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Money Reconstructed:
Argentina and Brazil after Hyperinflation

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Abstract

Under high inflation, money's dual function as a unit of account and a unit of payment are split and transferred on alternate supports—either a foreign currency (as in Argentina) or domestic indices (as in Brazil). This paper compares the 1994 Brazilian *Plano Real*, which rebuilt a working, national monetary order, and the bimonetary Argentine Currency Board regime, whose 2001 collapse caused a major dislocation of both the real economy and the financial sector. "Pesification" is analyzed as an improvised attempt to rebuild a single, national money. Whereas returning to peso pricing on domestic markets proved to be surprisingly easy, the conversion of financial contracts (deposits, credits, bonds, etc.) was a disaster: state intervention into existing private contracts opened the way for a large-scale but opaque redistribution of private wealth. The experience of monetary destruction and reconstruction sheds light on how policy or regulatory intervention interacts with private choices. Policy efficiency is conditional on the willingness of agents to continue using the national money. Yet states that use money as a policy instrument may affect the agents perception that its stability is a condition for their own continuing private capacity to calculate and optimize. The effects of hyperinflation suggest that this constitutive ambiguity may actually result in the destruction of money.

This contribution draws from Sgard (2008, in French), with a reduced empirical material and an extended analytical discussion.

Keywords: Argentina, Brazil, hyperinflation, monetary reform, monetary theory
JEL classification: E31, E42, E65

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1. Introduction

Money is usually seen in action but rarely in construction. For instance, one may observe the issuing policy of central banks or the trade-offs faced by agents when buying or selling on a foreign exchange. Here money is a given, and it is also closely attached to the most synchronic and self-referential outcomes of economic analysis: market equilibrium and the formation of relative prices. Clearly, it is difficult to reconcile this view with a more "genetic" approach that is centered on the constitution of money, its evolution, and its possible breakdown.[1]

Two classical narratives of money's emergence reflect this constraint in that both are very much ad hoc. One version is followed by those who think within the neoclassical or orthodox paradigm and so envisage money exclusively as a medium of exchange. That is, money is just the $(n-1)$th good, which theoretically allows decentralized agents to shift from barter to integrated markets. In this view, money springs fully formed out of private exchange and its essential function is to reduce transaction costs.[2] This natural history of markets then encounters well-known logical difficulties. If markets pre-date money, then how can one account for aggregation and the operation of a price mechanism in the pre-monetary era? And if money is a commodity, what can be said of fiat money? What, then, is the point of having a central bank? In other words, this narrative may serve as a low-cost prologue to, say, the analysis of monetary policy, but it is not a promising start for a comparative or historical approach to explaining how money is established.

The second narrative derives from Knapp's so-called Chartalist approach.[3] Here, money results from the act of a state, or a "charter": a declaration by the sovereign that this or that piece of metal or paper constitutes "money". The obligation to pay taxes in this currency typically gives the statement some muscle. Historical records confirm this story and also document the long fight of pre-modern states to establish their monopoly on money issuing and minting. Still, one struggles to account on this basis for the long-standing capacity of agents to create private monies or institutions that are supplementary or complementary to public ones—or, perhaps, substitutive or dilutive of them.

Both of these narratives, the natural and the statist, raises the risk of "hypostasis of money".[4] That is, money is considered not as an institution but rather as some essence, of an extraordinary social quality, that was obscurely created some time after humans emerged from the state of nature. Beyond the largely unanswerable question regarding the ultimate origin of a social institution, the open question is how public regulators and private agents shape the evolution of money, and affect over time its overall stability and the quality of its services: how money supports private contracting and the proper operation of markets, and whether it offers the government an effective policy instrument. Money in its modern form is altogether a highly regulated institution that is closely tied to core government prerogatives, and an instrument of private contracting that cannot be imposed upon agents. In fact, the effectiveness of money depends entirely on their willingness to rely on it when buying goods, negotiating prices, or raising debt. Hence, its regulation is not only about policy making, whether one thinks to central banking, foreign exchange regimes, or the lender of last resort ; it is also about accounting norms, solvency constraints, the discipline of payment or banking regulation. In other words, rather than being constructed as some ahistorical or essential invention, money should be

[1] This contribution draws from Sgard (2008), with less empirical material and a revised analytical discussion. This version benefited from comment made by Céline Bignebat and Witold Henisz.
[2] Ostroy (1973), Jones (1976), Bell (2001).
[3] Knapp (1924), Lerner (1947).
[4] Cartelier (2007).

envisaged as a downstream, highly conditioned, state-contingent institution. In other words, exploring what early monies, say in the Pacific Islands, have in common with the recent experience of the Federal Reserve may not be a highly rewarding enterprise.

In this contribution I look however at an indeed exotic and comparatively rare experience, namely hyperinflation. But because the two cases under review unfold in modern, capitalist environments, analysing them may add to our understanding of how money works in today's advanced economies. Hyperinflations are indeed experiences where money as an institution is debased, sometimes destroyed, and possibly stabilized and reconstructed. They are indeed occasions when this institution becomes highly fluid and unstable: bifurcations and collapses may emerge in the very short run and then exert long-term constraints on its "re-institutionalization", therefore on the future conditions of private choices and policy options. For instance, "dollarization" typically progress by leaps and bounds, under the pressure of brutal monetary crisis and more or less improvised policy reactions; but it is then extremely difficult to undo.

This paper explores how a working monetary order was reestablished in Argentina and Brazil after the hyperinflations that marked the 1980s and early 1990s. What's of interest here is not just the technique that ended inflation but also the process whereby money recovered its capacity to support economic calculability and market operations while serving also as a useful policy instrument. Comparing two nearly simultaneous experiences also allows accounting for the qualitatively different outcomes obtained over the long run as a consequence of the interplay between policy initiatives and the decentralized (informal) institutional choices made by private agents.

The empirical basis for this comparison is that during the years of high inflation each country adopted a different response to the massive redistributive threats it experienced. Argentina largely transferred its monetary functions to the dollar. Brazil, in contrast, opted for a more inward strategy of protection, relying on price indices as an accounting hedge while the domestic, highly inflationary instrument of payment (i.e., cash) remained widely in use. Thus the two countries coordinated around two different monetary rules through a mix of decentralized or informal institutional choices and policy actions that triggered, confirmed, or curbed these choices. After stabilization (i.e., after 1991 and 1994 in Argentina and Brazil, respectively), the two contrasting regimes built on these legacies exercised entirely different micro- and macroeconomic constraints. The regimes also proved to be unequally sustainable: whereas Brazil succeeded in gradually modernizing its market institutions and expanding its economy, in 2001–2002 Argentina experienced a second major crisis that once again inflated its currency (though under a different scenario than with past hyperinflations).

As a matter of convenience, I use the term *monetary order* to refer to the broad set of institutions and rules (both private and public) that provides stability and consistency to monetary relations and allows a national money to deliver its expected private and public benefits. I use *monetary regime* or *policy regime* to refer to the conventions and public organizations that are specifically related to monetary policy in the standard macroeconomic perspective: interest and foreign exchange policies, convertibility rules, policy commitments, issues of credibility, procedures and so forth.

Section 2 explains how money consists of a unit of account and a unit of payment as well as how these units may be split under high inflation. Section 3 discusses the Brazilian *Plano Real* of 1994, which succeeded in reestablishing a working national money; and Section 4 addresses the Argentine 1991 Currency Board and its eventual collapse in 2001. Section 5 concludes.

2. Protection against high inflation: Theoretical issues

Two monetary functions: Accounting and payment

Generations of social scientists—starting with Max Weber, Georg Simmel, and Ludwig von Mises—have analyzed the key role that money plays in the development of individual agency, microeconomic calculations, and the capacity to leverage private resources across large social fields. Money empowers agents and therefore supports the dynamics of the division of labor: to the extent that it remains stable, money facilitates lending, investment decisions, and the sale and purchase of goods and services.

However, money in action differs from a broadband network, a technical norm, or even a stock exchange: it can more easily be debased, and the externalities caused by its decline or collapse are potentially much larger. This is because once it has been established, in its current forms, money is seized and invested by decentralized agents who rely on it as they exchange on markets for goods and debt; that is, money enables the coordination of a decentralized division of labor based on contracts and payments, so that if its capacity to coordinate market exchange fails then the whole social machinery is affected. In the worst cases, the breakdown of the payment system may make it impossible to settle any type of transaction beyond barter; this is the endpoint of uncontrolled hyperinflation *and* a systemic liquidity crisis (i.e., the two paradigmatic crises for money). Conversely, restoration of the monetary order is typically associated with a recovery in private contracting and hence in economic activity. The prospect of falling into barter and getting out of it does not however surreptitiously reintroduce the "natural history of money" that has been criticized in the introduction. Barter is the ultimate default option when money brakes down. But how the collapse of money may affects social exchange is conditional upon how money had been used by agents and, beforehand, how it had been socially constructed.

Yet a closer look reveals that money actually has two functions of coordination. First is the *unit of payment*, which is the instrument for settling contractual liabilities: it is provided in exchange for goods or services and it circulates as a medium of multilateral exchange. Therefore this unit is at stake when agents opt for barter: in some way, they cannot or they do not want to use it anymore. Money's unique capacity to settle debts also explains why profligate governments have so much interest in issuing it: if the state controls the manufacture of money, then it can pay salaries and service its own debt without visibly raising revenue from the population. The unit of payment is thus the instrument of monetary policy, which is primarily about how much instruments of payments will be put in circulation in the economy. Hence it is about seignorage but is subject to inflation.

Money's second function is as a *unit of account*, in which real term economic values, or terms of trade are measured as a reflection of market forces (i.e., relative scarcities). Hence this function affects agents when they negotiate contracts, set prices, substitute an input for another in their production function, or trade off alternate financial strategies. For this reason, highly volatile relative prices, which are by-products of high inflations, reduce the capacity of agents to optimize decisions and trade off competing offers. Foreign exchange is another example: if its short-term evolution is unpredictable owing to high domestic inflation, then setting the price of imported goods in terms of the domestic unit of account may become all but impossible. Traders may then decide to post only dollar prices or stop trading altogether.

However, the unit of account does not only support exchange on spot market, where the transfer of goods and money are simultaneous. It also records financial commitments: stocks of assets and liabilities. Hence it formalizes future obligations of payments, hence inter-temporal wealth transfers. The unit of account then bear strongly on a firm's performance, hence on its sustainability, i.e. its solvency. It is one the key institutions that build the time-horizon of agents, specifically via their capacity to calculate economic choices over a more or less extended time-frame. High inflation are then associated with a considerable weakening of financial obligations, typically via large and informal or extracontractual wealth transfers between debtors and savers. Under such conditions, agents are driven less by solvency constraints than by protecting themselves in the short run against inflationary erosion (or by benefiting from the losses incurred by others).

Hence the unit of account supports two generic dimensions of economic calculation associated with two principles of market discipline.[5] First is the relative price structure, which is synchronic (i.e. observed at a given instant in time) and which primarily reflects the efficiency of competing producers—that is, their production function, or the supply side of the economy. Second is the intertemporal financial structure of firms, which determines their time horizon, profitability and solvency, and thus the distribution of wealth.

In principle, money's "payment" and "accounting" units should be closely anchored one on the other. in which case inflationary erosion would affect both units. Firms would first negotiate terms for one work week (accounting function) and later pay for that work in the same money (payment function). Other things equal, intermediary inflation would cause a loss of revenue for the supplier. At this point, agents are like price takers on a competitive market or beneficiaries of a pure, nonexclusionary public good: they may either use this currency (and support the inflation risk) or exit.[6] Under high inflation, however, agents tend to hedge their transactions and split the two monetary functions: they will typically include in their contracts ad hoc revaluation clauses that automatically adjust payments to reflect monetary devaluation as the contract matures. By definition this strategy concerns only inter-temporal contracts. It may easily be applied not only to debt contracts, bank deposits, and wages but to virtually all financial transactions, including bonds, tax liabilities, insurance polices, rents, and so forth.

Thus, the payment and accounting functions of money may be transferred independently of one another, so each may gain a life of its own. Agents would then act strategically with respect to the respective monetary units, though they could not ignore the choices of other agents – monetary substitution is also about coordination, hence it is by definition a collective choice. Within a given economy, if prices were set in five different substitute currencies then markets would segment unless one money emerged as the dominant one.

Relative prices and economic adjustment

Over the medium term, the key problem with a split money is that the economy loses a key micro- and macroeconomic adjustment mechanism. Normally, a one-off permanent adjustment of the exchange rate (or, more generally, any change in relative prices) leads to a corresponding permanent change in relative profit rates across sectors. For instance, a lower foreign exchange rate will cause domestic nontraded services to become less expensive and less profitable vis-à-vis internationally traded goods. Production factors will be progressively reallocated to the more profitable (exporting) sectors. Hence, the economy's supply side will adjust to market signals and recover some growth potential, while the demand side will support the short-run adjustment of the current account.

However, this mechanism does not work if agents systematically protect their purchasing power against *any* price movement. Suppose all producers, including hairdressers and plumbers, set their prices in dollars; then any change in the exchange rate of the national peso will be immediately reflected in *all* peso prices. Producers will simply adjust their price list as soon as they learn of the

[5] These two dimensions of calculability are embodied by two classes of accounting books. On the one hand are *inflows and outflows of payments* as reported on the income statement, which reflects (a) the production function's efficiency at prevailing prices and (b) the firm's liquidity constraints and hence its capacity avoid immediate default. On the other hand are *stocks of assets and debts*; these are recorded on the balance sheet, which shows how future income flows will be shared among capital providers and thus reflects their individual risk in the case of solvency *or* bankruptcy. See Cartelier (2006).

[6] After Cagan (1956), we say that *hyperinflation* exists whenever the monthly inflation rate exceeds 50% for two consecutive months. However, many of the dynamic patterns evident at rates of only 20–30% per month are much like those observed at 50%. On hyperinflations in general, see Sargent and Wallace (1981), Sargent (1982), Dornbusch and Fischer (1986), Dornbusch et al. (1990), and Vegh (1992). On currency substitution, Calvo and Vegh (1992), Rennhack and Nozaki (2006).

market movement. Rather than allowing for a correction in relative prices, the whole episode will end up in pure inflation, that is an homothetic drift of the whole price structure covering both the traded and the non-traded sectors. There will be no gain in price competitiveness, the balance of payments will not move and the supply side will not adjust. The same results obtain if producers anchor their price lists to a preestablished price index; only the time lag will be a bit different. In other words, even if the economy is flexible and open, a split and dysfunctional money may severely impact the way agents respond to market signals, hence the adjustment pattern in the real economy. Money is not a natural, given hence neutral institution: how it works and the services it offers depend upon how agents use it. This is the experience that Argentine and Brazilian agents made first-hand, although in different manner.

From the early 1970s onward, Argentina chose the dollar as a dominant monetary substitute.[7] This is by far the most common strategy in developing or socialist economies, if only because it does not require much in the way of institutional investments or capacity for collective action: a basic exchange bureau can handle the job with little or no policy guidance. Then this collective choice typically comes with large foreign exchange and banking crisis that cause large jumps in the overall level of dollarization. Argentina had its share of it.

In contrast, Brazil already during the 1960s opted for domestic price indices as a hedge against inflation.[8] This made it easier to preserve the state's monopoly of the national money on payments: the bank could not readily open dollar deposits to domestic agents and, contrary to the experience of Argentina, cash transactions in dollar did not develop much, even informally. Capital controls also remained tight and imposed short-term constraints on private agents, although the point should not be overplayed. The sheer magnitude of revenue transfer under high inflation implies that domestic hedging instruments were actually available, for otherwise agents would also have taken the road of de facto dollarization.

Compared with dollarization, indexation clearly demands better foresight and stronger domestic institutions, both public and private. Price indices must be timely, resilient, and widely trusted. The Brazilian solution was a decentralized and competitive supply of price indices. For years, agents could freely contract on the basis of monthly or weekly indices as well as of consumer and production indices, or sectoral and regional ones; some indices were provided by state institutions and others by trade unions, professional organizations, or chambers of commerce. In other words, the *cruzeiro* remain the dominant unit of payment though it largely lost its accounting function, which was altogether privatized, fragmented, and opened to competition. Yet the system still functioned in so far as it coordinated agents and allowed markets to function.

Another example of institution-building is the interbank payment system, which should be highly efficient under high inflation; if not, enterprises may rapidly lose large parts of their working capital as a consequence of inflationary transfers.[9] Or take the domestic bond market: Brazil's 1987 introduction of indexed Treasury bills was the basis for strong growth in the supply of a broader array of private, indexed financial assets. Despite accelerating rates of inflation, the following years witnessed rapid growth in private balance sheets, in technical know-how, and in the use of high-tech equipment in Brazilian banks. Public regulation accompanied the whole process, which featured economies of scale and other positive network externalities. During this period, Argentine banks were nearly destroyed by hyperinflation.

[7] Llach (1985), Giorgio (1989), Balinõ (1991), Sturzenegger (1991).

[8] See Fishlow (1974, 2005), Lara Resende (1990), and Simonsen (1995). Actually, in each country both indexation and dollarization were observed simultaneously; at issue in this paper is the *dominant* form of monetary substitution around which institutions and regulations were built.

[9] See Listfield and Montes-Negret (1996). In Argentina until the end of the 1990s, settlements between commercial banks and the central bank were still made largely in cash (i.e., via armored trucks). See also Angelini (1998).

The catch, however, is this: given the exponential nature of anticipated inflation, high inflation cannot be sustained over time; in fact, efficient hedging can serve only to postpone eventual stabilization (as it probably did in Brazil). Nonetheless, choices made under high inflation by agents and policy makers may shape their ulterior trade-offs. Under the pressure of economic crisis, agents offered adapted financial services and built up their balance sheets (i.e., they accumulated savings and investments contracts designed to limit the risk of decapitalization). Regulators then responded to these strategies by supporting, accommodating or restricting them, or by trying to influence them. All these factors later affected how stabilization was envisaged and how a monetary order was reconstructed. Path-dependency is primarily founded on the mutual consistency between public regulations, market institutions, and the structure of individual balance sheets which reflect past trade-offs and also shapes present private interests.

3. The Brazilian *Plano Real*

Beyond nominal stabilization, reconstructing national money is about reanchoring the accounting and payment units to each other. That is: inducing agents to rely on the same money as a coordinating institution for their payment and accounting operations. After a series of programs in the 1980s that aimed to destroy (or at least weaken) the "parasitic" link between the national money and its substitutes,[10] both Argentina and Brazil eventually opted for what was actually a much less ambitious strategy: *a complete anchoring of the economy to its alternate unit of account*, to which the unit-of-payment function would then be legally transferred. Neither country relied on a policy surprise or any shock on expectations: the measures were widely discussed and voted on by the Parliament weeks before their inception, so agents had nearly complete knowledge of the stabilization's logic before it was implemented. Therefore, coordination was not entirely the ex post result of individual market-based reactions to the plan when introduced. It was relied very much on an ex ante coordination based on open, public deliberation.

The strategy in the *Plano Real* (1994) was to begin by reconstructing the unit of account, which carries the highest risk because of the underlying redistributive stakes.[11] Between February and June 1994, the plan sought to re-coordinate agents on a new daily accounting index, the *Unidade Real de Valor* (URV). It published by the central bank and was linked to the dollar but with no underlying commitment. At the same time, laws stipulated that all wages and all *new* contracts must be anchored solely to the new URV, and agents were given strong incentives to convert *old* contracts into the new unit—especially financial contracts, which carry the highest redistributive stakes.

The consequences of this strategy were twofold. First, the fragmented unit of account was reunified or "re-nationalized", so that it became again a coherent public institution. Second, the ongoing process of indexation (active since the mid-1960s) was almost fully completed, with the account and payment functions entirely separated. Everyone was now using the unified new unit of account, which supported the whole price structure, while continuing to use the *cruzeiro*, the old unit of payment. Practically all domestic private contracts and relative prices were accounted for in URV, with no link whatsoever to the actual instrument of payment and to monetary policy, which was still run in the old, highly inflationary *cruzeiro*.[12] Hence, in June 1994, the *cruzeiro*'s 48% monthly inflation rate then amounted to a homothetic shift in the price structure. This was a most extraordinary and dangerous situation: the

[10] The policy debate of the 1980s on inflation stabilization opposed orthodox monetarists, who argued that money control should be the sole anchor, and the so-called heterodox, who argued for multi-anchor programs (e.g., the exchange rate coupled with a freeze on wages and prices). See Dornbusch and Simonsen (1987), Heymann (1987), Bruno et al. (1988), Kiguel and Liviatan (1988), Giorgio (1989), Modiano (1990), and Bruno et al. (1991).

[11] Arida and Lara Resende (1985) were the first to detail the logic of this program, more than a decade before it was actually tried. For a full description of its implementation, see Franco (1995); see also Garcia (1996).

[12] Inflation in UVR was estimated at 3.7% between February and June, according to Sachs and Zini (1996).

economy had no monetary anchor, and monetary policy could have no impact on relative prices and real term revenues.

Once the re-coordination of the URV was obtained, a standard monetary reform was implemented. On July 1, the unit-of-payment function (i.e., the legal tender) was transferred to the URV; this became the *real*, which replaced the old *cruzeiro*. The old fiduciary money was withdrawn, and the central bank began to conduct both monetary and foreign exchange policy in *reals*. Monthly inflation fell from 48% in June to 7.8% in July and to 1.9% in August; it remained below 2% during the two following years. In other words, a single, integrated monetary unit had been created that formally was as perfectly dis-indexed as the *cruzeiro* was indexed (on the URV) at the end of June 1994. The key intuition here is that—because individual hedging strategies had taken a decentralized, contractual form—overcoming the accounting unit's fragmentation required starting from contracts and voluntary agreements. Thus, rebuilding money could not be a declarative, unilateral act of the sovereign; it had to accommodate the existing structure of financial contracts and the private trade-offs of agents.

The cricital question the day after was whether the new *real* could itself lose the unit-of-account function. When confronted with a large foreign exchange shock, for instance, would the public hang on to the new national money? Or would agents once again shift their price list to an alternate accounting unit in order to protect themselves against revenue transfers? In this latter case, then the *real* would have failed to establish itself as a viable, integrated national money: its capacity to adjust relative prices movements and transfer market signals would not be restored, and inflation could easily ratchet up.

This question was answered in January 1999, when a foreign exchange crisis was followed by a 35% depreciation in the exchange rate. Yet by the second quarter, annualized inflation had reached only 8% and remained at that level until year's end—under a fairly restrictive policy mix.[13] In these conditions, a textbook "J-curve" scenario of stabilization and export-led recovery could progressively take hold; at the same time the central bank adopted a standard inflation-targeting policy framework that explicitly assumed that the country could now run its own monetary policy, with no commitment as regard the exchange rate.[14]

4. The Argentine monetary experiments

Monetary reconstruction, I: The Currency Board

The Argentine Currency Board, established in April 1991, shared many features of the Brazilian *Plano Real*. The main principle was to anchor the national peso at par on its parasitic substitute, here the dollar. By law, both monies became perfect substitutes: all the peso's functions (including that of legal tender) were assumed as well by the dollar. In other words, it was implicitly conceded that the dollar had achieved an almost complete monopoly on the unit-of-account function; hence, the peso's last chance for survival—as a (part-time) unit of payment—was to be anchored as solidly as possible to the dollar. At least some seignorage revenue would be kept, along with the unspoken option of returning to a single national currency. In order to maximize its commitment to the anchor, the Argentine central bank was required to follow strict rules of emission: the stock and flow of reserve money was to be fully backed by dollar assets.[15]

The main consequence of this monetary regime was that domestic interest rates were driven exclusively by the U.S. Federal Reserve policy and the "country risk premium" as measured by

[13] IMF (1999), Baig and Goldfajn (2000).
[14] Bogdanski et al. (2001). Before 1999, Brazil followed a succession of monetary and foreign exchange rules with no a priori commitment; see Franco (2000).
[15] Actually, 20–30% of the central bank's foreign reserves could be in the form of dollar-denominated Treasury bills issued by the Argentine government.

international capital markets. Via the credit multiplier, capital inflows (resp. outflows) implied an automatic expansion (resp. contraction) of money supply and credit distribution. In principle, there could be no "sterilization" and no lender of last resort.[16]

At first, the Argentine Currency Board was quite effective and allowed for some catch-up growth, which was fueled by large capital inflows. Its success in weathering the 1994–1995 Mexican crisis seemed, at the time, to signal its long-term sustainability.[17] But the Asian crisis (1997–1998) and, more directly, the Brazilian 1999 devaluation proved too hard to absorb. The eventual collapse of this regime reflected the real term appreciation of foreign exchange (i.e., a loss of competitiveness) as well as increasing pressure on the budget and hence on the public debt. The result was a painful recession followed by a full-scale systemic crisis: the country lost access to international capital market in March 2001, and starting in October growing capital outflows led to a drastic liquidity and credit crunch. This was followed by a full-blown run on the banks and, in a context of severe social and political instability, a default on the public debt (December 2001) and a panicked exit from the fixed exchange rate (January 7).[18] The peso then lost 72% of its value against the dollar; over the first half of 2002, the GDP contracted by 15%, investment by 44%, and imports by 56%.

Monetary Reconstruction, II: Pesification

Simultaneously with these developments, a unique process of monetary disintegration unfolded along three different dimensions. First, starting in mid-2001, many provinces started to issue parallel monies, such as the *patacones* of the Province of Buenos Aires. Unable to enter capital markets or to tap the central bank's cash, the insolvent and illiquid provinces settled an increasing share of their payment obligations (in particular, their wage bill) with this new type of IOU. The liquidity of these securities increased once they could be used to pay local taxes, at which time a number of enterprises (especially in retail trade) also began accepting them.[19] This history is in line with Knapp's (1924) views. The second aspect of the monetary disintegration affected the payment system through which agents should settle decentralized transactions: bank deposits were frozen on December 3, and foreign payments remained de facto blocked for more than three months.

However, floating the peso also implied the sudden breakup of a ten-year-old institutional arrangement hence a mass of private arrangements, network externalities, and stocks of financial contracts that were premised on the assumption that the bimonetary constitution would hold. Critically, floating the peso was doomed to result in a highly unstable, two-equilibria situation in light of the open competition between peso and dollar, both of which were used extensively by the public. Agents could quickly and fully re-coordinate around one of the currencies, causing the other's value to plunge toward zero—and there was little mystery regarding which currency would fall. For this reason, the main risk was not hyperinflation, as was commonly supposed; rather, the risk was destruction of the peso on the foreign exchange market leading to a domestic price explosion—regardless of whether the money supply could be controlled.

This was the third component of the monetary crisis in Argentina: once the unit of payment had been fractured and the payment system frozen, the national unit of account could be destroyed almost

[16] See Canavese (1992) and Cavallo and Cottani (1997) for a description of this monetary regime.
[17] See Caprio et al. (1996) regarding the extreme measures taken to avert a full collapse of the banking sector during the 1995 Tequila crisis; also Calomiris and Powell (2000).
[18] The year 2002 feature much debate (not recounted here) on the main cause of Argentina's abandoning its Currency Board. See, among others, della Paolera and Taylor (2002), Fanelli and Heymann (2002), Hausmann and Velasco (2002), and Mussa (2002).
[19] This monetary phenomenon had been observed locally during the 1980s as well as recurrently in Argentina during the nineteenth century; see Irigoin (2000) and della Paolera and Taylor (2002).

instantly.[20] In Brazil, this risk had been fully controlled: until July 1, 1994, agents had no other choice than to pay in the old, inflationary *cruzeiro* until its entire stock was exchanged for *reals* in a one-off, nonmarket conversion. In fact, the Argentine government tried to take the same road in order to forestall a destructive open competition between the dollar and the peso: in February 2002 it decided to "pesify" the economy, i.e., to convert into pesos all domestic prices, wage contracts, financial assets, private debts, interbank payments, etc. In a chaotic context marked by unprecedented levels of improvisation, the objective was to give again the peso the full monopoly over the accounting and payment functions, after it has been lost since the since the 1970s.

By the end of 2002, the results of pesification were quite remarkable from the viewpoint of an institutionalist theory of money. On the one hand, the price for goods and services responded positively: the nontrade sector exhibited only limited nominal price increases; traded goods remained anchored to international prices and so producers made large terms of trade gains.[21] This is exactly what theory predicts and what Brazil experienced in 1999: the economy recovered, although at the cost of massive revenue transfers between sectors of the population.

On the other hand, pesification had a destructive impact on the financial side of the economy. The main reason is that many agents in Argentina hold large debts and assets denominated in dollar; hence a precipitous fall in the exchange rate entailed a major redistribution of wealth. Dollar savers became nominally much richer, and those who had taken on dollar debt (because of its lower interest rate) faced insolvency. Hence pesification was implemented with two objectives: it aimed to rebuild a national money *and* to reverse, mitigate, or reallocate individual wealth losses due to declines in the exchange rate (i.e. between early January and late February). Reshuffling capital losses between agents and sectors became the key political economic issue. Violent proxy fights between interest groups and lobbies dominated the policy scene for over a year.

For a concrete example, take the "asymmetric pesification" of banks' balance sheets. In March and April 2002, dollar credits to enterprises were exchanged at a different rate than dollar deposits; enterprises were thereby subsidized at the expense of banks and their depositors. The government then decided to recapitalize the banks with the equivalent of 15% of GDP in Treasury bills—and this at a time when the state was already in default (i.e., patently insolvent). The utterly bizarre result was that, by the end of 2002, the only agents in Argentina who could measure their net wealth were those who had nothing (the majority) and the happy few who had everything abroad. Again and again the same questions were raised: Who owns what? Who is solvent and who is not? Who should exit the market and who may still trade and enter into new contracts?

The sheer impossibility of answering these questions was finally reflected in the suspension of bankruptcy law, the ultimate regulatory institution in any capitalist economy. Whether applied to banks, enterprises, private consumers, or state entities, bankruptcy could not operate because of the confusion that reigned about how accounts should be established and settled. This was the endpoint of the collapse of firms' intertemporal contractual structure and hence of the socially constructed norm—namely, solvency—that confirms their viability or sanctions their failure.

8. Conclusion

From the late 1960s onward, Argentineans and Brazilians adopted contrasting strategies for hedging against high and unstable inflation. In Argentina, agents re-coordinated around the dollar as a

[20] The Hungarian hyperinflation following World War II is a rare comparable experiment in which the economy had become de facto bimonetary so that the population could freely arbitrate between a strong unit and an inflationary currency. In July 1946, inflation of the unprotected money reached 4.2×10^{16}; at the end of the month, when that unit was withdrawn, the total corresponding monetary aggregate for the whole country could be converted on the black market to 2,300 U.S. dollars (Bomberger and Makinen, 1983).

[21] See Burstein et al. (2005) for a detailed analysis of price adjustments in Argentina after 2001.

dominant unit of account and unit of payment. However, the Brazilian economy re-coordinated on a variety of inflation indices; hence a more inward-looking regime took hold that better protected the private financial system and the real economy. In this sense, the 1994 *Plano Real* may contend as the most sophisticated (and the most baroque) monetary reform ever attempted. It first reassembled the unit of account by allowing a gradual, voluntary transfer of existing financial contract terms to a new, countrywide index. Then the unit-of-payment function was added; thus, virtually overnight a single, nonindexed national money was reborn that integrated both monetary units. An active issuing and foreign exchange policy was instituted at the same time.

In Argentina, the informal process of dollarization was confirmed by the establishment of a Currency Board in 1991: a tight, bimonetary regime of a permanently fixed exchange rate whose aim was to "import" low-inflation credentials via perfect substitutability between the dollar and the national peso. But over the medium term, this solution was not viable because it led to a large-scale monetary and economic collapse by 2002. At that time, the authorities tried to duplicate Brazil's strategy of reintegrating the two monetary functions into a single, national currency—except that Argentina tried to "pesify" its economy by fiat. Adoption of the new payment unit was not difficult, and few producers resisted setting prices in pesos. What proved to be much trickier was dealing with financial contracts, which by definition carry the greatest redistributive risks. In Brazil, agents had the time and a road map for renegotiating contracts privately: the microeconomic foundations of the monetary reform, as summarized in the balance sheets, were built before the new currency was introduced and monetary policy shifted to the new regime. In Argentina the authorities intervened in these contracts and reallocated private wealth on a large scale after pesification had been edicted anf after the peso had been floated.[22]

One highly orthodox conclusion is that the capacity to adjust relative prices is indeed decisive in any market economy. But there is a caveat: the loss of this capacity may reflect a policy choice (e.g., a fixed exchange rate) but may also result from private strategies (e.g., monetary substitution). This fact confirms that money as a market institution is neither exogenous nor "natural". It is jointly affected by regulatory and microeconomic decisions. Both influence how markets work but also constrain, in the short run and at the margin, the agent's and the policy-maker's trade-offs. For an example, recall the adjustment of shopkeeper price list and the economy's response to a trade shock.

Agents respond, sometimes strongly, to regulatory changes such as a stabilization program or monetary reform. Yet the impact of money on market dynamics depends on agents' *continued* willingness to use it in ways that confirm the expectations of monetary reformers. A currency is institutionally binding only insofar as it (a) coordinates all private exchanges and contracts and (b) imposes itself at the margin as the self-evident monopoly provider of both the payment function and the accounting function. This is how money acquires its institutional character. It is formalized by statute but it is also the outcome of a decentralized process of coordination and strategic behaviour.

Money then conditions microeconomic calculation and aggregation. An integrated and uncontested money then works through the whole division of labour and affects all market exchanges, via relative price signals. This is why its collapse is so costly for society and why it may affect behaviours over the long run. But because it affects individual trade-offs in such a comprehensive, symmetric, and nondiscriminatory manner, money also offers to policy makers a unique capacity to bear on virtually all individual decisions. It is a most remarkable policy-making instrument just because it affects agents as they freely calculate their market decisions. Hence, monetary policy can shape aggregate outcomes without impairing competition and private rights.

Even so, the very attempt to police or manipulate money (i.e., to use it as a variable in the policy makers' optimization) is contradictory to the agents' assumption that money is a given: that is, a parameter, both permanent and nonnegotiable, that conditions their own continuing private capacity to

[22] Cartelier (2006).

calculate and optimize. The experience of hyperinflation indicates that this ambiguity is constitutive of modern monetary orders and that it may also lead to their destruction.

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