How does Political Violence Affect Currency Substitution? Evidence from Egypt

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Abstract

In this paper we estimate a time-series model of the financial asset portfolio shares in Egypt, distinguishing between assets of varying degrees of liquidity and between domestic currency and foreign currency deposits. While financial liberalization and financial stability are found to have encouraged domestic residents to increase the share of their portfolio composed of domestic currency assets, these effects have been offset by an increase in the number of violent political incidents arising from conflict between radical Islamic groups and the Egyptian state. Greater violence has led to lower domestic asset demand and substitution into foreign currency deposits. The link between political events and financial outcomes provides a rationale for economic policy interventions by Bretton Woods institutions in response to increases in political instability.

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1. Introduction

Early in the 1990s the Egyptian government instituted a reform program that was largely successful by many conventional criteria. Domestic capital markets were successfully liberalized, and financially repressive controls on interest rates were removed. The foreign exchange rate black market premium, which had been growing steadily over the 1980s, was eliminated by a sequence of official exchange rate devaluations. However, these reforms had surprisingly little influence on many monetary and financial aggregates. For example, before the start of the reform program, at the end of 1985, the fraction of private sector deposits in Egyptian banks made up by domestic currency accounts was 68%. Ten years later, after the reform program had ended, the figure had risen only to 70%.[1] The private sector continued to hedge its bets about the viability of the post-reform exchange rate peg and low level of inflation: 30% of deposits were held in foreign currency accounts.

One possible explanation for the lack of confidence is that the reforms lacked credibility; but this is difficult to maintain when the program was successful by so many conventional criteria. In this paper we pursue an alternative explanation: that the economic reforms would have increased confidence in the local economy and currency, were it not for the worsening of political conditions in Egypt, as manifested by a rise in the level of politically motivated violence, mostly on the part of radical Islamist groups.[2] Our hypothesis is that in terms of the economic consequences of Egyptian government policy in the 1990s, a failure to prevent a rise in political instability offset the success in increasing economic stability. The vehicle for testing this hypothesis will be a time-series econometric analysis of the determinants of currency substitution, that is, substitution between domestic currency and foreign currency assets.

Our main aim in this paper is to estimate econometrically the extent to which political violence impacts on Egyptian investors' decisions about whether to hold domestic currency assets or foreign currency assets, and to compare the magnitude of any such effects with those of "standard" economic factors, such as the rate of exchange rate depreciation or the differential between domestic and foreign interest rates. The

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[1] These figures are based on the data discussed in Section 3. One way in which the Egyptian financial system has been relatively liberal, even as early as the 1970s, has been in the absence of any restrictions on the creation of foreign currency accounts by Egyptian banks. This means that at least Egyptians can hold their foreign currency savings in the formal financial sector, instead of accumulating illicit foreign bank notes. To a certain extent this mitigates the financial problems that arise when the domestic currency is weak, though foreign currency deposits do not necessarily promote the sustainability of a fixed official exchange rate peg like Egypt's (Mizen 1999).

[2] Political instability indicators have been found to impact on investment and financial markets in a small number of other LDCs, including South Africa. See Fedderke (2000), Fedderke and Liu (1999) and Fielding (2002).

focus on currency substitution is of interest in itself. If an economic reform program, such as the Egyptian reform of the early 1990s, is to be at all successful then it must generate confidence not only in the local financial system, but also in the local currency. The existence of a large quantity of foreign currency deposits held by agents whose expenditure is mostly in local currency indicates a lack of confidence in this currency. This lack of confidence erodes the government's seigniorage tax base, increasing the potential for fiscal crises and hyperinflationary episodes.

But the analysis of the determinants of currency substitution is also of interest because of its wider implications. The relative abundance of financial data in a country like Egypt permits an econometric analysis of the factors influencing the evolution of financial aggregates. Real economic variables – such as physical investment and GDP growth – are no less important; but these variables are more problematic in terms of econometric analysis because complete national accounts statistics are available for a relatively short period of time, and then only annually. Nevertheless, if a factor such as the intensity of political violence has a significant impact on the financial sector, this suggests that it is more likely than not that the real sector is affected also. Then political violence is not "just" a political problem but also an economic one, and should be a factor taken into account in economic planning and policy formation by national and international authorities.

The rest of the paper has the following structure. In Section 2 we review the political economy of radical Islamism in Egypt. The main purpose of this section is to show that although the total number of fatalities in politically motivated violent incidents is not in itself very high (compared with full-scale civil war), the political and economic consequences of such violence are far wider than their impact on the individuals and communities on whom they impact directly. Section 3 then reviews the financial and economic data that is used in the econometric analysis in Section 4. The summary in Section 5 suggests some possible policy implications of these results.

2. Radical Islamism and the political economy of Egypt

Currency substitution reflects Egyptian savers' expectations that the official exchange rate would depreciate. Therefore higher returns were expected on US$ holdings than on local currency, despite the lower interest rate on foreign currency deposits. An earlier study of currency substitution in Egypt (El-Erian, 1988) showed that residents' demand for foreign currency was sensitive to inflationary pressures and weak external balances. A dummy variable for "political disruption" after the assassination of president Sadat[3] indicated that

[3] This event falls outside the sample period of our own regression equations.

political factors also mattered for residents' confidence in the Egyptian pound. The following section proposes a causal link between Islamist violence and confidence in the pound. The effect of political violence on currency substitution is then examined using an index of Islamic fundamentalist attacks.

2.1 Explaining currency devaluations

The "escape clause" literature (following Obstfeld, 1994) explains that self-fulfilling currency crises may emerge because a government's commitment to an exchange rate peg depends on a political cost-benefit analysis[4]. The cost of maintaining a peg under a speculative attack is weighed against the benefits from maintaining the peg. If the economy is destabilised by high interest rates and / or political time horizons are short and long run benefits are heavily discounted, the peg is abandoned[5]. In developing countries, however, the main conflict may be between maintaining a fixed exchange rate and the government's need for seigniorage finance[6]. What is common to all the models is that speculators do not know the government's objective function and therefore have to guess how the government will react to changes in economic and political conditions.

The escape clause literature also assumes that there is a unified, pegged exchange rate at which all transactions take place. If there is a multiple exchange rate system, however, speculative pressure can to some extent be absorbed by a depreciation of the parallel market exchange rate. So the timing of the depreciation of the official exchange rate becomes even more indeterminate, as investors have to guess the size of the black market premium that will be tolerated by the government. Egypt managed its foreign exchange transactions through a multiple exchange rate arrangement throughout the period of investigation[7]. An official parallel market for foreign exchange was established in 1973 and from 1975 the exchange rate in the parallel market fluctuated independently from the official rate[8]. The combination of inflation and an official exchange rate peg resulted in a steady appreciation of the real exchange rate and through the 1980s the spread between the official and black market rate increased dramatically. So the lack of confidence in the domestic currency was initially reflected in the black market rate rather than the official exchange rate. In 1989, 1990 and 1991 the official exchange rate was realigned to reflect the black market rate of the Egyptian

[4] For example Drazen and Masson (1994), Bensaid and Jeane (1997), Jeanne and Masson (1999).
[5] Bussiere and Mulder (1999), Leblang and Bernhard (1999).
[6] Fielding and Mizen (2001).
[7] See the IMF *Exchange Arrangements and Exchange Restrictions*.
[8] Domac and Shabsigh (1999).

pound[9]. Since then the authorities have intervened in the foreign exchange market to maintain the rate in a tight band against the US$[10].

We conjecture that the Egyptian government was sensitive to increased spreads between the official and parallel exchange rate and to the size of its hard currency reserves. Investors would have to guess whether the government would tolerate an increase in the spread between the official and parallel exchange rates, intervene in the foreign exchange market using its US$ reserves, or adjust the official exchange rate[11]. Risk averse savers therefore held some of their wealth in US$ deposits. Clearly savers should react to changes in Egypt's economic performance. But why would savers be sensitive to political violence?

2.2 The effect of political violence on currency substitution

Political models of currency crises look at political factors that affect the time horizon of governments and therefore affect the trade-off between the short-term costs of defending a peg and the long-term gains of maintaining the peg. Political factors, which have been shown to be significant in explaining past crises, include elections (especially those leading to the defeat of a right-of-centre government), cabinet dissolutions and coups[12].

Most studies of the effects of political instability on confidence in a currency would treat Egypt as politically very stable, though. There has been an extremely low turnover of veto players and the time of office of the strong presidents was very long (11 years for Mr Sadat and 16 years for Mr Mubarak by 1997). The governing party had a large and stable majority exceeding 70% of seats in the parliament throughout the period of examination, as potentially popular opposition parties were suppressed. Moreover, the opposition was fragmented with independent candidates representing the largest part of the seats not held by the government since 1990. This made meaningful political opposition a remote possibility. According to the Beck database of political institutions there was only one period of political instability since 1980: in 1981 President Sadat was assassinated. He was replaced by a political ally, who has been in office ever since. Currency substitution is therefore unlikely to be driven by changes in the government's time horizon. Political violence did not create expectations of a change in the government and hence fear of a policy U-turn.

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[9] From February 1991 a unified exchange rate replaced all other existing exchange rates.
[10] Handy (1998).
[11] A further way of managing exchange rate pressure was through quantitative import restrictions and high tariffs. (Handy 1998).
[12] For example Eichengreen *et al* (1995), Bussiere and Mulder (1999), Leblang and Bernhard (1999).

There are, however, two possible causal mechanisms by why an increase in political violence could be reflected in increased currency substitution. Firstly the government reacted to political violence by strengthening anti-terrorist legislation, which was then used to crack down on suspected Islamist activists. Estimates of the numbers detained fluctuate between the authorities' estimate of 10,000 and the Islamist opposition's claim of 30,000 detainees[13]. There has also been an increased cost of protecting politicians and state institutions. A large contingent of tourist police has been deployed to guard tourist sites. The increase in political violence is therefore reflected in increased fiscal expenditure. This meant that there was an increased incentive to raise revenues through the inflation tax and thereby endanger the peg.

Secondly, political violence deterred tourists and hence weakened external balances and foreign exchange reserves. The probability that the government would use its foreign exchange reserves to intervene in the parallel market would be affected by a downturn in tourist revenues. Falling reserves would increase the incentive for holding hard currency rather than Egyptian pounds. Evidence for the effect of violence on tourist revenues and the reserve position are presented in Appendix 1. It shows that tourism was affected by violence, whether or not this violence was specifically targeted at tourists. The development of Islamist strategies is discussed in the following section.

2.3 Islamist violence in Egypt

The strategy of the militant Islamist organisations fluctuated during the period of observation, in terms of the frequency of attacks, their targets and military tactics.[14] Islamist movements were banned from Egyptian politics in 1954 and went underground in response to government repression. During the 1970s, however, there was a general Islamist revival, spread through mosques, youth clubs and cultural and welfare organisations. There were two main Islamist movements: *al-Ikhwan al-Muslimun* (the Muslim brotherhood), which was non-violent and *Al-Jama'a al Islamiya*, which had no political programme but a preference for direct action. There were also two small radical groups (plus a few unimportant tiny radical groups): *Jama'at al'Muslimun* (a splinter group from the *Ikhwan* movement) and *Shabab Muhammad.* Between 1972 and 1979 there were 26 incidents of Islamist violence, which were mainly directed against the Christian minority, the Copts.

Political violence increased in the 1980s as Islamists opposed the government's rapprochement with Israel and its pro-Western stance. The radical wing of the *Ikhwan* movement gained prominence in the otherwise non-violent movement and Upper Egypt's

[13] *Le Monde Diplomatique* January 1998: "Egypt's Islamists caught in a bind".
[14] See Hafez 2000.

Jama'a movement joined forces with the radical *al-Jihad* organisation. The violent incidents in this period were increasingly directed against the state rather than the Copts. The violence culminated in the assassination of President Sadat in October 1981 and the insurrection of radical Islamists in Asyut. The states' brutal repression in response to these events succeeded in lowering the number of violent incidents from 1982 to 1985.

From 1984 the *Ikhwan* movement became a player in Egyptian politics being tolerated as a religious group and cooperating with the *Wafd* party to gain parliamentary representation. *Ikhwan* therefore became committed to pluralism, gradualism and non-violence. Violent acts were mainly committed by *Jama'a* in Upper Egypt and mostly targeted at musical festivals, beer deliveries, cinemas and individuals engaged in "vice". The secular government responded to these incidents with mass arrests and the storming of *Jama'a* mosques. The violent repression turned public opinion against the government.

From late 1989 *Jama'a* started to target prominent officials for assassinations. In December 1989 an unsuccessful attempt was made to assassinate the interior minister Zaki Baldr and in 1990 the former speaker of parliament Rafat al-Mahjoub was assassinated. From 1992 a vicious circle of incidents of violence and counter-violence began. Through 1992 and 1993 there were almost daily incidents of violence, mainly the work of *Jama'a* with *al'Jihad* playing a minor role. *Jama'a* formed an official armed wing using high-tech explosives and military intelligence, which attacked policemen, security forces and prominent government officials. There were also attacks on banks and foreign exchange bureaus. The government reacted by suppressing the *Ikhwan* movement politically and arrested those *Ikhwan* members most likely to stand for the 1995 parliamentary election. In response the Islamists started a series of direct attacks on tourists and issued communiqués for Western tourists to stay away from Egypt. Examples of such attacks are the massacres of Greek tourists outside their Cairo hotel in April 1996, German tourists in front of the Cairo Museum in September 1997 and the killing of 60 tourists in Luxor in November 1997.

2.4 Summary

Islamist violence in Egypt was initially based on religious tension between Muslims and Christians, and the desire of some Islamists to impose *Sharia* laws. However, the political stance of the government towards Israel and its repression of Islamist fundamentalists meant that Islamist violence was increasingly directed against the state. Radical Islamist groups employed a variety of strategies, designed to harm the government *directly* through assassination attempts or *indirectly* through undermining

tourism, which provided much of the government's revenues and hard currency income. Violence therefore meant that state resources would be tied up in military and security expenditure and that the foreign exchange operations of the Bank of Egypt would be constrained by low foreign exchange reserves. This would make a devaluation more likely at any given level of the black market foreign exchange premium. At any one point in time, the black market premium might be close to the level that triggered a monetary authority intervention. With low foreign exchange reserves, that intervention is more likely to be a devaluation than a repurchase of Egyptian pounds. Savers were therefore sensitive to changes in political violence and held some of their wealth in hard currency, to avoid being caught out by a devaluation.

In the absence of reliable quarterly data on tourism receipts and security expenditures, it will not be possible to estimate a structural model that traces the causal chain from greater violence to lower tourism revenue and higher security expenditures to currency substitution. Nevertheless, we will attempt to estimate the overall impact of violence in reduced form, by including a measure of political violence directly in an asset demand function.

3. The evolution of monetary aggregates and political instability in Egypt

The key variables we will focus on in this paper are those measuring the ratio of foreign currency deposits to domestic currency deposits held by Egyptians, as reported in the Central Bank of Egypt *Monthly Statistical Bulletin*. Aside from the disaggregation by currency, deposits are disaggregated by depositor (business sector deposits and personal household sector deposits) and by the type of deposit (demand deposits and savings deposits). Figures 1-2 depict the evolution of the quarterly real values of the deposit series over the 1980s and 1990s.[15] With the three types of disaggregation there are eight series in total. The econometric analysis in the following section is designed to explain the following four ratios:

D^B	The ratio of business sector foreign currency demand deposits to business sector domestic currency demand deposits;
D^P	The ratio of household sector foreign currency demand deposits to household sector domestic currency demand deposits;
S^B	The ratio of business sector foreign currency savings deposits to business sector domestic currency savings deposits;

[15] We use as a deflator the consumer price index reported in the IMF *International Financial Statistics*.

S^P The ratio of household sector foreign currency savings deposits to household sector domestic currency savings deposits.

Four separate currency ratios are used because asset demand elasticities could principle vary between households and businesses, and between demand deposits and savings deposits.

[Figures 1-2 here]

As Figures 1-2 illustrate, real values of all of the deposit series have illustrated a great deal of variability over time. Some of these variations appear to be linked to particular economic events. Certainly there is a substantial movement out of foreign currency (predominantly US Dollars) and into domestic currency coinciding with the Economic Reform and Structural Adjustment Program (ERSAP) of 1990-91. The program involved extensive liberalization and privatization within the Egyptian financial system (El-Refaie, 1998). Probably the most important element of the program from the point of view of currency substitution was Decree 117 of 1991, allowing free trade in foreign currency and so legalizing the black market for Dollars. The program also instituted greater flexibility in interest rates charged on domestic currency deposits, and reformed the regulation of private capital markets (El-Din, 1998).

It remains to be seen whether the coincidence of financial reform and substitution into domestic currency assets reflects a causal relationship between asset demand and financial market conditions. Moreover, there are variations in the asset demand series that are not obviously related to financial reform. For example, business sector demand for foreign currency assets has risen steadily since 1994, despite a stable, market-clearing official exchange rate and a declining rate of inflation. A robust model of currency substitution must incorporate factors that explain these movements.

One candidate to explain the additional variations in asset demand is an indicator of the level of political violence discussed in Section 2. Abul`ala (1998) and Hafez (2000) provide an annual time-varying indicator of the aggregate level of violence, measured as the total number of politically motivated violent incidents reported in Egyptian newspapers in any one year. We will be fitting a currency substitution model incorporating quarterly economic data, so the political violence index we will use is a quarterly interpolation of the logarithm of the annual series reported in our primary sources.[16] This quarterly time series is illustrated in Figure 3.

[16] The interpolation method is that of Lisman and Sandee (1964). Alternative filters (such as the Hodrick-Prescott filter) produce quarterly series that look very similar to the one we use.

[Figure 3 here]

Figure 3 shows that the level of violence has varied considerably over the last 20 years. In particular, there was a substantial and apparently permanent increase in the level of violence in the early 1990s, coinciding approximately with the instigation of the ERSAP. Investigating whether the ERSAP was one of the causes of the increase in violence is beyond the scope of this paper; but we will investigate whether the violence has counteracted some of the effects of the reform program. In order to do this we need to construct an econometric model of Egyptian currency substitution that incorporates the political violence index.

4. The econometric model

4.1 Introduction

In standard models of money demand with adjustment costs (for example, Cuthbertson and Taylor, 1987; Agénor and Khan, 1996), the real value of the total stock of financial assets – or the ratio of two components of the stock, R – evolves according to a process of the form:

$$\ln(R_t) = \lambda \ln(R_{t-1}) + (1-\lambda)(1-\lambda\cdot r)\{\sum_{j=0}^{j=\infty} (\lambda\cdot r)^j \cdot E_t[\ln(R^*)_{t+j}]\} + u_t \qquad (1)$$

where R^* is the desired ratio, λ is an adjustment cost parameter, r a discount rate, u a stochastic error and $E_t[.]$ an expectations operator. (In our case, there will be four different ratios: D^B/D^P, D^P/S^B and S^P/S^B) If R^* is a function of a vector of N political and economic variables, $z_t = [z_{1t},...,z_{Nt}]'$, then under Rational Expectations this process can be represented by:

$$R_t = a_0 + a_1 \cdot R_{t-1} + a_2\, p(L) z_t + h_t \qquad (2)$$

$$z_{t+1} = f(L) z_t + q_t \qquad (3)$$

with certain cross-equation restrictions on the lag polynomials $p(L)$ and $f(L)$. h and q are random error terms. Estimation of equation (2) alone is consistent but inefficient. Under alternative hypotheses about expectations, other restrictions on $p(L)$ are appropriate.

We will be working with a sample of about 60 observations,[17] so tests of restrictions of this kind will not have very much power. For this reason, we decide to remain agnostic about the process by which expectations are formed, and will estimate equations of the form of (2) above, but without any restrictions. We acknowledge that this involves a potential efficiency loss, but we wish to be sure that we are not imposing invalid restrictions leading to inconsistent parameter estimates. In this respect we differ from some previous work on foreign currency deposits in LDCs, for example Agénor and Khan (1996), who do impose Rational Expectations restrictions. Since the main focus of our analysis is the impact of political violence on asset demand, our primary concern is to obtain a consistent estimate of the political violence parameter.

The choice of variables to enter the z vector is informed by existing economic theory. The desired ratio of foreign to domestic currency deposits will depend on their relative rate of return. This relative return comprises the difference between foreign and domestic interest rates plus the rate of nominal exchange rate depreciation. (Since Egypt has been financially repressed for most of its history, there is no reason to expect any sort of interest parity condition to hold.)

Since the numerators and denominators of the asset ratios we are measuring are made up of aggregates that are not entirely homogenous, the choice of an appropriate interest rate differential is not entirely straightforward. However, all rates offered on dollar deposits (which make up the bulk of foreign currency deposits) closely track the three-month LIBOR. Typically, the rates offered by Egyptian banks are 30-40 basis points below the LIBOR, and this margin is pretty constant over time. Similarly, all rates on Egyptian pound deposits closely track the three-month domestic deposit rate, controlled by the government for most of our sample period. We will use the end-of quarter difference between the three-month LIBOR and the three-month deposit rate as our interest differential measure, denoted $[r^* - r]_t$.

The rate of exchange rate depreciation that investors will take into account depends on which foreign currency market they have access to. Those with access to the black market will operate on the basis of the black market rate; others will operate on the basis of the official rate. We do not have reliable information on the fraction of investors with access to the black market, so we will include both quarterly depreciation in the black market rate ($\Delta\ln(b_t)$) and quarterly depreciation in the official rate ($\Delta\ln(s_t)$) separately in our model. So in total we have three variables capturing the relative rate of return on foreign currency deposits. These variables are illustrated in Figure 4.

[17] The sample size is limited by the availability of data for the dependent variables, which are reported from the early 1980s onwards, and for the political violence index, which runs up to 1997. Table 5 below indicates the sample sizes in each regression.

[Figure 4 here]

In time-series models of currency ratios in which the only source of uncertainty is the conditional volatility of the relative rate of return, and in which this volatility is constant over time, the three variables above are the only ones to appear in the regression equations. However, our model will include three variables capturing different kinds of uncertainty.

1. It turns out that in Egypt the conditional volatility of the rate of depreciation of the black market rate $\Delta\ln(b)$ is not constant over time. In fact, the process for this variable exhibits autoregressive heteroskedasticity (ARCH). Table 1 reports an ARCH regression for $\Delta\ln(b)$. When $\Delta\ln(b)$ is conditioned on its own past value, the squared regression residual is significantly autocorrelated.[18] We will include the fitted squared residual (h_t) as an explanatory variable in the currency substitution equation. We anticipate that higher conditional volatility will reduce the relative demand for dollar deposits, because the bulk of Egyptian consumption is in goods purchased in domestic currency. Higher volatility in the exchange rate induces greater uncertainty in the purchasing power of dollar deposits. We do not include any analogous volatility indicator relating to the official exchange rate $\Delta\ln(s)$. As can be seen from Figure 4, $\ln(s)$ was constant for most of the sample period, changing only during the liberalization episode in 1990-91. So the conditional volatility of $\Delta\ln(s)$ is highly correlated with its mean, and has no extra explanatory power in the currency substitution equations.

[Table 1 here]

2. As we have already noted, asset ratios are to be estimated over a period in which there has been a substantial devaluation / liberalization episode. It is quite possible that this episode has altered Egyptians' perceptions about the health of the domestic financial system. Post-liberalization, there may be greater confidence that there will be no further devaluations of the domestic

[18] Alternative specifications of the mean equation for $\Delta\ln(b)$ in Table 1 including more regressors – such as the other explanatory variables in the currency substitution model described below – produce very similar estimates of the magnitude of squared residual autocorrelation. These regressors are not jointly significant. Note from Table 3 below that $\Delta\ln(b)$ is a stationary series.

currency. One measure of the degree of confidence Egyptians can be expected to have in their own currency is the gap between the black market and official exchange rates, as measure by, for example, $\ln(b/s)$, which was substantially reduced by the liberalization episode. *After* the liberalization episode reducing $\ln(b/s)$, Egyptians may have been more confident that the official value of domestic currency assets would be maintained. Of course, this does not alter the fact that *during* the episode (when the official exchange rate is depreciating rapidly) the relative demand for foreign currency deposits ought to have been higher. This should be reflected by a positive association between the relative demand for foreign currency deposits and the rate of depreciation of the official rate, $\Delta\ln(s)$. In other words, the short-run and long-run impacts of the devaluation on the asset ratios are differently signed.

3. Finally, we will include our political instability index, $\ln(v)$. Higher instability ought to raise the relative demand for foreign currency deposits, for the reasons outlined in Section 2.

So our econometric model will incorporate four asset ratios – $\ln(D^B)$, $\ln(D^P)$, $\ln(S^B)$ and $\ln(S^P)$ – plus the explanatory variables discussed above: $[r^*-r]$, $\Delta\ln(s)$, $\ln(b/s)$, $\Delta\ln(b)$, h and $\ln(v)$. The precise definition and data sources for these variables are listed in Appendix 2. Table 2 lists sample standard deviations of the variables, which will be important in interpreting the regression equation coefficients. The underlying rationale for the model is encapsulated by equation (2) above but the econometric specification, discussed below, depends on the time-series properties of these variables.

[Table 2 here]

4.2. Model specification

In a small sample such as ours, tests for the order of integration of the variables of interest have relatively little power. Indeed, the ADF test statistics reported in Table 3 for the four asset ratios and the interest rate differential, $[r^*-r]$, include some statistics quite close to the 10% critical value, so it is not at all obvious whether they should be treated as I(0) or I(1). Moreover, one of our explanatory variables, $\ln(v)$, is derived from an annual series with too few observations to make any formal stationarity test at all meaningful. The only variables for which there is strong evidence of stationarity are $\Delta\ln(b)$ and $\Delta\ln(s)$, though h is stationary by construction. For these reasons, we choose to remain agnostic about the order of integration of most of the variables of interest, and employ the approach advocated by Pesaran *et al*. (2001). That is, we specify an equation

for each asset ratio $R = (D^B, D^P, S^B, S^P)$ that includes contemporaneous growth rates of all the variables of an uncertain order of integration (i.e., all variables except $\Delta\ln(b)$, $\Delta\ln(s)$ and h) plus lagged levels.[19] Our empirical specification of equation (2) becomes:

$$\Delta\ln(R)_t = b_0 + \sum_{i=1}^{i=TR} b_i \cdot \Delta\ln(R)_{t-i} + \sum_{i=0}^{i=Ts} g_i \cdot \Delta\ln(s)_{t-i} + \sum_{i=0}^{i=Tb} d_i \cdot \Delta\ln(b)_{t-i} + \sum_{i=0}^{i=Tr} z_i \cdot \Delta[r^*-r]_{t-i} + \sum_{i=0}^{i=Tv} h_i \cdot \Delta\ln(v)_{t-i}$$
$$+ b^* \ln(R)_{t-1} + g^* \ln(b/s)_{t-1} + z^* [r^*-r]_{t-1} + h^* \ln(v)_{t-1} + q \cdot h_t + e^R_t \qquad (4)$$

All Greek letters are parameters; e^R_t is the regression residual. If we do not know that the variables in equation (4) are I(0) then we cannot rely on the t-ratios associated with the starred parameters. However, Pesaran *et al*. (2001) calculate upper and lower bounds for the critical values of an F-test for the joint significance of the starred parameters, i.e., a test of the absence of a long run relationship between the possibly I(1) variables. The upper bound corresponds to the case that all are I(1), the lower to the case that they are all I(0).

Since the four regression residuals might be correlated there are potential efficiency gains from estimating the four equations simultaneously: the OLS and Maximum Likelihood estimates will not be identical. However, the maximum sample period available is not the same for all four asset ratios. So simultaneous estimation requires the omission of some observations from some equations, with a consequent efficiency loss. For this reason we estimate the equations both singly by OLS, using as long a sample period as possible, and simultaneously by Maximum Likelihood. As we will see, the parameter estimates are very similar for the two estimators.

[Tables 3-5 here]

4.3. Estimation results

The full OLS regression results are reported in Table 5; the corresponding ML estimates are available on request. Table 4 reports the long-run coefficients implicit in both the OLS and the ML estimates, which are very similar. Table 4 also includes F-statistics for the test of the null that there is no long-run relationship between the possibly I(1) variables. With the exception of the OLS regression for D^B, all the Fstatistics are greater than the upper bound of the corresponding 5% critical value. (For D^B the F-

[19] Our $\Delta\ln(b)$ regressions suggest that the black market exchange rate is independent of deposit ratios. (Most black market transactions are probably in cash.) However, we did also look at deposit ratio regressions that omitted contemporaneous value of $\Delta\ln(b)$. The long-run parameter estimates from these equations were very similar to the ones reported below, which suggests that there is no endogeneity bias.

statistic falls between the upper and lower bounds.) This gives us some confidence that the long-run relationships between the possibly I(1) variables in equation (4) are statistically significant. In all the regressions, the maximum lag order for each variable z, T_z, has been chosen to minimize the Schwartz-Bayesian Information Criterion. (In some cases $T_z = 0$.)

The first part of Table 5 records regression diagnostic statistics: Hansen's (1992) joint test for parameter stability, LM tests for residual autocorrelation and ARCH, and χ^2 tests for normality of the residual distribution. In no case is there any evidence for mis-specification of the regression equations. The following parts of the table record the parameters estimated in each of the four regression equations, along with standard errors, t-ratios and partial R^2s. (In some cases there is some evidence of heteroskedasticity, so corrected standard errors are also recorded. The difference between corrected and uncorrected standard errors is typically very small.)

Individual regression coefficients are difficult to interpret economically, so Figures 5-8 summarise the regression coefficients by plotting the dynamic response of each asset to a permanent standard deviation shock to the level of ln(s), ln(b) and ln(v) respectively, and to a temporary standard deviation shock to h.[20] The plots are constructed on the assumption that all other variables are held constant, and are therefore entirely hypothetical. The following economic interpretation of our results refers to the response profiles in these figures and to the long-run coefficients reported in Table 4. We will consider the impact on asset ratios of each variable in turn.

[Figures 5-8 here]

1. **The official exchange rate, *s*.** As conjectured above a positive shock to s, i.e., a devaluation of the official exchange rate, causes a temporary increase in the ratio of foreign to domestic currency deposits: during the devaluation period the relative rate of return on foreign currency deposits is higher. As long as the black market rate b remains constant, there is nonetheless an eventual decrease in the ratio: after the devaluation has reduced the black market premium (b/s), Egyptians have more confidence in their own currency. This is true of all four asset ratios, applying equally to the business sector and the personal sector, to demand deposits and savings deposits. The response profile is also very similar for all four ratios, with a peak in the response profile four quarters on from the

[20] We plot the impact of a temporary shock to h because this variable is definitely stationary, so permanent shocks are impossible. The other three explanatory variables are (possibly) difference-stationary.

shock. The magnitude of the initial increase is somewhat greater for savings deposits than for demand deposits. A standard deviation shock to ln(s) will cause the savings deposit ratios to increase by about 10% within the year; for demand deposits the impact is about half as big. However, there is not such a large difference in the asymptotic effects of the shock. The reduction in the savings deposits ratio is slightly more than 10% and the reduction in the demand deposit ratio slightly less than 10%, but this difference is not statistically significant. In all cases the response profile flattens out after about 20 quarters.

2. **The black market exchange rate, *b*.** As anticipated, a positive shock to the black market rate increases the relative demand for foreign currency deposits. In the short run, as the exchange rate is depreciating, this is because the rate of return to foreign currency deposits is higher. In the long run the higher relative demand reflects the fact that for a given level of the official rate s, a depreciation in the black market rate entails a larger premium b/s. In all cases the short-run effect exceeds the long-run effect, although the shape of the response profile does vary a little across different asset ratios. In response to a standard deviation shock to b, the ratio for business sector demand deposits (D^B) will rise by about 12½% within four quarters, and then fall back gradually over the next 16 quarters to an asymptote about half as high as this. For the other three asset ratios the peak is a little lower, and there is hardly any subsequent reduction in the black market rate. Also, the asymptote is reached much more quickly. This suggests that for most assets, a permanent shock to the level of b matters more because of its consequences for the long-run black market premium than because of the implicit temporary change in the rate of currency depreciation.
3. **The political violence index, *v*.** This variable has a statistically significant impact on all four asset ratios. In the case of the two demand deposit ratios (D^B and D^P) a standard deviation shock to the index raises the relative demand for dollar assets by about 3½% on impact; this effect increases gradually over the next 20 quarters, by which time it has nearly doubled. In other words, an increase in violence will lead to an immediate switch away from domestic currency assets into foreign currency assets; if the increase turns out to be permanent, then the magnitude of asset switching will increase substantially. For the savings deposit ratios (S^B and S^P) the long-run effects are a little smaller, though still significant. A standard deviation shock to ln(v) will lead to an eventual increase in S^B of about 2½% and in S^P of about 4%. However, the initial effects of the shock are much greater than this: within the first four quarters the ratios will have increased by 6-7%. It is not immediately apparent why the dynamic responses of

demand deposits and savings deposits to an increase in violence should differ in this way. Nevertheless, all four asset ratios exhibit the same general long-run feature: an increase in violence reduces confidence in local currency assets.

4. **The conditional volatility of the rate of black market exchange rate depreciation, *h*.** All of the asset ratios respond in a very similar way to a temporary shock to h. As anticipated, there is an initial fall in the relative demand for dollar deposits. The magnitude of the initial effect following a standard deviation shock varies from about 4% to about 6%, depending on the asset in question. About half of this effect persists to the end of the fourth quarter, and by the 20th quarter virtually all of the effect has been dissipated. Unpredictability in the black market exchange rate does have some effect in dissuading businesses and households from holding foreign currency deposits.
5. **The interest rate differential, [*r*-r*].** As can be seen in Figure 4, the interest rate differential has exhibited far less variability than the rate of exchange rate depreciation in Egypt. For this reason, it is difficult to establish any strong relationship between asset demand and the differential: there just isn't enough variation in the [r^*-r] time series. For the two demand deposit ratios, the regression Schwartz Criterion is minimized when all lags of the interest rate term are excluded, so the variable does not appear in the first two regressions reported in Table 5. For the two savings deposit ratios there is a statistically significant relationship, with an elasticity of around 0.05. In the case of S^B this is only a short-run effect, but in the case of S^P the effect is also statistically significant in the long run. Increases in the differential will encourage a switch into foreign currency deposits, but the effect is quite small.

The regression results indicate that political violence is as important as economic factors in determining Egyptian investors' currency substitution decisions. The order of magnitude of a typical shock to the political violence index is as great as that of a typical shock to the official or black market exchange rate. In other words, Egyptian government policies that affect the level of violence are just as important as exchange rate management in influencing investors' decisions.

5. Conclusion

In the early 1990s the Egyptian government undertook a substantial monetary reform program that included a liberalization of foreign currency and capital markets: the authorities removed financially repressive interest rate controls and eliminated the black market exchange rate premium. One indicator of the degree of confidence in

government monetary policy is the fraction of domestic assets that are held in domestic currency as opposed to foreign currency. If local investors are confident that the government will ensure that the Egyptian Pound retains its value against major international currencies, then they are less likely to hold foreign currency deposits. It is therefore noteworthy that at the end of a reasonably successful reform programme the share of domestic currency assets in the total is little different from its initial level.

One might just ascribe the lack of a substantial response to cynicism on the part of private investors. However, econometric analysis reveals an alternative explanation. Investors *have* responded positively to the monetary reform: other things being equal, they *will* switch into domestic currency assets when the value of the Egyptian Pound is stable and there is little or no premium on the black market for foreign exchange. However, the positive impact of the monetary reform has been offset by an increase in politically motivated violent attacks by radical Islamist groups. Investors' behavior is highly sensitive to variations in the degree of violence over time, and the increase in violence has offset the effects of the reform programme.

These stylized facts lead to two conclusions. First, reform packages that concentrate solely on financial and economic factors are unlikely to be effective in promoting confidence in the local economy if they do not also deal with the causes of political conflict in the country concerned (in this case Egypt). Second, increases in violent conflict increase the demand for foreign currency, and in particular US Dollars, while at the same time reducing the demand for local currency. So the local seigniorage revenue tax base contracts and the tax base in industrialized countries – and in particular the US – expands. Given the negative international externalities known to result from radical Islamism in countries like Egypt, enlightened self-interest might direct the industrialized world to channel the extra implicit seigniorage revenue into social and economic aid designed to stabilize the Egyptian economy and remove the economic sources of political unrest.[21]

[21] It is unlikely that the sources of unrest are entirely economic (Hafez, 2000). But cross-country evidence indicates that other things being equal, poverty reduction lowers the probability of violent conflict (Collier and Hoeffle, 2001).

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Appendix 1: The Impact of Political Violence on Tourism Receipts and Foreign Exchange Reserves

Tourism receipts and foreign exchange rate reserve data are available only annually in Egypt, so statistical analysis of the data is subject to large standard errors. Nevertheless, using annual data for 1976-97, it is possible to estimate a regression of the form:

$$\Delta\ln(A)_t = a\cdot\Delta\ln(v)_t + b\cdot\ln(v)_{t-1} - g\cdot\ln(A)_{t-1} + u_t \qquad \text{(A1)}$$

where A is the detrended real dollar value of tourism receipts and v is the political violence index discussed in the main text, also detrended. u_t is a residual. The point estimate of b/g is –0.118, which suggests that in the long run violence reduces receipts; but with only 22 observations this figure is not statistically significant.

Similarly, one can estimate the impact of tourism receipts on the central banks' foreign exchange reserves by estimating a regression of the form:

$$\Delta\ln(F)_t = a_1\cdot\Delta\ln(A)_t + a_2\cdot\Delta\ln(A)_{t-1} + b\cdot\ln(A)_{t-1} + d\cdot\Delta\ln(F)_{t-1} - g\cdot\ln(F)_{t-1} + u_t \qquad \text{(A2)}$$

where F represents real detrended foreign exchange reserves. (The extra lag is necessary to ensure that the residual is not autocorrelated.) Here the estimate of b/g is 0.533, and this is significantly different from zero at the 5% level. There is a significant correlation between Egypt's tourism receipts and its central bank's foreign asset position.

Appendix 2: Definition of and Sources of the Quarterly Data for the Variables in the Model

$\ln(D^B)$	The (log) ratio of business sector foreign currency demand deposits to business sector domestic currency demand deposits, from the Central Bank of Egypt (1980-2001)
$\ln(D^P)$	The (log) ratio of household sector foreign currency demand deposits to household sector domestic currency demand deposits, from the Central Bank of Egypt (1980-2001)
$\ln(S^B)$	The (log) ratio of business sector foreign currency savings deposits to business sector domestic currency savings deposits, from the Central Bank of Egypt (1980-2001)
$\ln(S^P)$	The (log) ratio of household sector foreign currency savings deposits to household sector domestic currency savings deposits, from the Central Bank of Egypt (1980-2001)
$[r^*-r]$	The difference between the three-month *LIBOR* and the Egyptian three-month deposit rate, from the Central Bank of Egypt (1980-2001)
$\ln(s)$	The (log) official Egyptian Pound – US Dollar exchange rate, from IMF *International Financial Statistics*
$\ln(b)$	The (log) black market Egyptian Pound – US Dollar exchange rate, from *Picks Currency Yearbook*
$\ln(v)$	The (log) number of violent political incidents, interpolated from annual figures in Abul`ala (1998) and Hafez (2000)
h	The conditional volatility of $\Delta\ln(b)$; see Table 2

Table 1: ARCH regression: $\mathbf{D}\ln(b)_t = a_0 + a_1 \cdot t + \mathbf{S}_i a_i \cdot \mathbf{D}\ln(b)_{t-i} + u_t$

1. Mean Equation: $\Delta\ln(b)$

variable	coeff.	std. err.	t ratio	prob.
intercept	0.05195	0.00730	7.113	0.0000
trend/100	-0.08092	0.01604	-5.046	0.0000
$\Delta\ln(b)_{-1}$	-0.16861	0.07314	-2.305	0.0247
$\Delta\ln(b)_{-2}$	-0.09603	0.05041	-1.905	0.0618

2. Variance Equation: u^2

variable	coeff.	std. err.	t ratio	prob.
intercept/100	0.04758	0.02010	2.367	0.0213
u^2_{-1}	2.90750	0.99239	2.930	0.0048

Table 2: Standard Deviations of Variables' Growth Rates: 82(3)-96(4)

$\ln(D^B)$ = 0.163	$\ln(S^P)$ = 0.179	ln(s) = 0.112	ln(b) = 0.068
$\ln(D^P)$ = 0.109	$\ln(S^B)$ = 0.191	[r*-r] = 0.933%	ln(v) = 0.313

Table 3: Stationarity Test Statistics

variable	ADF t ratio	5% critical value	lag order	trend
$\ln(D^B)$	-1.685	-2.898	0	no
$\ln(D^P)$	-1.338	-2.898	0	no
$\ln(S^B)$	-2.361	-3.474	2	yes
$\ln(S^P)$	-2.229	-3.474	2	yes
[r*-r]	-2.104	-2.897	0	no
ln(b/s)	-1.649	-2.909	4	no
$\Delta\ln(b)$	-4.995	-3.482	4	yes

Lag orders and deterministic components of the ADF regressions are selected on the basis of the Schwartz Criterion.

Table 4: Long-Run Coefficients

Equation	ln(b/s)	ln(v)	[r*-r]	F-statistic	h x 100
$\Delta\ln(D^B)$ OLS	0.8448	0.1926	0.0000	F(3,47) = 03.7	-0.1149
$\Delta\ln(D^P)$ OLS	0.8217	0.1961	0.0000	F(3,48) = 08.2	-0.0708
$\Delta\ln(S^B)$ OLS	1.1624	0.0567	0.0000	F(3,36) = 22.3	-0.0462
$\Delta\ln(S^P)$ OLS	1.1050	0.1294	0.0666	F(4,37) = 20.9	-0.0822
$\Delta\ln(D^B)$ FIML	0.9780	0.1653	0.0000	F(3,44) = 07.4	-0.1158
$\Delta\ln(D^P)$ FIML	0.9014	0.1981	0.0000	F(3,39) = 13.7	-0.0710
$\Delta\ln(S^B)$ FIML	1.1466	0.0558	0.0000	F(3,36) = 32.4	-0.0510
$\Delta\ln(S^P)$ FIML	1.1128	0.0923	0.0448	F(4,37) = 29.7	-0.0788

Table 5: OLS Regression Results

"h.c.s.e" indicates standard errors corrected for heteroskedasticity.
"ins." indicates Hansen's (1992) parameter stability statistic.

1. Diagnostic Statistics

Equation	Hansen Joint Param. Inst.	Residual AR (p-value)	ARCH (p-value)	Residual Norm. (X^2_2)
$\Delta\ln(D^B)$	2.25705	0.2528	0.9867	0.2542
$\Delta\ln(D^P)$	2.66631	0.4322	0.5551	0.9584
$\Delta\ln(S^B)$	2.47979	0.2144	0.5742	0.1392
$\Delta\ln(S^P)$	2.63491	0.3379	0.8474	0.4566

2. $\Delta\ln(D^B)$ equation. Sample: 1981(3)-1996(4)

variable	coeff.	s.e.	t ratio	h.c.s.e.	ptl. R^2	ins.
intercept	-0.37485	0.11210	-3.344	0.12750	0.1922	0.07
$\Delta\ln(D^B)_{-1}$	-0.18697	0.13273	-1.409	0.11329	0.0405	0.09
$\Delta\ln(s)$	0.26264	0.21569	1.218	0.15936	0.0306	0.05
$\Delta\ln(s)_{-1}$	0.28555	0.24644	1.159	0.15787	0.0278	0.02
$\Delta\ln(s)_{-2}$	0.24348	0.22513	1.082	0.27953	0.0243	0.03
$\Delta\ln(s)_{-3}$	0.43412	0.21324	2.036	0.14086	0.0810	0.01
$\Delta\ln(b)$	0.54163	0.34127	1.587	0.32583	0.0509	0.20
$\Delta\ln(b)_{-1}$	0.54946	0.38061	1.444	0.28819	0.0425	0.12
$\Delta\ln(b)_{-2}$	0.68221	0.37951	1.798	0.44932	0.0643	0.20
$\Delta\ln(b)_{-3}$	0.58054	0.34438	1.686	0.28248	0.0570	0.09
$\Delta\ln(v)$	0.12290	0.06511	1.888	0.08021	0.0705	0.36
$\ln(D^B)_{-1}$	-0.19932	0.06879	-2.898	0.07506	0.1516	0.12
$\ln(b/s)_{-1}$	0.16838	0.06107	2.757	0.06262	0.1392	0.03
$\ln(v)_{-1}$	0.03838	0.01786	2.149	0.01718	0.0895	0.11
h	-2.29060	0.89899	-2.548	0.77276	0.1214	0.04

R^2 = 0.38624; Joint significance: F(14,47) = 2.1126; σ = 0.14826

3. $\Delta\ln(D^P)$ equation. Sample: 1981(3)-1996(4)

variable	coeff.	s.e.	t ratio	h.c.s.e.	ptl. R^2	ins.
intercept	-0.37830	0.08553	-4.423	0.09173	0.2895	0.04
$\Delta\ln(D^P)_{-1}$	-0.19692	0.11161	-1.764	0.12127	0.0609	0.19
$\Delta\ln(s)$	0.19388	0.13696	1.416	0.11927	0.0401	0.02
$\Delta\ln(s)_{-1}$	0.26715	0.15169	1.761	0.09891	0.0607	0.03
$\Delta\ln(s)_{-2}$	0.41208	0.13580	3.034	0.13505	0.1610	0.02
$\Delta\ln(s)_{-3}$	0.31926	0.13133	2.431	0.07422	0.1096	0.01
$\Delta\ln(b)$	0.25065	0.20254	1.238	0.19845	0.0309	0.08
$\Delta\ln(b)_{-1}$	-0.10418	0.21801	-0.478	0.17857	0.0047	0.18
$\Delta\ln(b)_{-2}$	0.67092	0.21570	3.110	0.23655	0.1677	0.05
$\Delta\ln(v)$	0.11340	0.03907	2.902	0.04638	0.1493	0.36
$\ln(D^P)_{-1}$	-0.21199	0.05713	-3.711	0.06456	0.2229	0.06
$\ln(b/s)_{-1}$	0.17419	0.03742	4.655	0.04287	0.3110	0.03
$\ln(v)_{-1}$	0.04158	0.01220	3.409	0.01221	0.1949	0.04
h	-1.50080	0.51751	-2.900	0.44484	0.1491	0.39

R^2 = 0.49617; Joint significance: F(13,48) = 3.6362; σ = 0.08872

Table 5 (Continued)

4. $\Delta\ln(S^B)$ equation. Sample: 1983(2)-1996(4)

variable	coeff.	s.e.	t ratio	h.c.s.e.	ptl. R^2	ins.
intercept	-0.26163	0.05053	-5.177	0.04707	0.4268	0.04
$\Delta\ln(S^B)_{-1}$	0.12861	0.07945	1.619	0.07695	0.0678	0.11
$\Delta\ln(s)$	0.29270	0.14419	2.030	0.09203	0.1027	0.03
$\Delta\ln(s)_{-1}$	0.97091	0.17202	5.644	0.15277	0.4695	0.02
$\Delta\ln(s)_{-2}$	1.08240	0.16158	6.699	0.19309	0.5549	0.02
$\Delta\ln(s)_{-3}$	0.55007	0.14893	3.693	0.10244	0.2748	0.02
$\Delta\ln(b)$	-0.26378	0.22798	-1.157	0.18038	0.0359	0.06
$\Delta\ln(b)_{-1}$	-0.32341	0.22595	-1.431	0.24129	0.0538	0.08
$\Delta\ln(b)_{-2}$	0.75333	0.22547	3.341	0.29291	0.2367	0.03
$\Delta[r^*-r]$	-0.00711	0.01823	-0.390	0.01359	0.0042	0.07
$\Delta[r^*-r]_{-1}$	0.04193	0.01858	2.257	0.01845	0.1240	0.02
$\Delta[r^*-r]_{-2}$	0.02972	0.01882	1.580	0.01655	0.0648	0.08
$\Delta\ln(v)$	0.27901	0.10812	2.580	0.11774	0.1561	0.03
$\Delta\ln(v)_{-1}$	-0.21842	0.15975	-1.367	0.13240	0.0494	0.08
$\Delta\ln(v)_{-2}$	0.27095	0.11290	2.400	0.10638	0.1379	0.26
$\ln(S^B)_{-1}$	-0.41213	0.05298	-7.780	0.06784	0.6270	0.03
$\ln(b/s)_{-1}$	0.47905	0.06254	7.659	0.07316	0.6197	0.01
$\ln(v)_{-1}$	0.02336	0.01066	2.191	0.00950	0.1177	0.05
h	-1.90370	0.59010	-3.226	0.67451	0.2243	0.15

R^2 = 0.77717; Joint significance: F(18,36) = 6.9755; σ = 0.08717

5. $\Delta\ln(S^P)$ equation. Sample: 1983(2)-1996(4)

variable	coeff.	s.e.	t ratio	h.c.s.e.	ptl. R^2	ins.
intercept	-0.37144	0.05182	-7.168	0.06524	0.5814	0.05
$\Delta\ln(S^P)_{-1}$	-0.09665	0.07091	-1.363	0.11161	0.0478	0.09
$\Delta\ln(s)$	0.49512	0.10578	4.681	0.07420	0.3719	0.05
$\Delta\ln(s)_{-1}$	0.70950	0.13602	5.216	0.14464	0.4237	0.02
$\Delta\ln(s)_{-2}$	0.66128	0.11684	5.660	0.13688	0.4640	0.01
$\Delta\ln(s)_{-3}$	0.27886	0.10767	2.590	0.10614	0.1535	0.05
$\Delta\ln(b)$	-0.07835	0.16207	-0.483	0.16289	0.0063	0.18
$\Delta\ln(b)_{-1}$	-0.18510	0.17971	-1.030	0.18965	0.0279	0.08
$\Delta\ln(b)_{-2}$	0.75378	0.17929	4.204	0.26178	0.3233	0.03
$\Delta\ln(b)_{-3}$	0.41891	0.17053	2.457	0.19070	0.1402	0.03
$\Delta[r^*-r]$	0.01823	0.01443	1.263	0.01545	0.0414	0.19
$\Delta[r^*-r]_{-1}$	0.02158	0.01464	1.474	0.01117	0.0555	0.05
$\Delta\ln(v)$	0.20432	0.04130	4.948	0.05785	0.3982	0.03
$\ln(S^P)_{-1}$	-0.28770	0.03786	-7.598	0.05248	0.6094	0.06
$\ln(b/s)_{-1}$	0.31791	0.04262	7.459	0.05387	0.6006	0.03
$[r^*-r]$	0.01917	0.00941	2.036	0.00854	0.1007	0.03
$\ln(v)_{-1}$	0.03722	0.01318	2.824	0.01447	0.1773	0.04
h	-2.36430	0.40853	-5.787	0.54995	0.4751	0.15

R^2 = 0.82033; Joint significance: F(17,37) = 9.9372; σ = 0.06627

Figure 1: Logs of Real Private Business Sector Deposits (in £10,000s at 1990 prices)

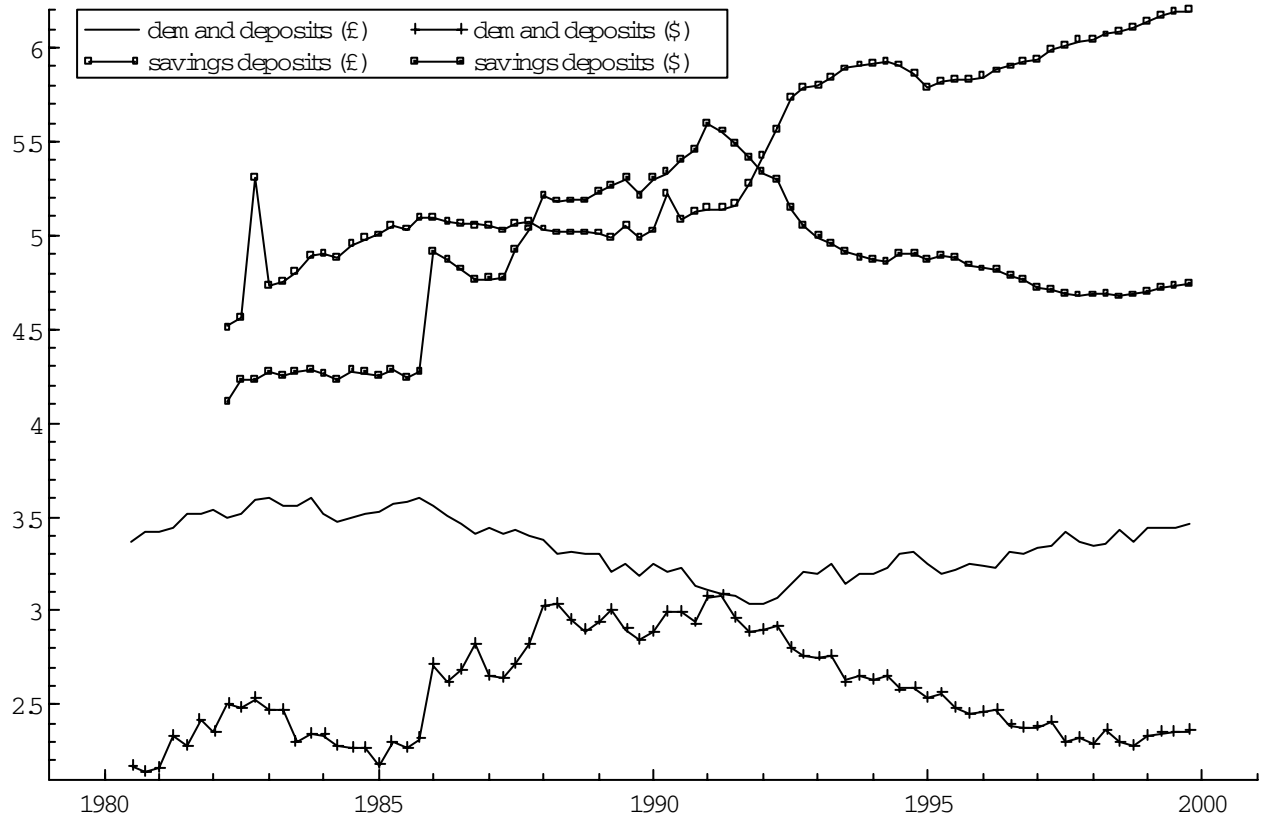

Figure 2: Logs of Real Personal Sector Deposits (in £10,000s at 1990 prices)

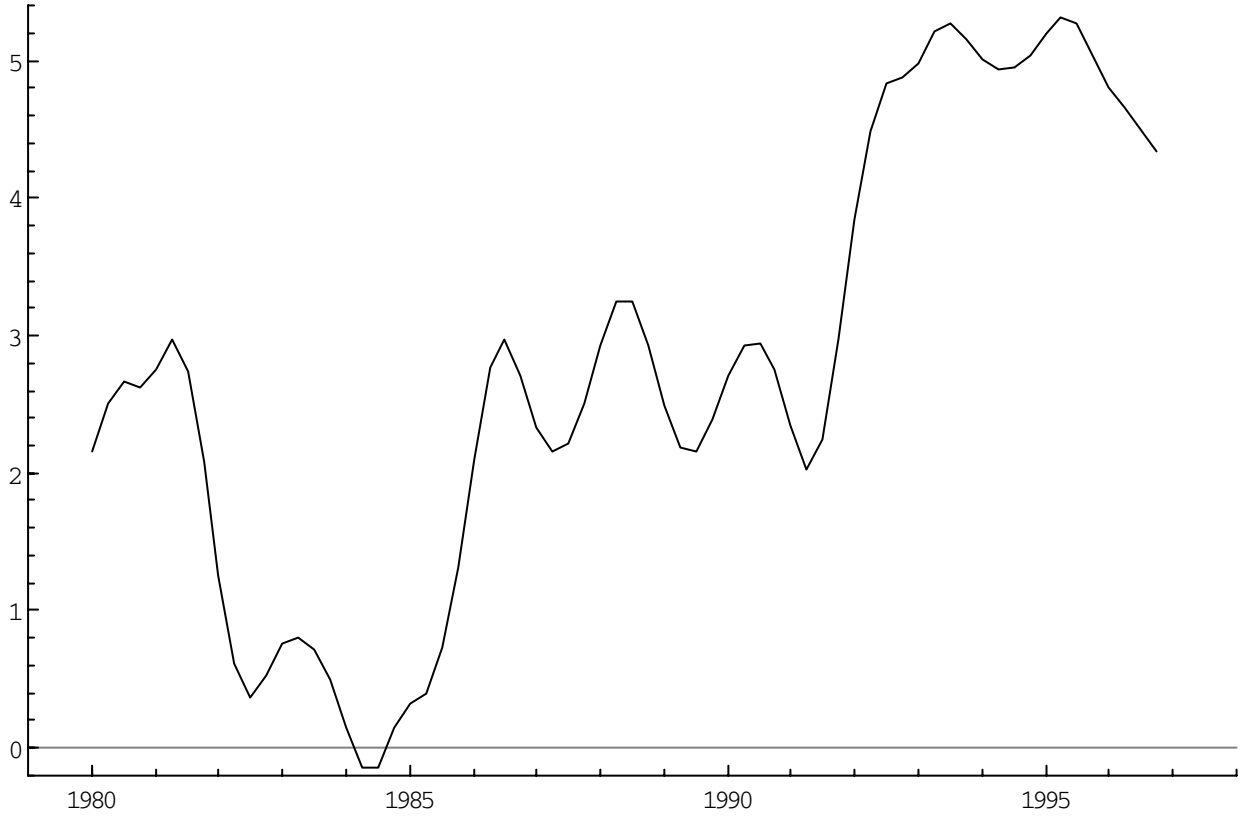

Figure 3: The Political Violence Index (Quarterly Interpolation)

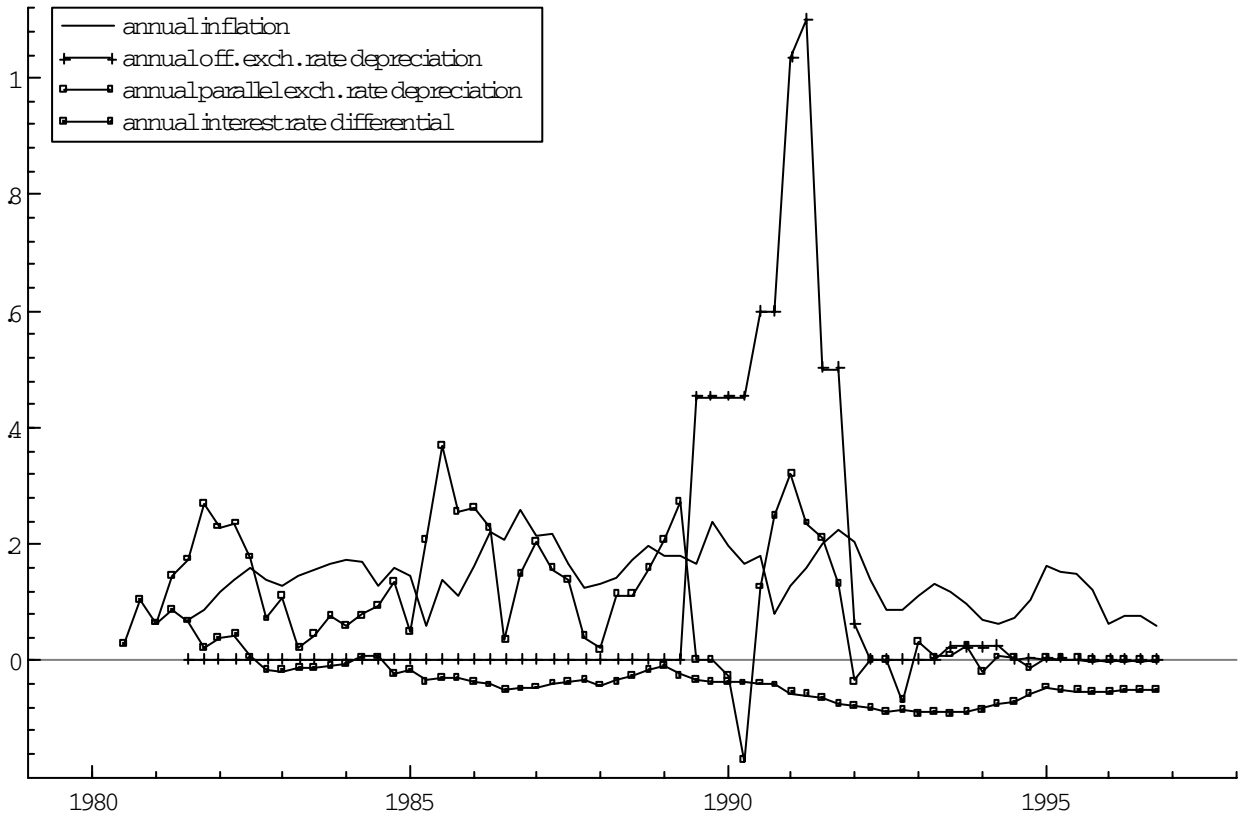

Figure 4: Annualized Inflation, Exchange Rate Depreciation and Interest Rates

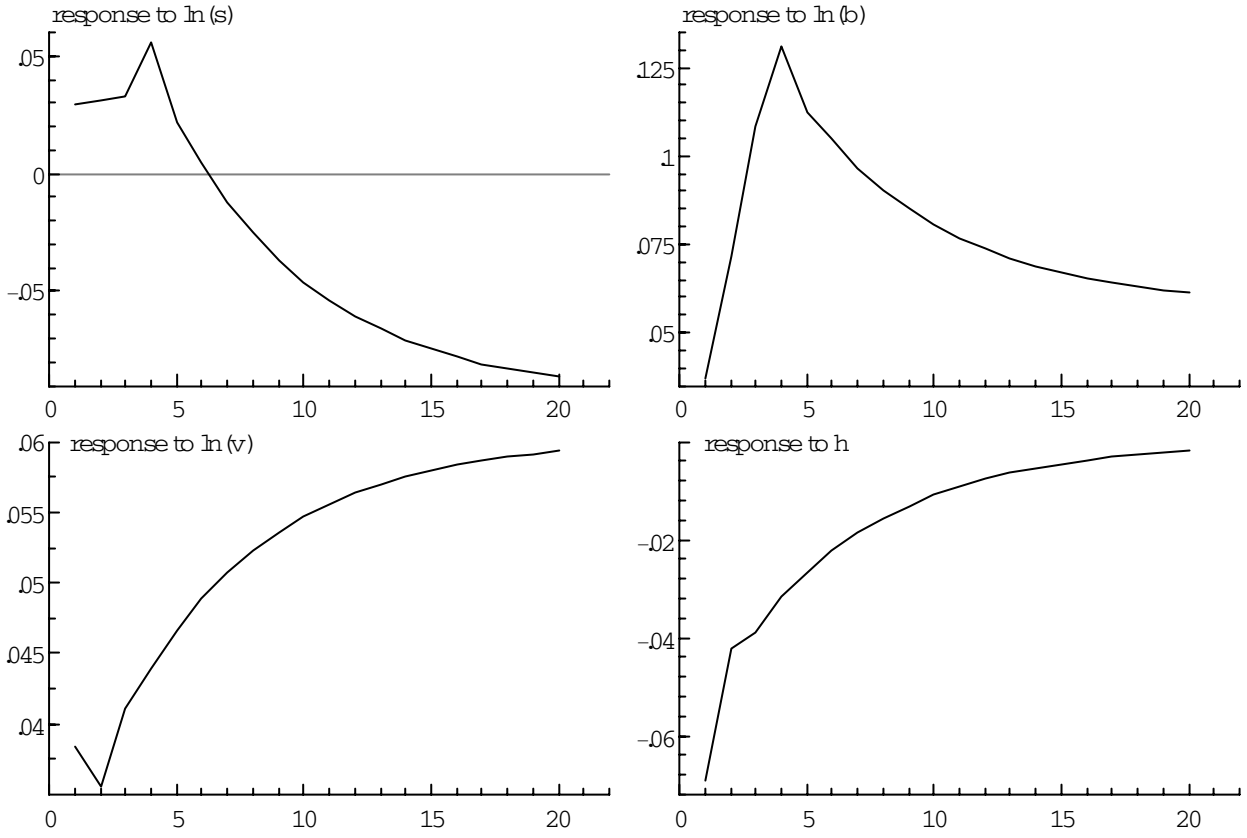

Figure 5: Impulse Responses: $\Delta \ln(D^B)$ Equation

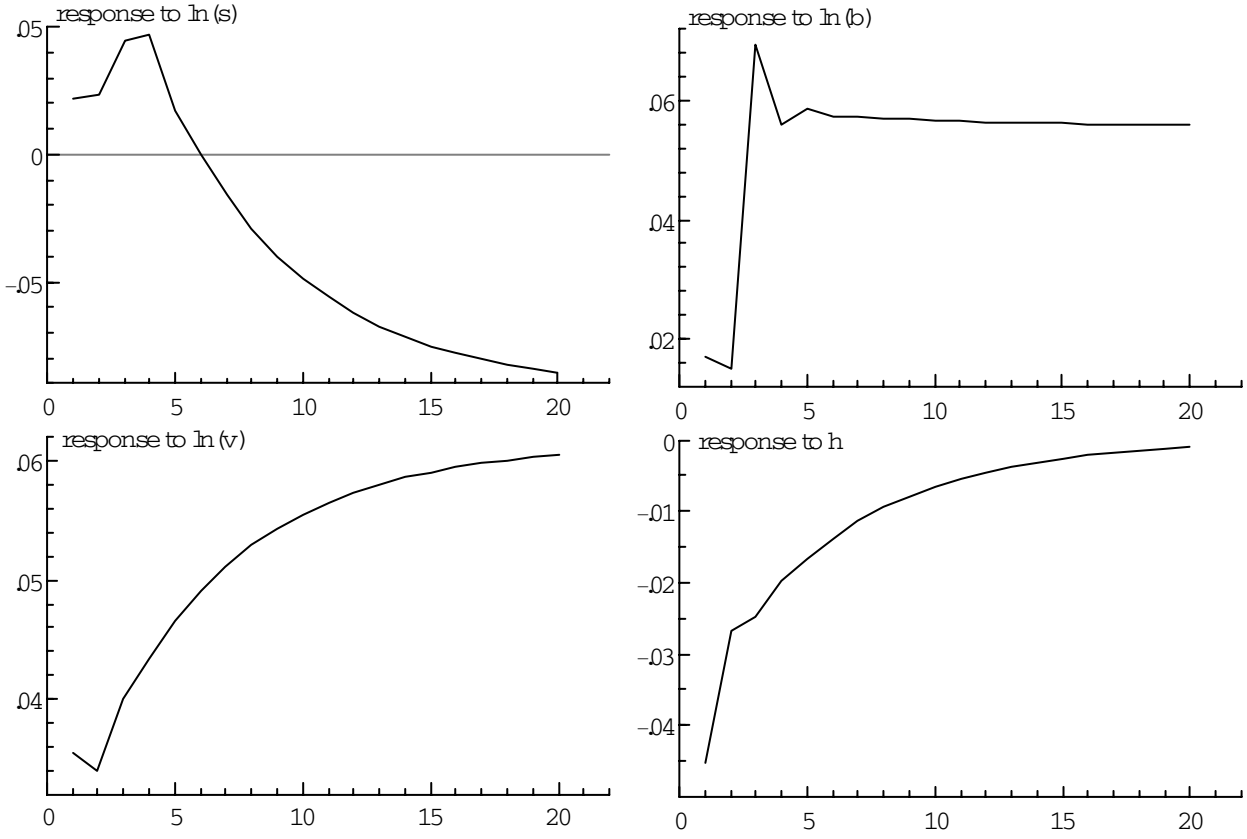

Figure 6: Impulse Responses: $\Delta \ln(D^P)$ Equation

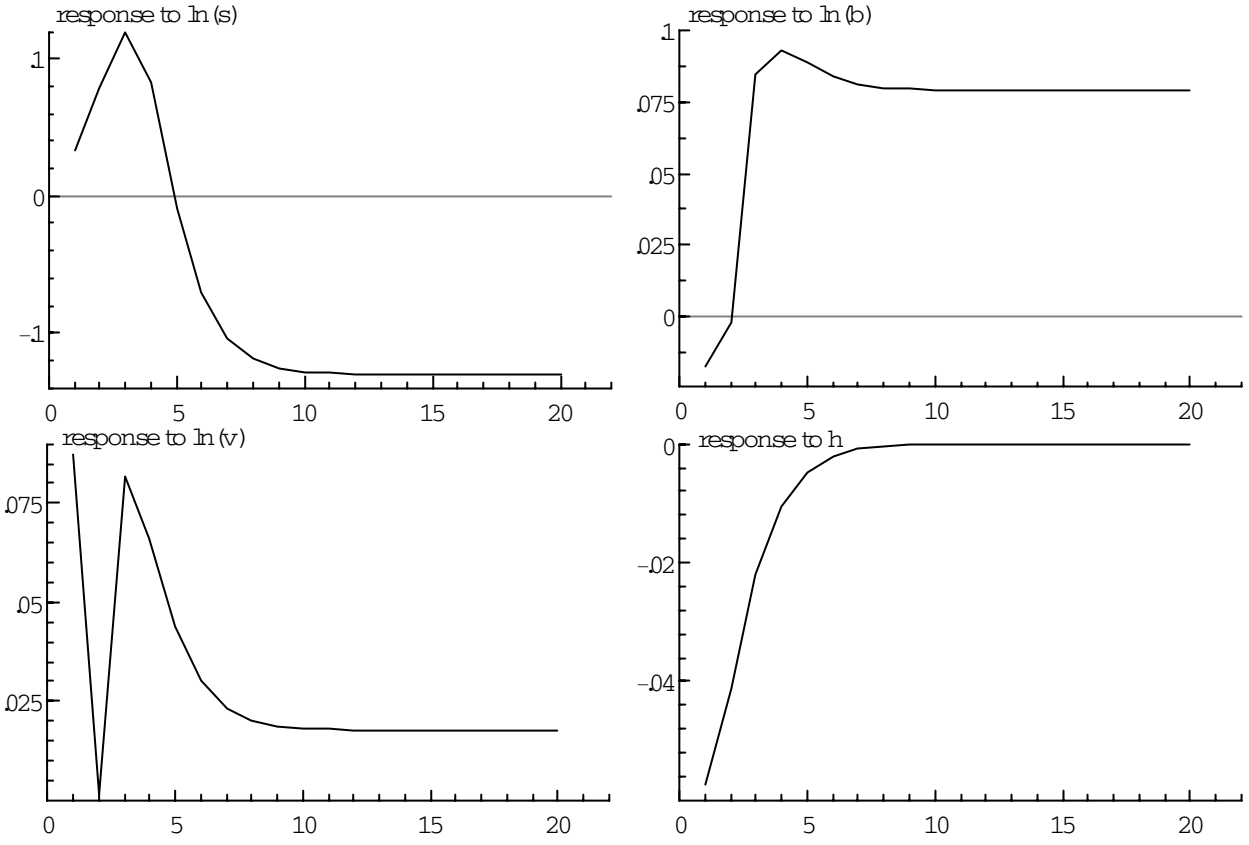

Figure 7: Impulse Responses: $\Delta \ln(S^B)$ Equation

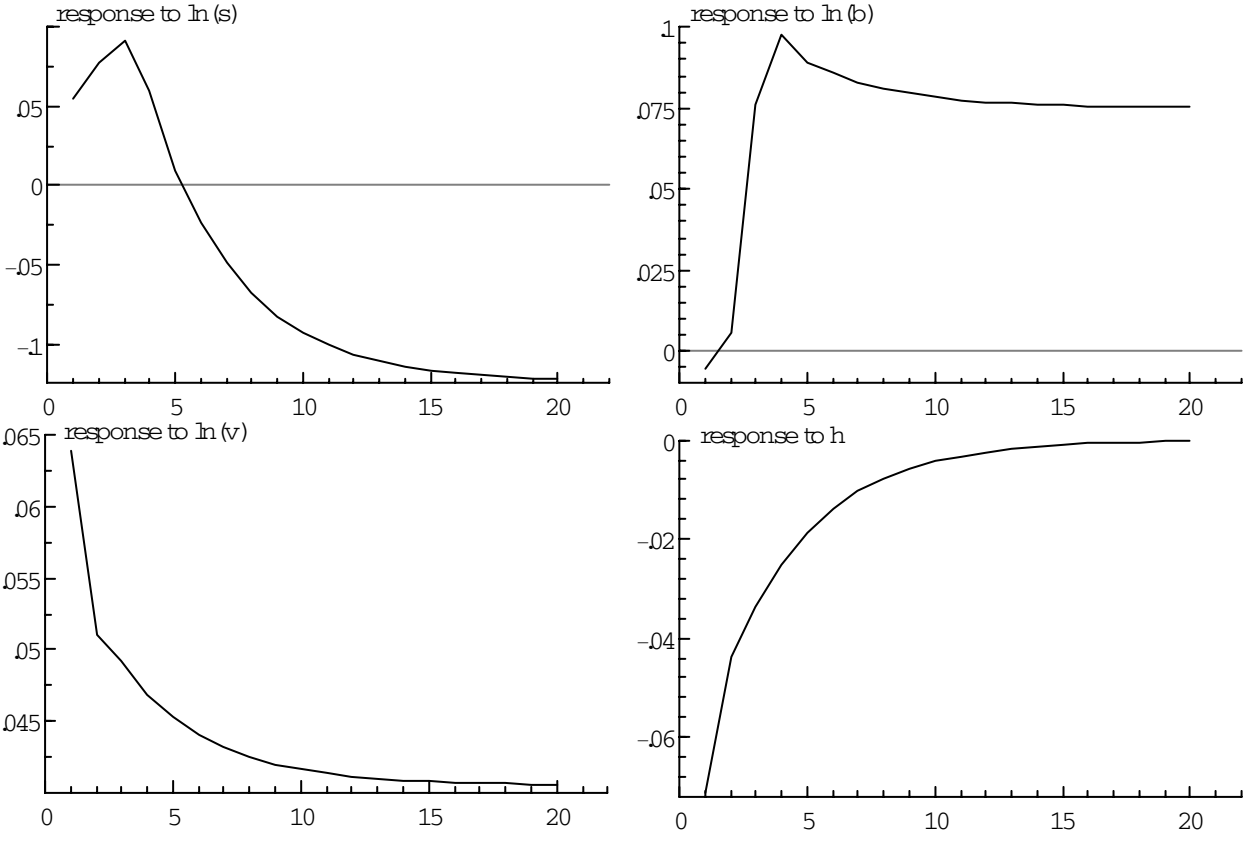

Figure 8: Impulse Responses: $\Delta \ln(S^P)$ Equation