

The transmission mechanism of monetary policy in a stabilising economy: notes on the case of Brazil¹

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Recent research has shown that understanding the transmission mechanism of monetary policy is a difficult and still largely incomplete task.² Understanding that mechanism in the context of a stabilising economy is an even more daunting challenge because stabilisation produces important structural and behavioural changes in the economy. During stabilisation the nature of the transmission mechanism is modified; indeed to a large extent stabilisation has to do with restoring the effectiveness of monetary policy.

A country that has lived under chronic high inflation for a long time produces a series of adaptations in its economic life that tend to reduce the power of monetary policy. As inflation recedes, these adaptations become superfluous and have to be replaced by normal stable price conditions. Hence as stabilisation progresses, important parts of the transmission mechanism have to be reconstructed so that the effectiveness of monetary policy can be gradually restored.

Among these adaptations to high inflation conditions, in the case of Brazil three are particularly relevant to our discussion. First, a crawling peg was adopted. The exchange rate became linked to a general price index, which amounted to freezing the real exchange rate.

Secondly, there was widespread currency substitution through the development of sophisticated financial indexation mechanisms.³ As a result, long-term debt dominated in non-indexed domestic currency disappeared. The market overnight rate on federal debt repos – the so-called SELIC rate – became the leading interest rate and almost all debt, whether private or public, became linked to that rate. This meant that the

¹ The author is grateful to Marcio Garcia for a helpful suggestion in connection with the wealth channel.

² See for example Mishkin (1995) and the related symposium papers on the monetary transmission mechanism.

³ See Dias Carneiro and Garcia (1993) and Garcia (1996) for details on the Brazilian experience.

duration⁴ of all debt instruments, including credit operations, converged to zero.

And thirdly, the banking system became “float-dependent”. Even though non-remunerated deposits shrank over time, banks were still able to amass a considerable amount of revenue from the high levels of inflation. They made large profits not only from demand deposits but also through (usually implicit) “administrative fees” on remunerated deposits whenever these were used as substitutes for demand deposits. These “fees” were paid by their clients because their only available alternatives were cash, demand deposits or foreign currency. Of these only the last offered a hedge against inflation, but it forced transactions out of the formal banking system (hence no cheques or other banking services). This transaction cost made remunerated deposits that offered an inflation hedge a clearly superior alternative to holding foreign currency. But that also meant that banks could charge a fee on these deposits (that is, could pay less than the rate of inflation) provided that the indifference threshold was not reached. This float-dependent banking system was characterised by low leverage. Credit was not an important source of revenue. Since both assets and liabilities were equally short-term (and of almost zero duration) balance-sheet risk was small.

In what follows we look at the main changes occurring in the transmission mechanism of monetary policy during stabilisation and some related issues for the case of Brazil.

1. The interest rate channel

The interest rate channel of transmission of monetary policy was clearly defined in Keynes’s General Theory. The present value of capital and durable consumption goods is negatively related to the real interest rate (the marginal efficiency of capital function). A lower real rate of interest implies a higher present value of existing durable (capital and consumption) goods and an increase in the ratio between the prices of existing stocks and the prices of newly-produced goods (*Tobin’s q*). Hence a

⁴ Duration is defined as a weighted average of the components of a stream of cash flows, in which the time of receipt of each payment is weighted by the present value of that payment. It can be seen as a measure of the approximate change in the value of an asset or liability for a 100 basis point change in interest rates.

stimulus is given to the current production of durable goods and, through the multiplier, to aggregate demand.

In a high-inflation economy, the interest rate channel loses strength because the relevant concept of the real rate of interest must be modified to take into account the high volatility of inflation. The relevant cost of capital concept must take into account the nominal interest rate minus the certainty equivalent of inflation. If inflation is very volatile, its certainty equivalent will exceed its expected value by a “volatility” premium. Therefore a high real interest rate is not necessarily synonymous with tight monetary policy if the volatility premium is similarly high.

When inflation goes down the interest rate channel is strengthened because low inflation usually also implies less volatile inflation. Hence the volatility premium decreases. A given real interest rate will produce much more monetary restraint when inflation is low and less volatile than when inflation is high and more volatile.

2. The wealth channel

The transmission of monetary policy through wealth effects has been analysed in the Pigou-Metzler-Patinkin tradition. Here we want to focus on the public debt component of wealth.

In a high-inflation economy there is no long-term debt. In such an environment, since the duration of all public debt is very close to zero, changes in interest rates produce little impact on its present value. A simple way to model this is to assume that all public debt is in the form of perpetuities linked to the current (short-term) interest rate. Hence the stock of public debt has a present value of B paying every period total interest of iB , where i is the interest rate for the period (which of course may change over time). Notice that although debt has infinite maturity it is really short-term because its duration is just one period.⁵

Under this assumption the public debt component of wealth is insensitive to the interest rate. Financial wealth can be defined as $W = m + B$, where m is the real value of money. Assume aggregate demand is given by:

⁵ In Brazil before the Real Plan, most of the public debt was in the form of LFTs (Letras Financeiras do Tesouro – Treasury Financial Notes), which could have maturities of up to one year but, since they were linked to the overnight interest rate (SELIC), had a duration close to zero (more exactly, of one day!).

$$Y = D(i, Y_d, W) + G$$

where private demand is negatively related to the interest rate and positively related to disposable income and financial wealth ($D_i < 0$, D_{Y_d} and $D_W > 0$) and public demand is given by non-financial expenditures G . Disposable income is given by GDP, Y , plus interest charges on government debt, that is, $Y_d = Y + iB$. Assume a normal inverse relationship exists between real money and the interest rate. Hence an increase in the interest rate reduces demand both directly and through its effect on wealth (because m and W fall as i increases) but at the same time increases demand through its effect on disposable income. The net effect on aggregate demand is clearly ambiguous.

This result is modified when we move to a low-inflation economy where long-term debt has been reconstructed. To see it most clearly, take the extreme assumption that all public debt is in the form of fixed rate perpetuities (like the British consols). In this case, the stock of public debt has a present value of B/i paying every period total interest of B . Financial wealth is defined as $W = m + B/i$, and disposable income is given by $Y_d = Y + B$. In this case, an increase in the interest rate reduces aggregate demand through its effects on wealth while leaving disposable income unaffected.⁶ There is no doubt that the net effect of an interest rate increase is unambiguously restrictive.

This analysis of the extreme cases of zero and infinite duration allow us to conclude that, as stabilisation consolidates and the duration of public debt increases, monetary policy becomes more powerful as a result of its transmission through the wealth channel.

3. The credit channel

It has been recognised in the literature that monetary policy affects not only the interest rate but also the “external finance premium”, defined as the difference between the corporation’s or household’s cost of funds raised externally (by imperfectly collateralising borrowing, for example) and the opportunity cost of internal funds. This premium is very similar to the spread charged by banks between borrowing and lending rates and

⁶ Observe that in this case interest rate changes are transmitted to aggregate demand through the effect on financial wealth of resulting changes in the present value of public debt.

it is an important determinant of investment and spending decisions. As emphasised by Bernanke and Gertler (1995), the credit channel is not really an independent alternative to the traditional interest rate mechanism but rather an amplifying mechanism.

Two mechanisms have been considered in the literature on the credit channel: the balance-sheet (or net worth) mechanism and the bank lending mechanism. The balance-sheet mechanism is based on the well-documented fact that a borrower with a stronger financial position pays a lower external finance premium. We also know that present value is more sensitive to a given interest rate change when the stream of payments is longer. In other words, the interest elasticity of an asset price is higher when the stream of payments derived from that asset has a longer duration. To the extent that corporations and households have balance sheets in which the duration of assets exceeds the duration of liabilities, their net worth becomes inversely linked to the interest rate. This may be the case, for example, if a large part of borrowing is in the form of short-term or floating-rate debt. Also, if a rising interest rate causes declining asset prices, the value of loan collateral will shrink. The result is that a higher interest rate worsens the financial position of most firms and households, increasing their external finance premium and depressing spending.

In a high-inflation economy, this balance-sheet mechanism loses strength because long-term debt disappears. In an environment where the duration of all debt instruments, including credit operations, is very close to zero, changes in the interest rate produce little impact on the relative prices of financial assets and on the relative valuation of capital assets; hence their effect on net worth is negligible. On the other hand, in a stabilising economy, as long-term debt is gradually recreated, the balance-sheet channel comes back into operation.

The other mechanism of the credit channel, the bank lending mechanism, works through the conditions of supply of bank loans. A tightening of monetary policy reduces the supply of loans for small or medium-sized bank-dependent businesses, which are forced to search for new lenders and to construct new credit relationships. These costly activities are likely to increase their external finance premium and hence to affect their spending decisions.

In a high-inflation economy, where banks are float-dependent and assume minimum credit risks, this mechanism cannot be very powerful.

With the fall of inflation, float revenues disappear and the banking system finds itself oversized. Reducing costs to match the now reduced level of revenues is a slow, painful process. Moreover, an obvious “prisoner dilemma” exists: any bank that avoids reducing costs early, for example by not closing unprofitable branches, may end up gaining market share. Hence there is a profit in not being the first to adjust by reducing costs, the typical non-cooperative solution to the non-zero-sum game.

In order to maintain profitability in this new low-inflation environment, banks try to create new sources of revenue rather than cut costs dramatically. They are bound to take more risks, by increasing leverage and turning credit operations into an important source of revenue. In this process they are also likely to increase their currency risk exposure if borrowing abroad offers a low-cost alternative to domestic funding. As a result, the bank lending mechanism becomes more powerful and there is also an increased risk of bank distress.

4. The exchange rate channel

In a high-inflation economy where a crawling peg is in operation, which is the most typical case, the exchange rate channel becomes powerless. Inflation stabilisation usually proceeds either through a currency board, as in Argentina, or through a floating exchange rate coupled with very high interest rates, as in Brazil. In the first case there is a self-imposed restriction on the use of monetary policy: the domestic interest rate is determined by the interest rate on the currency to which the domestic currency is pegged. The exchange rate channel is clearly shut off.

In Brazil the Real Plan, launched in July 1994, maintained a floating exchange rate coupled with a real interest rate of 27% (annual rate) in its first six months. The nominal exchange rate (R\$/US\$) appreciated by 16% and the trade balance moved from a surplus of US\$ 12.9 billion in the 12 months ending in June 1994 to a deficit of US\$ 600 million in the 12 months ending in June 1995, and of around US\$ 5 billion in 1996. The recessionary nature of this movement in the trade account cannot be seen in the GDP statistics because output growth proceeded at a rapid pace fuelled by the consumption boom that typically follows stabilisation. But GDP growth rates of 5.8% in 1994 and 4.3% in 1995 would certainly have been much higher without this contractionary shift in the trade

balance (judging from the Argentine experience, perhaps some 2 to 3 percentage points higher each year). There is no doubt that the exchange rate channel was fully operative here.

Starting in 1995, the central bank used a policy of intervening in the exchange market in order to avoid further currency appreciation, thereby reducing somewhat the contractionary impulse through the exchange rate channel and avoiding (*ceteris paribus*!) a further deterioration in the trade balance. A formal band was adopted in the first half of 1995 (with a width of around 8%) and a “very dirty” float has been used since the second half of 1995, with almost weekly interventions using very small informal “mini-bands” (with a width of no more than 0.5% between buying and selling points). But the vast majority of interventions was aimed at avoiding exchange rate appreciation, which real interest rates of 33% in 1995 and 17% in 1996 promoted. Most of the time, the central bank was on the buying side of the market with the balance of payments showing surpluses of US\$ 13 billion in 1995 and US\$ 10 billion in 1996.

The exchange rate channel has probably been the key transmission mechanism of monetary policy in the recent Brazilian experience. This stabilisation process cannot be adequately described as an exchange-rate-based one. The combination of large foreign reserve accumulation (from US\$ 42.9 billion in June 1994 to US\$ 60.5 billion in November 1996) with extremely high interest rates leaves no room for doubt that this has so far been a monetary-policy-based stabilisation process. As stabilisation proceeds and other channels of transmission of monetary policy are gradually restored, one may expect that the need for very high interest rates will be somewhat reduced. A tight monetary policy stance in a floating exchange rate regime will become possible with interest rates comparable to those used by stable advanced countries. Only at that point will stabilisation be truly consolidated in Brazil.

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