fell.⁴⁴

WHAT WERE THEY THINKING?

Supporting Evidence: Tracking the Crisis in Contemporary Reports

To better document the perceptions of a change in regime we examined the accounts of contemporaries. Newspapers gave great emphasis to the decrees of December 5, 1929 (the option to rediscount) and December 16, 1929 (suspension of convertibility and closure of the *Caja*). Reports commented on the impact of gold flows on domestic economy and the inelastic relationship between money and gold. A heated debate

⁴³ Of course, under CF2, a large injection of money would still have ensued in 1935, from the gold revaluation plan, and, proportionately this would have been much larger, as a fraction of the level of M0 in 1935, than in the actual case, absent the rediscounts of 1931–34. Thus, in CF2, there is one very big change in money base in 1935, enough to temporarily drive real interest rates very low for a year or two. Absent the revaluation, in CF1, this effect disappears and real interest rates stay higher, although they do diminish finally in 1935–36 as a result of temporary gold inflows (see Table 1).

⁴⁴ Investigating the impact of monetary policies after 1933 in the United States, Romer ("What Ended?") found a marked correlation between declines in real interest rates, and recovery in investment and consumption activity. The same pattern is apparent: after 1931 in Argentina; *ex ante* real interest rates fell (Figure 5), and consumption and investment began to recover (Table 1), offering more evidence in favor of a "Mundell effect" interpretation.

about suspension ensued. Some observers considered the rediscount law acceptable, as long as it was not used to monetize deficits and was temporary. Others thought the closure of the *Caja* illegal. International reaction was not seen as negative since Argentina was able to close on new £5 million loan from Baring and Morgan, despite the suspension.⁴⁵

As the crisis mounted, attention turned to the fiscal problem. Very soon it was appreciated that if the trade balance didn't recover and future refinancing fell short, then gold would be used to avoid default and it would be desirable to sterilize the outflow:

Everything tends to the belief that the international balance of payments may be unfavorable in 1930....in consequence, it is of great importance to adopt from now onward, measures tending to reduce imports, to promote the introduction of foreign capital....in the regrettable event of the foregoing solutions not being adopted in adequate degree, it will be necessary to export more gold, possibly to the equivalent of some 200 million pesos paper....in the event of this gold going out, it would be desirable to make use of the rediscount facility...⁴⁶

At the same time, pressure came from the banking sector to ease the liquidity crunch. The *Banco de la Nación* had already made abundant use of its rediscount provision in creating banking money to help other banks in distress. Now it sought relief in the form of high-powered money via the *Caja's* own hitherto unused rediscount facility:

At the moment when the moving of the crops and the usual end-of-year business habitually begin to require a larger quantity of notes in circulation, the private banks would not have been able to contribute adequately to supply them without detriment to their own relatively low supplies....it was indispensable to give them access to the resources of the Banco de la Nación by means of the rediscount of their commercial portfolios....Against this however, the situation of the bank itself was an obstacle, as its own cash holdings, reduced by the efflux of gold, could not be strained further....Hence

⁴⁵ "Closure of Caja de Conversión," *Review of the River Plate* (henceforth *RRP*), December 20, 1929, p. 9. Alejandro E. Bunge, "The Rediscounting Faculty," *RRP*, December 20, 1929, p. 11. "The Closure of the Caja de Conversión," *RRP*, December 20, 1929, p. 19. Diego Ortiz Grognet, "Causes and Effects of The Closure of the Caja de Conversión," *RRP*, December 27, 1929, p. 13. Diego Ortiz Grognet, "Results of The Closure of the Caja de Conversión," *RRP*, January 3, 1930, p. 11. Alejandro E. Bunge, "Gold Exports," *RRP*, January 10, 1930, p. 11. Fortunato B. Arzeno, "The Caja de Conversión and the Rediscount Faculty," *RRP*, January 17, 1930, p. 15. "The National Credit," *RRP*, December 27, 1929, p. 19. Guillermo E. Leguizamón, "Illegalidad e Inconveniencia de la clausura de la Caja de Conversión," *Revista de Economía Argentina*, June 1931, p. 449.

⁴⁶ Alejandro E. Bunge, "The Fall in the Peso: Loan Issues Abroad," *RRP*, January 31, 1930, p. 19-23.

the necessity of permitting the rediscount of commercial bills at the Caja...and the petition in that sense presented to the Executive Power.⁴⁷

Thus, lobbying began to get the rediscount provision actually used. Still, no action was taken by the Radical government to employ it and nobody was sure the regime change would happen.⁴⁸

Slowly, financial constraints tightened. A new loan of \$50 million was secured in April 1930, but only for 6 months. It was a short-term patch of the fiscal gap and it failed to halt the depreciation.⁴⁹ By now pessimism was gathering steam; orthodox views were harder to maintain and the calls for central banking were growing.⁵⁰ Observers saw through the gold standard's "asymmetry" and the adverse consequences of large-scale sterilizations by France and the U.S. An early resumption began to seem unlikely and even once-conservative commentators such as the *Review of the River Plate* started to see that reopening the *Caja* would have disastrous consequences.⁵¹ Around the same time it became apparent that the deflation was having serious effects on business:

If the risk-taking capital and the entrepreneurs' reward are greatly reduced, this being the mainspring of our economic machine, business enterprise is grievously restricted. It is very difficult to get a forward business movement on a *falling* price level. No doubt in the long run just as good business can be done upon one level as another, but it is the transition that works havoc. The object of greater stability is to avoid these dangers.⁵²

⁴⁷ Banco de la Nación Argentina, "The Financial Year 1929," *RRP*, February 21, 1930, p. 11.

⁴⁸ Some observers lobbied for a central bank as a solution but this required a long range plan. Moreover, the Irigoyen government was distracted, confronting much bigger social and political problems in the year 1930. A rapid reaction was needed as attempts to plug the gap were getting desperate. "The Monetary Question and Possible Answers," *RRP*, March 7, 1930, p. 13. "From Conversion to Centralization? Will Argentina Join the World Movement Towards Central Banking?" *RRP*, April 11, 1930, p. 15.

⁴⁹ *RRP*, April 11, 1930, p. 17. *RRP*, April 18, 1930, p. 7.

⁵⁰ Alejandro E. Bunge. "Argentine Money, Finance, and Balance of Payments: The Outlook for 1930," *RRP*, June 20, 1930, p. 11. "Central Banking and Currency Control: Gold Movements and Cash Reserves—Their Application [sic] to Argentine Conditions," *RRP*, May 9, 1930, p. 15. "Deserting the Gold Standard: Argentina's Attitude Towards Gold Movements," *RRP*, May 30, 1930, p. 17.

⁵¹ "For while it is true that by opening the Conversion Office tomorrow exchange might be brought to close upon parity, the contraction in Argentine currency which would result might well prove catastrophic in its effects upon the general commercial movement in the country." See "Gold and the Currency: Are Shipments Under Current Conditions Advisable?," *RRP*, August 1, 1930, p. 29.

⁵² "A Stable Price Level: Are Present Difficulties Really Due to Over-Production?," *RRP*, August 15, 1930, p. 13–15. Emphasis as in the original.

In September, the Radical government of Irigoyen was deposed amid labor unrest and breakdown in the rule of law. General Uriburu led a new government committed to sound policies to rebuild the economy. But there was still no change in monetary policy: the new Finance Minister thought any "fundamental" change should await a subsequent, democratically-elected government.⁵³

There was still no use of the rediscount law and this remained so until April 25, 1931. Contemporary domestic and international reports saw this as the crucial turning point. On the next day the most influential daily *La Nación* led with the story on its front page under the headline "THE REDISCOUNT UP TO 200,000,000 PESOS WAS AUTHORIZED," saying:

The measure was suggested by the business and commercial corporations to the government. The government affirms that this is not to create new ventures but rather a definite means to regulate credit to avoid the sudden contraction of loans by banks... The Undersecretary Prebisch added that this is an important step that the government has made to overcome the biggest defect in the prevailing monetary system, which is the rigid inelasticity of the volume of money in circulation.

The *Review of the River Plate* reflected the views of international business, and led its next issue (May 1) with a story titled "Re-Discount Decreed." A more optimistic outlook came the next week (May 8) in an article "Inflation as a Remedy: Would it Help to Cure Trade Depression?" they cited the "recently granted re-discount facilities" and noted that "[n]eedless to say the main interest in connection with the whole idea of inflation is centered upon its possible application to the remedy of the present state of world trade depression..."

⁵³ "The Government and the Caja," *RRP*, September 19, 1930, p. 9.

International opinions can be detected in the *Economist* (May 23, p. 1097) article "Re-Discount Operations in Argentina" where the inflationary essence of the whole plan was applauded:

...rediscount of commercial paper held by the Banco de la Nación Argentina has already been effected with the Conversion Office...The backing is ample, and provide that all the safeguards governing the commercial paper are adhered to unflinchingly, the issue of additional money at the present moment will help the local situation. Nevertheless, it is undeniably inflation, and moreover, it undermines, be it by ever so little, the whole principle of Argentina's currency legislation...

We think it is apparent that contemporary observers, domestic and foreign, were in little doubt that Argentina had taken a bold "inflationary" step in April 1931 in defiance of orthodoxy.⁵⁴

Paths Not Taken: Why Didn't They Just Default?

Are our counterfactuals the relevant ones for study? One puzzle not addressed by our analysis is why Argentina didn't choose some other counterfactual path. An obvious candidate would be the path chosen by so many other countries in Latin America: default. If Argentina had not used up gold to honor external obligations there would have been no need for sterilizations and the use of the rediscount facility. This would have eased fiscal tensions in the 1930s—and perhaps at a small cost? It has been argued that being a "good debtor" in the 1930s did not do Argentina much good in the long run: in the postwar Argentina was treated no better than "bad debtors" in world markets.⁵⁵

⁵⁴ Of course, Prebisch never viewed the policy as inflationary, rather anti-deflationary, in an attempt to stabilize prices in a specific historical situation. He was always ready to dismiss as academic arguments that the policies might lead to inflation. See his article "La inflación escolástica y la moneda argentina" in the July 1934 issue of *Revista de Economía Argentina*. In the long run, such inflationary tendencies were realized, but Prebisch resigned from the Central Bank in 1943 in objection to what he saw as a tendency to excessive money printing.

⁵⁵ Jorgensen and Sachs, "Default"; Eichengreen and Portes, "After the Deluge." However, the fact that Argentina was not treated better than defaulters in capital markets after 1940 may not be a puzzle after all, because *ceteris paribus* did not apply. Prior to the 1940s Argentina stood out as a bastion of orthodoxy and sound policies in Latin America. With the rise of Perón, and a shift to inward looking policies and price distortions, Argentina by the 1950s and 1960s looked like one of the worst places in Latin

We have two responses to these observations. First, more than any other country in the region, Argentina had bought into the idea of orthodoxy ever since the painful attempt at stabilization during the 1890s Baring crisis. In that watershed event, the national government suspended any attempt to restore convertibility but stopped short of canceling service on debts, although municipal and corporate issues were in a shameful default and had to be later assumed by the nation. As President Carlos Pellegrini declared during the negotiations:

Not to have serviced these debts with punctuality, the government would have had to declare the country bankrupt, producing such a terrible reaction in our European creditors that there would not have been limits to the general indignation directed against us, and they would have closed forever those markets, resulting in the shame of our nation and the rapid decadence of our social state.⁵⁶

We think the same *mentalité* persisted in the 1930s, "a conscious internal perception that satisfaction of debts was a necessity."⁵⁷ Argentina believed she would be rewarded for good behavior, as Pellegrini believed in the 1890s. It is striking that in the contemporary press the subject of default is almost never raised, and the possibility was dismissed as remote:

A precipitate return to parity is not, apparently, intended and would not be desirable....The investor must, therefore, wait patiently for the financial and monetary reforms of the Provincial Government to fructify. This should not cause him any distress, since the service of the external debt of the Republic will be promptly effected and default, as far as the present Government is concerned, is unthinkable.⁵⁸

Second, although it is generally agreed that as a "good debtor" Argentina reaped no long-run benefits after the 1940s, the *ex post* outcome differed from *ex ante* beliefs. Moreover, beliefs that faithful debt service would be rewarded *were* correct, at least in

America for foreign investors, not one of the best, based on these objective economic criteria. Potential investors surely did not ignore these more immediate disincentives, whatever the repayment record decades prior. Taylor, "Tres fases"; "On the Costs."

⁵⁶ Quoted in Fishlow, "Conditionality," p. 99.

⁵⁷ Fishlow, "Conditionality," p. 99.

⁵⁸ *Economist*, March 14, 1931, p.568.

the short run. In the late 1930s, Argentina obtained much better access to capital markets than defaulting countries. There were several refinancing loans, including \$129 million of 35-year external conversion bonds in 1937 and a \$25 million 10-year issue in 1938. And the terms of these later loans were good:

The new issues yielded an average 4.7% when the U.S. rate on Baa corporate bonds hovered around 5.2%... Thus Argentina's good behavior did seem to earn it some return in easier credit access during the 1930s when capital markets were closed to most Latin American countries.⁵⁹

Sadly, the new loans flowed only briefly after the global crisis abated and before World War Two. If such large-scale loans had been available in the early 1930s, instead of the small refinancing secured, Argentina might have averted the substantial fiscal use of gold in 1929–35.

The costs of deviating from the gold standard as a "contingent rule" were appreciated, as were the costs of default; capital markets could punish both kinds of deviance with higher costs of borrowing.⁶⁰ Argentina understood the tradeoffs and had to make a choice. As in a model of public debt management, the fiscal authority fixed the level of public debt and the monetary authority made the choice as to its composition as between bonds and money.⁶¹

Increasing the rediscount limit and at the same time shipping gold to pay for the loan in question, means a reduction of the percentage of the metallic guarantee which Argentina's currency has hitherto enjoyed. It must not be forgotten, however, that even although this is in a sense equivalent to inflation, it has in its favour two very important points; in the first place, an external debt becomes an internal liability, and secondly the actual amount of the currency in the hands of the public suffers, for the time being, little or no change.⁶²

⁵⁹ Data on loans and quotation from Jorgensen and Sachs, "Default," p. 75. It could be that Argentina gained an increase in reputation by paying in exceptionally harsh external circumstances, giving a "positive surprise" to her creditors. This is argued in a game theoretic model of reputation of capital-market access by Tomz, "Do Creditors?"

⁶⁰ On the contingent rule, see Bordo and Kydland, "Gold Standard"; Bordo and Rockoff, "Gold Standard."

⁶¹ Sargent, "Reaganomics."

⁶² *RRP*, August 28, 1931, p. 17.

The most elegant feature of the Argentine case is that once the country reached a "debt ceiling" the combination of an orthodox fiscal policy and a heterodox monetary policy satisfied the solvency (transversality) condition of the government budget constraint. In an exceptional international crisis, Argentina made a remarkably smooth transition to a fiduciary monetary regime whilst retaining creditworthiness in external capital markets. Though they had almost no degrees of freedom, such was the technocratic finesse of Prebisch and Pinedo.

CONCLUSIONS: PLUS ÇA CHANGE...

The work of economic historians has led to a new consensus as to the role of the gold standard in fostering deflation and depression in the 1920s and 1930s, and the critical impact of monetary policies as a tool for recovery.⁶³ Yet evidence is largely restricted, at a detailed level, to the study of the United States, Britain, France, Germany, and other countries in the core. Further research is now needed to see how the same approach can be applied to the World Depression at the periphery. This will test the broad applicability of the model and our study is one step in this direction.

We argue that Argentine macroeconomic policies in the 1930s did successfully avert a major disaster by subverting, if only marginally, the prevailing orthodox *mentalité* inherited from earlier epochs. Like the core economies, Argentina found itself with little room for maneuver in fiscal matters, a constraint that was made even tighter by the need to service a large external debt. Fiscal orthodoxy was offset, however, by a bold change of monetary regime, from metallic to fiduciary, in an effort to dislodge deflationary expectations. This plan was the brainchild of Raúl Prebisch, and was a

testament to his creativity and brilliance as an economist and policymaker. The actions of the Conversion Office in the Spring of 1931 predated the British departure from gold by a good six months, and U.S. interventions by almost two years. Policymakers acted in a way consistent with Sargent's ideas on expectations and monetary regime changes as applied by Temin and Wigmore to the deflationary context of the 1930s. Associated with Mundell, the deflation trap was also emphasized by Fisher and Keynes, each of whom credited its original exposition to the obscure Argentine thinker Silvio Gesell.

Events in the history of thought and events in economic history were most clearly intertwined in the Argentine experience. Gesell's insight came in the economic crisis that followed an attempt to pursue rigid metallic rules in the 1890s as a prelude to resumption at the 1881 parity. In a crisis, experience with a fiduciary regime and suspension in the 1890s provided a model of how economic recovery and the maintenance of par might be at odds. Gesell's ideas won the day then, and thirty-two years of gold standard orthodoxy by the Conversion Office could not diminish their relevance in times of serious deflation. Collective memory was drawn upon as the prospect of a repeat of the recessions of the 1890s and 1914–19 loomed, and the penetrating ideas of Prebisch held sway as those of Gesell had a generation before.

In summing up, though, excessive optimism concerning the change of regime should not be read into our story. In the long run there was rather too much reliance on expansionary monetary policy in subsequent Argentine history, as elsewhere in Latin America. Hyperinflations in many countries brought the need for exactly the opposite kind of regime shift *à la* Sargent. That shift eventually came to Argentina in an all too

⁶³ See, *inter alia*, Temin, *Lessons*; Eichengreen, "Origins"; *Golden Fetters*; Eichengreen and Temin, "Gold Standard";

familiar form. In 1991 a return to a currency-board rule was instigate with much popular support after all patience had been exhausted with the previous sixty years of floating exchange rates and persistent, often wild, inflations. The current Convertibility Law puts Argentina on a dollar-standard rule very similar to, and in some ways stricter than, the gold-standard mechanism used at the Conversion Office from 1900 to 1931. Apart from one tough recession, economic performance has been impressive in the last few years. Though little else would be familiar, one might imagine that a visitor arriving from the 1880s, 1900s, or 1920s, would feel very much at home with today's dollar-peso rule. Yet knowing as they did the pitfalls of a metallic regime, and the crises of the 1890s, 1910s, and 1930s, one cannot be very sure that Silvio Gesell or Raúl Prebisch would so comfortably travel back to the future.

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TABLE 1
CONTOURS OF THE ARGENTINE GREAT DEPRESSION

(a) Nominal Variables

	Money Base (millions paper pesos)			Money Supply (M3) (millions paper pesos)	Exchange Rate (paper pesos per US \$)	General Price Level (1913 = 100)	Wage Price Level (1913 = 100)	Land Price Level (1913 = 100)	Banks' Discount Rate (%)
	Total (M0)	Gold Stock	Domesti c Credit						
1913	823	530	293	1,687	2.35	100	100	100	5.4
1928	1,406	1,113	293	4,717	2.32	131	180	296	6.3
1929	1,247	954	293	4,652	2.35	127	178	293	6.9
1930	1,261	968	293	4,660	2.70	122	166	238	6.9
1931	1,245	593	652	4,149	3.40	118	155	260	7.2
1932	1,339	584	755	4,116	3.83	119	146	237	7.1
1933	1,214	561	653	4,061	3.18	114	139	210	6.1
1934	1,172	561	610	4,078	3.89	130	136	196	5.5
1935	1,647	1,354*	293†	4,180	3.75	128	147	185	5.4
1936	1,685	1,528*	157†	4,611	3.55	131	153	217	5.6
1937	1,679	1,422*	257†	4,922	3.28	150	159	252	5.2
1938	1,615	1,296*	319†	4,811	3.86	140	160	271	5.3
1939	1,796	1,396*	400†	4,960	4.27	143	166	256	5.8
1940	1,810	1,329*	481†	5,050	4.30	163	176	248	5.8

(b) Real Variables

Terms of Trade (1913 = 100)	Real Exchange Rate (1913 = 100)	Components of GNP (millions paper pesos at 1913 prices)							Consolidated Government Deficit/GDP (%)
		Output Q	Private Consumption		Public Consumption G	Investment I	Exports X	Imports	
			C						
1913	100	100	4,640	4,322	204	579	1,805	2,270	0.8
1928	99	121	7,780	6,549	406	900	2,901	2,991	1.7
1929	90	126	8,146	6,781	425	1,029	2,847	3,048	2.3
1930	88	144	7,784	6,829	408	871	2,100	2,533	4.3
1931	65	165	7,216	5,248	393	533	2,871	1,651	2.7
1932	68	162	6,966	5,092	393	374	2,636	1,282	1.8
1933	64	139	7,309	5,723	415	418	2,474	1,506	1.7
1934	79	159	7,912	6,085	447	554	2,546	1,584	1.8
1935	79	153	8,275	6,187	538	691	2,754	1,836	1.2
1936	96	148	8,336	6,249	565	824	2,491	1,870	1.7
1937	110	121	8,964	7,145	612	748	2,911	2,381	2.4
1938	101	151	8,979	7,703	634	824	1,963	2,251	2.4
1939	89	162	9,337	7,271	668	691	2,501	1,755	3.6
1940	91	145	9,486	7,588	672	637	2,071	1,461	2.7

† Domestic Credit is defined as after 1935 as money base minus revalued gold minus reserves.

* After 1935 gold reserves were revalued when official par changed from 2.27 to 4.96 paper pesos per gold peso.

Source: Most of the data used in this paper came from two sources. Annual macroeconomic time series were taken principally from della Paolera and Ortíz, "Dinero." Monthly series on banking and financial variables were taken principally from Baiocco, *La economía bancaria*. Both databases were augmented with data drawn from other sources. The databases are available from the authors upon request.

TABLE 2
MONETARY POLICY CHRONOLOGY, 1883-1935

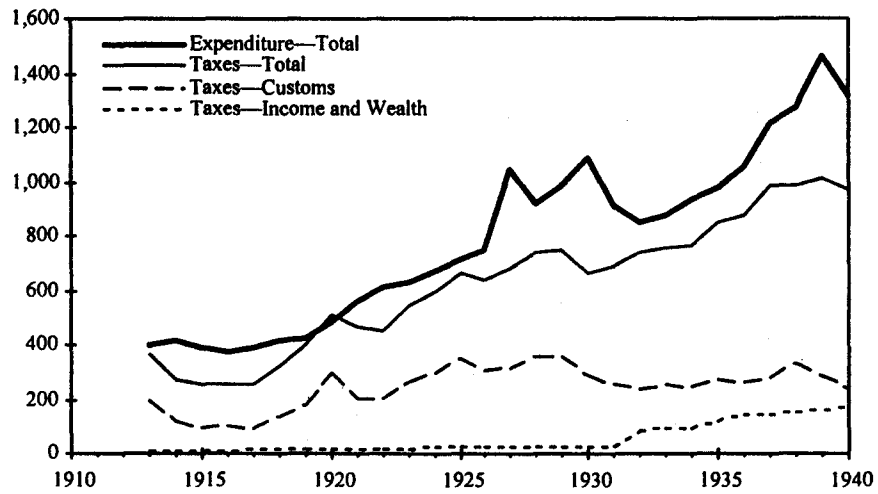
1881	Law 1130 proposes establishing a metallic regime to end the "monetary anarchy" that had previously occurred under the auspices of multiple banks issuing paper money.
1883	Law of 1881 implemented, gold standard established.
1883- 1885	Gold standard; par is 1 gold peso = 1 paper peso.
1886- 1891	Baring Crisis; inflation and a speculative bubble leads to collapse of convertibility; exchange rate begins to float and depreciates markedly.
1890	Law 2741 creates <i>Caja de Conversión</i> (Conversion Office), with a monopoly over the emission of a new currency.
1891- 1899	Inconvertible paper currency. Floating exchange rate of paper to gold pesos.
1899	Law 3871 ("convertibility law") orders the <i>Caja</i> to act as a <i>currency board</i> , and exchange gold pesos for paper pesos at a new par (2.27) for all transactions. Though initially having zero gold backing for the currency in its vaults, the <i>Caja</i> accumulates gold rapidly after 1902.
1899- 1914	Gold standard; 1 gold peso = 2.27 paper pesos.
1914- 1927	Inconvertible paper currency. Floating exchange rate of paper to gold pesos. Gold flows at the <i>Caja</i> limited to occasional government uses. <i>Caja</i> continues to exchange gold pesos for paper pesos at new par (2.27) for these transactions. Laws 9479 and 9577 are passed in 1914, granting the <i>Caja</i> permission to deviate from its rule for reasons of wartime emergency. Suspension occurs. Briefly, in 1925, the rediscounting facility is employed.
1927- 1929	Gold standard; 1 gold peso = 2.27 paper peso.
1929- 1931	Inconvertible paper currency. Floating exchange rate of paper to gold pesos. Gold flows at the <i>Caja</i> limited to fiscal uses (payment of government foreign debt). <i>Caja</i> continues to exchange gold pesos for paper pesos at new par (2.27) for these transactions.
1931	<i>Caja</i> deviates from its previous mechanical money creation rule and starts to rediscount commercial paper. Prebisch invokes the obscure 1914 laws as justification. Beginning of an independent Argentine monetary policy.
1935	Creation of <i>Banco Central</i> (Central Bank). Takes over all assets and liabilities of the Conversion Office. Revalues gold stock according to prevailing market rate of exchange (new par is 4.96 versus 2.27). Uses proceeds to increase backing of money base, and to bail out financial system.

TABLE 3
A MODEL OF PRICES, EXCHANGE RATES, AND INTEREST RATES

(a) VAR Model of Exchange Rates and Prices				(b) Mishkin-type Forecast of Real Interest Rate			
Dependent Variable	$\Delta \ln E$		$\Delta \ln P$	Dependent Variable		r	
Constant	0.11	(0.2)	-0.73	(1.6)	Constant	9.69	(1.1)
$\Delta \ln E\{1\}$	0.02	(0.1)	0.30	(1.7)	$\Delta \ln M$	-47.24	(3.0)
$\Delta \ln P\{1\}$	0.04	(0.2)	-0.09	(0.6)	$\Delta \ln M\{1\}$	-44.10	(2.6)
$\Delta \ln M$	0.25	(1.6)	0.16	(1.1)	$\Delta \ln M\{2\}$	-48.26	(2.8)
$\Delta \ln PUS$	-0.51	(1.6)	1.21	(4.2)	$\Delta \ln Y$	71.73	(2.6)
$Q\{1\}$	-0.02	(0.2)	0.16	(1.6)	$\Delta \ln Y\{1\}$	-4.64	(0.2)
					$\Delta \ln Y\{2\}$	17.02	(0.6)
					$i\{1\}$	-0.27	(0.1)
					$i\{2\}$	3.23	(0.9)
					$i\{3\}$	-3.50	(1.4)
					$\Delta \ln P\{1\}$	9.91	(0.7)
					$\Delta \ln P\{2\}$	25.64	(1.8)
					$\Delta \ln P\{3\}$	23.11	(1.8)
Observations	56		56		Observations	54	
R squared	.15		.35		R squared	.52	
Mean of Dependent Variable	0.02		0.02		Mean of Dependent Variable	3.46	
Standard Error of Estimate	0.11		0.10		Standard Error of Estimate	10.42	
Regression F(5,50)	1.45		4.69		Regression F(5,50)	3.20	

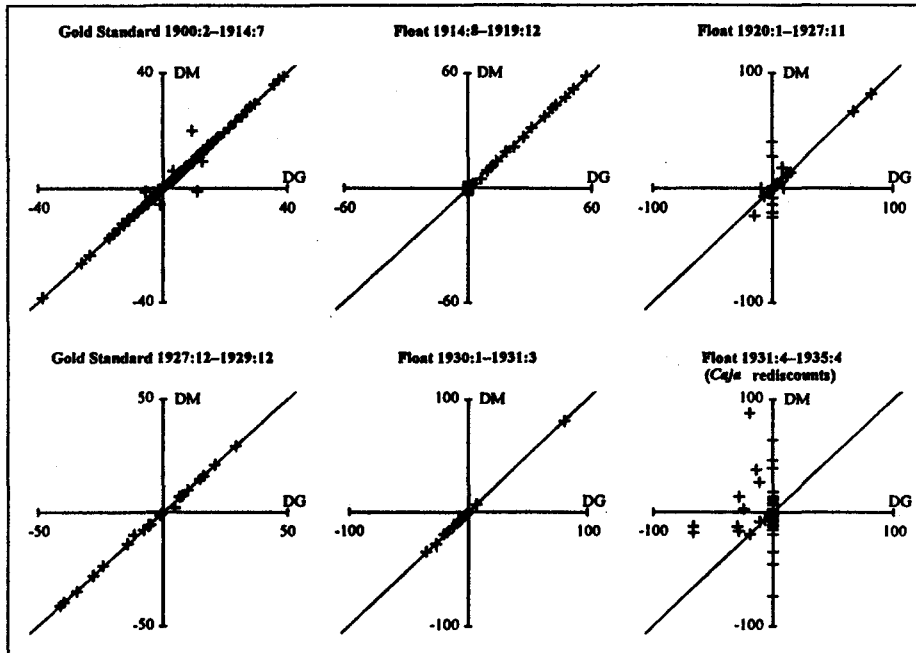
Notes: For an explanation of the equations see text. Sample is annual data 1884-1941. Absolute t-statistics in parentheses. X{n} denotes the nth lag of X.
Source: Author's appendix.

FIGURE 1
ARGENTINE FISCAL POLICY



Notes: Units are millions of paper pesos.
Source: Mitchell (1993).

FIGURE 2
CHANGES IN GOLD STOCKS AND THE MONEY BASE, 1900-1935



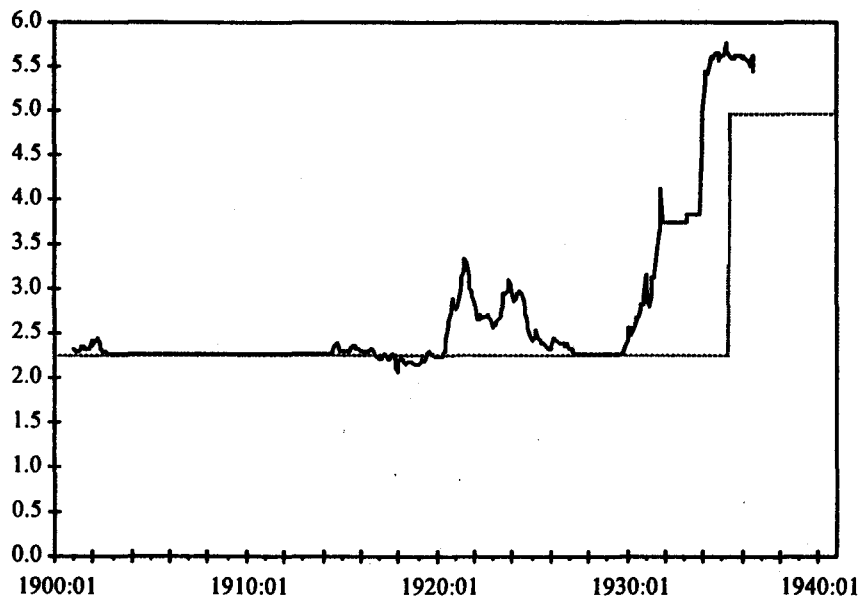
Notes: The regressions corresponding to the scatterplots are:

Regime	Dates	All months			Means	
		b	SE	N	DG	DM
Gold Standard	1900:2-1914:7	1.00	0.01	174	2.56	2.57
Float	1914:8-1919:12	1.00	0.01	65	6.74	6.74
Float	1920:1-1927:11	1.00	0.06	95	1.90	1.90
Gold Standard	1927:12-1929:12	1.00	0.01	25	-	-
Float	1930:1-1931:3	1.00	0.00	15	-	-
Float	1931:4-1935:4	0.05	0.24	49	-	0.57

Units of G (gold stock) and M (money base) are millions of paper pesos, with G evaluated at parity of 2.27 peso papel per gold peso. Regression is of DM on DG, using OLS, and reporting coefficient b , standard error SE, and sample size N .

Source: Author's appendix.

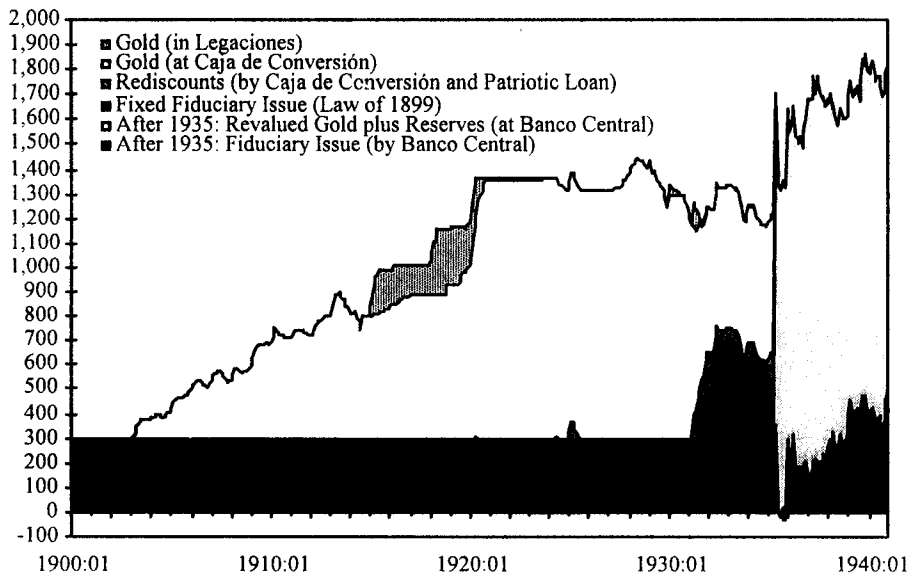
FIGURE 3
EXCHANGE RATE, PAPER PESOS PER GOLD PESO VERSUS PAR, 1900-1940



Notes: Par is 2.27 paper pesos per gold peso until April 1935,
and 4.96 from May 1935.

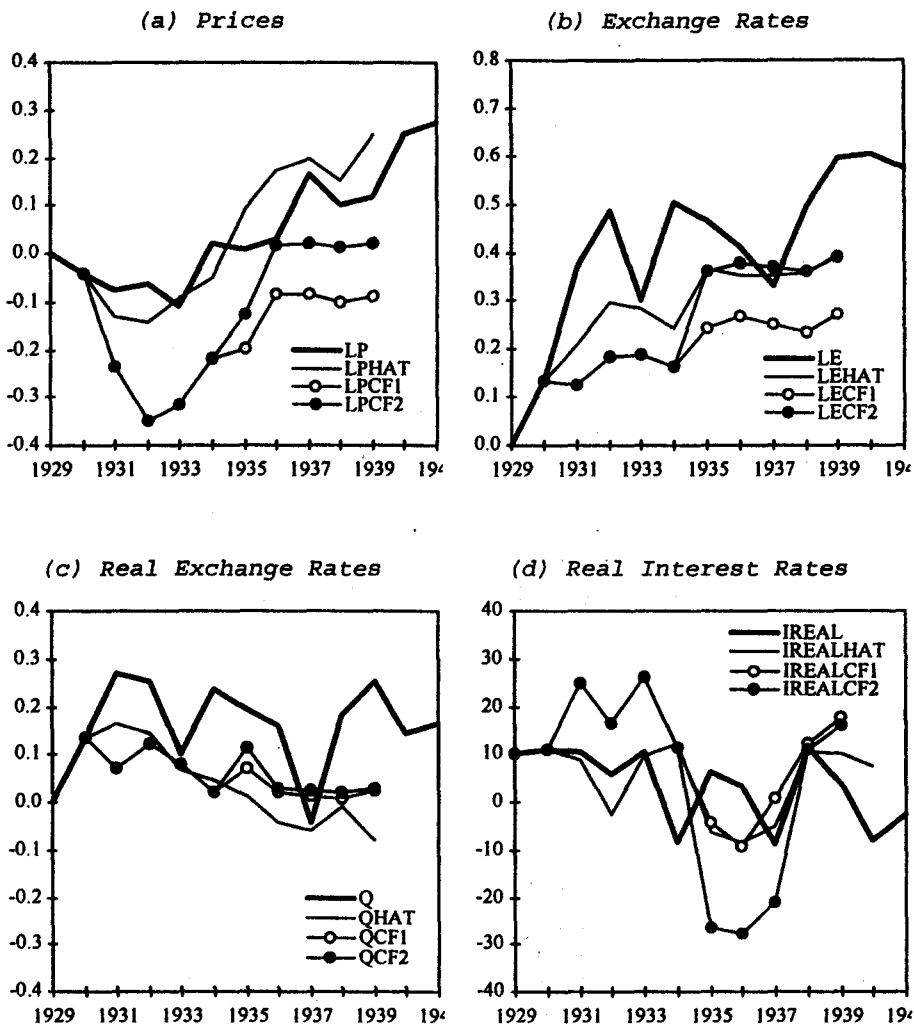
Source: Author's appendix.

FIGURE 4
COMPOSITION OF THE MONEY BASE, 1900-1940



Note: Units are millions of paper pesos.
Source: Author's appendix.

FIGURE 5
 ACTUAL, FITTED, AND COUNTERFACTUAL SERIES FOR PRICES,
 EXCHANGE RATES, AND INTEREST RATES, 1929-41



Notes: See text and Table 4. $LE = \ln E$; $LP = \ln P$; $Q = \ln(EP^*/P)$, $IREAL = r$; $XHAT =$ fitted value of X ; $XCF1 =$ value of X in first counterfactual; $XCF2 =$ value of X in second counterfactual. Log values are normalized to a level of zero in 1929.

Source: Author's appendix.