Asset Prices and Current Account Fluctuations in Industrialized Economies *

Marcel Fratzscher[†]
European Central Bank

Roland Straub[‡]
European Central Bank

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Abstract

The paper analyses the effect of equity price shocks on current account positions for 16 industrialized countries in 1974-2007. It presents a DSGE model to derive restrictions for the identification of asset price shocks, and uses a Bayesian VAR with sign restrictions to empirically test for the effect of equity price shocks. Such shocks are found to exert a sizeable effect, with a 10% equity price increase for instance in the United States relative to the rest of the world worsening the US trade balance by 0.9 percentage points after 16 quarters. Moreover, the response of the trade balance to equity price shocks varies substantially across countries, and this heterogeneity appears to be linked in particular to the financial market depth and equity home bias of countries.

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Keywords: asset prices; current account; identification; Bayesian VAR; financial markets; home bias; industrialized economies.

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[†]M. Fratzscher: European Central Bank, Kaiserstrasse 29, D-60311 Frankfurt/Main, Germany. Email: Marcel.Fratzscher@ecb.int

[‡]R. Straub: European Central Bank, Kaiserstrasse 29, D-60311 Frankfurt/Main, Germany. Email: Roland.Straub@ecb.int

1 Introduction

Current account positions have hardly ever been so dispersed globally as they are today. It is not only that the largest economy, the United States, has been recording a current account deficit in excess of 5% for several years, but other industrialized countries, such as the UK and Australia, and some emerging markets and transition economies have similar or even larger deficits. By contrast, countries such as China, Japan and oil exporters register corresponding large trade surpluses. At the same time, asset prices have gone through a marked cycle over the past decade, with equity markets rising substantially in the second half of the 1990s and in 2002-06 and declining in 2001-02. The financial market crisis of 2007-08 has made the importance of asset prices for the global economy more than apparent. Despite the financial crisis, the role of asset prices for the global economy will most likely increase further as financial markets deepen and emerging economies liberalize and integrate.

The paper analyses the impact of asset price shocks on the current account. The objective is not only to grasp the magnitude of the effect of asset prices on trade, but also to understand the channels through which this effect materializes. Asset price shocks affect net exports through a wealth channel as households adjust saving and consumption decisions, and through an exchange rate and terms of trade channel, altering the relative prices of domestic and foreign goods. Equally importantly, asset prices may exert different effects across economies, as those with deeper yet more closed financial markets may respond more strongly.

The focus of the paper is on a broad set of industrialized countries and on the role of equity price shocks during the period 1974-2007. We employ a Bayesian VAR, following Canova and De Nicoló (2002), Uhlig (2005) and Peersman (2003), using sign restrictions to identify asset price shocks. This methodology not only requires imposing a relatively small and intuitive number of identification restrictions, but it also allows us to distinguish asset price shocks from other types of shocks, such as to technology, monetary policy or fiscal policy. Moreover, we derive the sign restrictions from a simple closed-economy DSGE model.

Our empirical findings show that asset prices exert a sizeable effect on the trade balance of countries. The channels through which equity prices influence net exports are both through wealth effects on private consumption and to some extent through the exchange rate. An increase in asset prices tends to have a positive impact on short-term interest rates and inflation, and leads to an appreciation of the real effective exchange rate and a sizeable increase in consumption. Moreover, we find a large degree of cross-country heterogeneity in the impulse response pattern. The US trade balance is among the most sensitive as net exports, on average, decline by 0.91 percentage points after 16 quarters in response to a 10% increase in US equity prices relative to the rest of the world. The trade balances of most other countries react substantially less.

Why is the effect of asset price shocks so different across countries and what explains the heterogeneity? We relate this cross-country pattern to financial openness and depth, trade openness as well as monetary policy and fiscal policy. While the analysis does not offer an empirical test of different hypotheses, its intention is rather to illustrate how different factors may influence the transmission of asset price shocks. As to the role of the financial channel, wealth effects of an asset price shock should be more important in an economy in which the size of financial wealth is larger, in which financial markets are more liquid and in which fewer households are liquidity constrained. Indeed, empirically the sensitivity of the trade balance appears to be more important in countries in which the equity wealth of households is relatively large, as well as in countries that have a higher home bias in their equity holdings. This applies for instance to the United States, which not only has a deep equity market, but where also a relatively large share of equity wealth is held domestically.

Another potential determinant is trade openness, as an asset price shock may have a larger effect on net exports through the wealth channel in more open economies. However, trade openness does not appear to be related in the expected way to the impact of asset price on net exports, and we find that the picture is also much more mixed for the role of monetary policy.

The paper is related to two fields of the literature. A first strand focuses on the drivers of the large and persistent global current account imbalances. Several papers emphasize the importance of a "saving glut" (Bernanke 2005) in many emerging markets and commodity-exporting countries, partly stemming from the underdevelopment and lack of integration of financial markets in those economies (Caballero et al. 2006, Ju and Wei 2006), as well as the increasing role of ensuing valuation effects on gross international asset positions (Gourinchas and Rey 2007, Lane and Milesi-Ferretti 2005) and a pre-cautionary motive as a rationale for high saving rates (e.g. Gruber and Kamin 2007, Chinn and Ito 2007). Other studies to explain the dispersion in current account positions stress the role of productivity differentials (e.g. Corsetti et al. 2006, Bussiere et al. 2005), expectations of an increasing share of US output in the world (Engel and Rogers 2006), or link it to the "great moderation" which has induced a decline in income volatility and uncertainty (Fogli and Perri 2006).

As to the second area, a vast literature identifies and measures the effect of price changes in various financial assets on private consumption.[1] In a different vein, Kraay and Ventura (2005) and Ventura (2001) argue that the sharp increase in asset prices over the past decade may largely reflect a bubble, which is rational because of market expectations that this increase may be highly persistent. This raises the issue of the structural interpretation of asset price shocks. Changes in asset prices that reflect e.g. productivity changes should clearly not be identified as asset price shocks. Along the lines of Kraay and Ventura, a bubble is the "purest" form of an asset price shock, and the 2007-08 financial market crisis provides further support that bubbles have been an empirically relevant phenomenon. As to empirical work, the role of asset prices for current account determination has received little attention so far. Fratzscher, Juvenal and Sarno (2007) focus on the United States, showing that equity market shocks and housing price shocks have been important drivers explaining more than 30% of the variation of the US trade balance, whereas exchange rates account for a much smaller share. This implies that an adjustment in the US dollar may do little to the US trade deficit, or that the US dollar decline would have to be very large as suggested by several studies (Blanchard et al. 2005, Obstfeld and Rogoff 2005, Krugman 2007).

The paper is organized as follows. Section 2 derives sign restrictions for the empirical identification of asset price shocks based on a closed-economy DSGE model with an explicit role for asset price fluctuations. The empirical model, benchmark results and various robustness tests are presented in section 3. A discussion of the results and of the potential role for financial depth, trade openness and monetary and fiscal policies follows in section 4. Section 5 concludes.

[1] For instance, Betraut (2002) and Case et al. (2005) find a significant effect of both equity wealth and housing wealth on private consumption.

2 Identification

In this section, we will present a DSGE model with an explicit role for asset price fluctuations for the derivation of our sign restrictions in the VAR. The model presented in the next section is a stochastic, finite-lifetime, New-Keynesian version of the model developed by Blanchard (1985) and Yaari (1965), and follows closely Nisticó (2006).

2.1 Households

The economy consist of an indefinite number of cohorts, facing a constant probability $\gamma \in [0,1]$ of dying each period, while every period a cohort of newborns of size γ enters the economy. The representative household of age j in this economy maximizes its lifetime utility by choosing purchases of the consumption good, $C_{j,t}$, and labour supply, $N_{j,t}$, given the following utility function:

$$E_t\left[\sum_{t=0}^{\infty}\beta^t(1-\gamma)^t\ (\log C_{j,t}-\log N_{j,t})\right], \tag{1}$$

Future utility is discounted in the model because of impatience (the intertemporal discount factor) indicated by β, and uncertain length of the lifetime, denoted by $(1-\gamma)$. Consumer have access to two types of financial assets: state-contingent bonds and equity shares issued by monopolistically competitive firms indexed by i. At the end of period t the representative agent of age j holds a portfolio of contingent claims with a one-period ahead nominal payoff $B_{j,t+1}$ in period $t+1$ - which he discounts according to the stochastic discount factor $F^j_{t,t+1}$- as well as a set of equity shares $Z_{j,t+1}(i)$ whose real price at period t is $Q_t(i)$. The income of the representative household is given by net labor income $W_t\,N_{j,t}-T_{j,t}$, where nominal W_t denotes wages, and $T_{j,t}$ are lump-sum taxes paid by households. The nominal financial wealth $\Omega_{j,t}$ carried over from the previous period, including nominal pay-offs on the contingent claims, $B_{j,t}$, and the return (price + dividend) on each share of the equity portfolio $Q_t(i)+D_t(i)$ has the form:

$$\Omega_{j,t}=\frac{1}{1-\gamma}\left[B_{j,t}+P_t\int_0^1\left[Q_t(i)+D_t(i)\right]Z_{j,t}(i)\ di\ \right] \tag{2}$$

Note that financial wealth $\Omega_{j,t}$ pays a gross return on the insurance contract that is redistributed among survived consumers. As a result, the maximization of the utility function at time 0 by the representative agent of age j is subject to a sequence of budget constraints of the form:

$$P_t\,C_{j,t}+E_t\left\{F^j_{t,t+1}B_{j,t+1}\right\}+P_t\int_0^1 Q_t(i)Z_{j,t+1}(i)\ di\leq\ W_t\,N_{j,t}-T_{j,t}+\Omega_{j,t} \tag{3}$$

and to a No-Ponzi game condition

$$\lim E_t\left\{F^j_{t,t+k}(1-\gamma)^k\Omega_{j,t+k}\right\}=0. \tag{4}$$

The corresponding first order conditions are denoted by:

$$C_{j,t}=\frac{W_t}{P_t}(1-N_{j,t}) \tag{5}$$

$$P_tQ_t(i) = E_t\left\{F^j_{t,t+1}P_{t+1}\left[Q_{t+1}(i) + D_{t+1}(i)\right]\right\} \tag{6}$$

$$(1 + r_t)\, E_t\left\{F^j_{t,t+1}\right\} = 1, \tag{7}$$

$$P_tC_{j,t} = \frac{1}{\Sigma}\left(\Omega_{j,t} + h_{j,t}\right), \tag{8}$$

Note that equation (8) is a forward-iteration of (3) and describes nominal individual consumption as a linear function of total nominal financial and human wealth $h_{j,t} = E_t\sum_{k=o}^{\infty}\left\{F^j_{t,t+k}(1-\gamma)^kW_{t+k}N_{j,t+k} - T_{j,t+k}\right\}$, and $\Sigma = [1-\beta(1-\gamma)]^{-1}$ is the reciprocal of the marginal propensity to consume out of financial wealth, which is common across cohorts. The linearity of the conditions allows us to aggregate across cohorts by averaging the corresponding generation-specific counterparts. Note that in equilibrium, the aggregate stock of outstanding equity for each intermediate good-producing firm must equal the corresponding total amount of issued shares, which we normalize to 1, that is $\int_j Z_t(i) = 1$ for all $i \in [0,1]$. Furthermore, we can define total real dividend payments and the aggregate real stock-price index as the integral over the continuum of firms $D_t = \int_0^1 D_t(i)\, di$ and $Q_t = \int_0^1 Q_t(i)\, di$. As a result, the demand side of the economy can be reduced to the following set of equations.

$$C_t = \frac{W_t}{P_t}(1 - N_t) \tag{9}$$

$$(\Sigma - 1)\, P_tC_t = \gamma E_t\left\{F_{t,t+1}\Omega_{t+1}\right\} + (1-\gamma)\Sigma E_t\left\{F_{t,t+1}P_{t+1}C_{t+1}\right\} \tag{10}$$

$$P_tQ_t = E_t\left\{F_{t,t+1}P_{t+1}\left[Q_{t+1} + D_{t+1}\right]\right\} \tag{11}$$

Note that if $\gamma = 0$, we are back to the standard infinite horizon model, with the corresponding standard intertemporal Euler equation. Finally, we define the 1-period riskless nominal interest rate r_t as:

$$1 = (1 + r_t)\, E_t\left\{F_{t,t+1}\right\} \tag{12}$$

resulting in a no-arbitrage condition between returns on nominal bonds and equity:

$$(1 + r_t) = \frac{E_t\left\{F_{t,t+1}\frac{P_{t+1}}{P_t}\left[\frac{Q_{t+1}+D_{t+1}}{Q_t}\right]\right\}}{E_tF_{t,t+1}} \tag{13}$$

2.2 Firms

There are two types of firms. A continuum of monopolistically competitive primary-goods producing firms indexed by $i \in [0, 1]$, each of which produces a single differentiated intermediate good, Y_t. The final-goods producing firms combine intermediate goods using a CES function to produce the final goods.

2.2.1 Primary-goods firms

Each primary-good producing firm i produces its differentiated output using a linear production function in labour

$$Y_t(i) = A_t N_t \tag{14}$$

The corresponding marginal cost is denoted by

$$MC_t = \frac{W_t}{P_t A_t} \tag{15}$$

Firms optimize expected profits using:

$$E_t \left[\sum_{k=0}^{\infty} F_{t,t+1} \left(\xi^k \, D_{t+k}(i) \right) \right],$$

Here, $F_{t,t+1}$ is the firm's discount rate while $D_t(i) = P_t(i) \, Y_t(i) - MC_t \, Y_t(i)$ are period-t nominal dividends yielded. Note that the firm's discount rate depends in this set up also on the parameter γ. Hence, we obtain the following first-order condition characterizing the firm's optimal pricing decision for its output sold:

$$E_t \left[\sum_{k=0}^{\infty} \xi^k \, F_{t,t+1} \left(\tilde{P}_t(i) - \frac{\theta}{\theta - 1} \, MC_{t+k} \right) \; Y_{t+k}(i) \right] = 0.$$

This expression states that in those intermediate-good markets in which price contracts are re-optimised, these are set so as to equate the firms' discounted sum of expected revenues to the discounted sum of expected marginal cost. In the absence of price staggering ($\xi = 0$), the factor $\theta/(\theta - 1)$ represents the markup of the price charged in domestic markets over nominal marginal cost, reflecting the degree of monopoly power on the part of the intermediate-good firms.

2.2.2 Final-good firms

Final good Y_t is produced using the following CES technology.

$$Y_t \; = \left(\int_0^1 \left(Y_t(i) \right)^{1 - \frac{1}{\theta}} \, di \right)^{\frac{\theta}{\theta - 1}},$$

As a result, the demand functions for individual goods, and the corresponding final good price aggregator have the following form:

$$Y_t \left(i \right) = \left(\frac{P_t(i)}{P_t} \right)^{-\theta} Y_t, \tag{16}$$

$$P_t \; = \left(\int_0^1 \left(P_t(i) \right)^{1 - \theta} \, di \right)^{\frac{1}{1 - \theta}}, \tag{17}$$

2.3 Equilibrium

Aggregating the production function across firms using (14)and using the individual demand function (16), we obtain the following condition for goods market equilibrium:

$$Y_t \int_0^1 \left(\frac{P_t(i)}{P_t} \right)^{-\theta} di = A_t N_t \tag{18}$$

We also assume that government expenditure is a stochastic fraction g_t of total output, i.e. $G_t = g_t Y_t$ that is entirely financed by lumps sum taxes T_t. As a result, we get:

$$Y_t = C_t + g_t Y_t \tag{19}$$

2.4 Monetary policy and exogenous shocks

The monetary authority is assumed to follow a Taylor-type interest-rate rule specified in terms of annual consumer-price inflation and quarterly output growth,

$$R_t = \phi_R R_{t-1} + (1 - \phi_R) \left[\phi_\Pi \left(\frac{P_t}{P_{t-1}} \right) + \phi_{g_Y} \left(\frac{Y_t}{Y_{t-1}} \right) \right] + \varepsilon_{R,t},$$

where the term $\varepsilon_{R,t}$ represents a serially uncorrelated monetary policy shock. The model is subject to further exogenous AR(1) processes to technology, government share of output, and non-fundamental asset price shocks[2] defined in log-linear term as :

$$a_t = \rho^a a_{t-1} + \eta_t^a \tag{20}$$

$$g_t = \rho^g g_{t-1} + \eta_t^g \tag{21}$$

$$\nu_t = \rho^\nu \nu_{t-1} + \eta_t^\nu \tag{22}$$

The models equilibrium dynamics is solved following log-linearization around the non-stochastic zero inflation steady-state.

2.5 Deriving the sign restrictions

In this section we discuss the set of sign restrictions that we derive from the impulse response functions of the presented model. Thereby, we apply the strategy discussed e.g. in Pappa (2004) and Peersman and Straub (2006), which requires the identification of model features that are robust to parameter uncertainty. Therefore, to capture parameter uncertainty, we define in the first step a sensible range for the structural parameter values. We set the range for the subjective discount rate β between [0.985, 0.995]. The Calvo parameters determining the degree of nominal price rigidities θ are allowed to vary in the interval $[0.5, 0.95]$. For the monetary policy rule, we delimit the range of parameters to cover the values generally discussed in the Taylor-rule literature. To ensure determinacy of the model, we restrict the inflation response to the range between $[1, 3]$ while the output response and the degree of interest rate smoothing are allowed to vary in the interval $[0, 1]$.

[2] The asset price shock is simply an exogenous factor affecting asset prices, apart from those endogenous factors discussed in the model, in the log-linear equilibrium. For a similar approach modelling equity premium shocks see Smets and Wouters (2003).

We allow the parameter driving the share of newborns which enter the economy γ to vary in the range $[0.01, 0.1]$. The range for degree of monopolistic competition ξ is set to $[0.5, 0.95]$, while the share of government spending in output is allowed to vary between $[0.1, 0.5]$. Finally, and in line with the empirical literature, we restrict the persistence of the shocks to the interval $[0.5, 0.99]$. The chosen intervals are also reported in Table 1.

In the next step, we assume that the structural parameters are uniformly distributed over the selected parameter range, and draw a random value for each parameter from the presented intervals and calculate the corresponding impulse response functions of the model. This exercise is repeated for 500,000 simulations. The median, 84th and 16th percentiles of all the conditional responses are shown in Figures 1-4.

Table 1: Parameter values and ranges

Parameter	**Description**	Range
β	discount factor	$[0.985, 0.995]$
γ	share of newborns entering the economy	$[0.01, 0.1]$
θ	degree of monopolistic competition in the goods market	$[3, 9]$
ξ	degree of nominal rigidities in the goods market	$[0.5, 0.95]$
G/Y	government spending ratio	$[0.1, 0.5]$
ϕ^{π}	coefficient on inflation in the monetary policy rule	$[1, 3]$
ϕ^{y}	coefficient on inflation in the monetary policy rule	$[0, 1]$
ρ^{r}	degree of interest rate smoothing	$[0, 1]$
ρ	persistence of shocks	$[0.5, 0.99]$

Recall that our goal is to find a set of sign restrictions that would allow us to differentiate the effects of non-fundamental asset price shocks from other shocks such as shocks to technology, asset-prices, government spending and monetary policy. We normalize all shocks to have a positive effect on consumption.

As shown in Figure 1, a positive technology shock induces a negative correlation between consumption and prices, and a fall in interest rates. The rise in productivity also leads to an increase in output, but a decline in marginal costs as indicated by (15). The decline in interest rates results from the Taylor rule, which in turn triggers the observed increase in consumption. As shown in Figure 2, positive asset price shocks follow a similar pattern as technology shocks, but, by contrast, lead to a fall in interest rates. The positive wealth shock, driven by the non-fundamental increase in asset prices, boosts consumption and inflation in the economy, resulting in a rise in nominal interest rates. As shown in Figure 3, a positive monetary policy shock (a reduction in short-term interest rates) implies an increase in consumption and is also associated a rise in inflation and asset prices. But the different direction of interest rate changes makes the monetary policy shock distinct from an asset price shock. Finally, in Figure 4 we present the effect of an exogenous fall in government spending, which in our model induces a reaction of both the demand side and supply side, having a positive impact on household wealth - as it reduces the absorption of goods created by wasteful government spending - and leading to a fall in labour supply[3]. The negative effect of government spending on aggregate demand is dampened by the corresponding rise in private consumption. As a result, despite the fall in output (not shown) the response

[3] Note that the log-utility assumption implies in our model that labor supply elasticity is denoted by $\frac{N}{1-N}$ where $N = \frac{1}{1+\mu\left(1-\frac{G}{Y}\right)}$.

of inflation is positive. The reaction of interest rates depend obviously on the weight that monetary policy attaches to output and inflation stabilization. In our Monte Carlo analysis, given the limited impact of government spending shocks on inflation, interest rates will fall under the wide majority of parametrization. The latter pattern of government spending shocks are in line with those found by Smets and Wouters (2005).

The presented impulse response functions of Figures 1-4 show patterns that allow us to identify asset-price shocks uniquely and distinguish them from these other three types of shocks. Table 2 summarizes the sign restrictions, as derived from the theoretical model, used for the identification in our structural VAR. Equally importantly, although we base our sign restriction identification strategy on the predictions of a theoretical model, we do not have to restrict the response of the current account and the real exchange rate, the main variables of interest. In this respect, we can let the data to speak for itself. In the next section, we describe in detail the empirical model.

Table 2: Theoretical Impulse Response Functions

	consumption	inflation	interest rate	asset prices
Technology shock	↑	↓		
Asset-price shock	↑	↑	↑	↑
Government spending shock	↑	↑	↓	
Monetary policy shock	↑	↑	↓	

3 Empirical Model and Results

In this section we present the specification of our structural VAR and the empirical results.

3.1 Model specification and data

Consider the following specification for a vector of endogenous variables Y_t:

$$Y_t = a + \sum_{i=1}^{n} A_i Y_{t-i} + B\varepsilon_t \tag{23}$$

where a is an $(n \times 2)$ matrix of constants and linear trends, A_i is an $(n \times n)$ matrix of autoregressive coefficients and ε_t is a vector of structural disturbances. Identification of (23) requires imposing n(n-1)/2 restrictions on B, which we do by using the sign restrictions shown in Table 2. Our sign restriction approach is based on Canova and De Nicoló (2002), Uhlig (2005) and Peersman (2003). The Appendix explains in detail the implementation of the sign restriction approach.

Our VAR includes six variables: $Y_t = [EQ \quad c \quad i \quad \pi \quad TB \quad REER]$, and comprises the variables identified in the closed-economy setting of the DSGE model of section 2, i.e. private consumption (c), short-term interest rates (i), inflation (π), equity returns (EQ), as well as the trade balance (TB) and the real exchange rate ($REER$). A caveat of the theoretical model of section 2 is that it is a closed-economy model that ignores the behavior and reaction of the rest of the world. Given that the great majority of countries has a substantial home bias is consumption and investment, the identifying restrictions should remain unchanged if we extend the model to an open-economy setting.

Our country sample focuses on 16 industrialized countries, which includes the G7 economies but also several other industrialized economies. The time period for the empirical analysis is 1974 to 2007, using quarterly data. We use 1974 as the starting point of the analysis as it is the start of the floating exchange rate period after the collapse of the Bretton Woods system. Of course, it would desirable to extend the country sample to emerging market economies (EMEs) as these are becoming increasingly important for the global economy and for global financial markets. In the robustness analysis, we extend our country sample by including an additional 28 EMEs and other industrialized countries. However, data availability limits the time period to 1990-2007 or 1995-2007. Appendix A lists the countries included.

For our empirical estimation we use relative variables, i.e. we specify each variable in domestic versus rest-of-the-world terms. More precisely, consumption c is the difference in log private consumption in the domestic economy and log private consumption in the rest of the world, both expressed in US dollar (using end-of-period exchange rates). Interest rates i are the percentage difference of domestic short-term (money market) rates from those in the rest of the world, while inflation π is the corresponding percentage difference in CPI inflation. The rest of the world for all three variables comprises the other 15 economies (in the benchmark sample) or other 43 countries (in the extended sample), with each country being weighted by its GDP share in the sample group.

Our preferred measure of asset prices EQ is the difference between domestic equity returns and foreign equity returns, both measured in local currency terms. We use local currencies to express returns, rather than US dollars, because we want to obtain a measure of asset price shocks that excludes exchange rate movements.[4] Moreover, we use shocks to equity prices, rather than changes to market capitalization, as our preferred measures because our primary interest is in the cross-country heterogeneity in the responses of the trade balance and the exchange rate. The rest-of-the-world group comprises the other countries in the sample, with each of these countries being weighted by their equity market capitalization. We use equity market capitalization weights, rather than GDP weights, because equity shocks are likely to affect the trade balance of countries partly through wealth effects, which in turn should be related to the size of financial wealth held by households, which is better proxied by market capitalization than GDP. In the section on the robustness analysis below we will discuss how alternative specifications of asset price shocks influence the empirical findings.

The trade balance TB is measured as a ratio to domestic GDP. We use the trade balance, rather than the current account, as we are interested in the effect of asset price shocks on net exports and want to exclude the effect on income. We use the total trade balance, rather than the trade balance only vis-a-vis the countries in the sample, though the results change little when using the extended country sample including EMEs; a point to which we return in the robustness analysis. As the final variable, the real effective exchange rate $REER$ uses trade weights for a broad set of partner countries, and is expressed in logs.

As to the data sources, the trade balance, consumption, inflation and short-term interest rates come from the IMF's International Financial Statistics (IFS). Equity returns and equity market capitalization are market indices and are sourced from Bloomberg while we took the real effective exchange rates from the IFS and the OECD. Appendix B lists the variables, their definitions and sources.

[4] Hau and Rey (2006) and Andersen et al. (2007), for instance, show that there tends to be a negative correlation between equity returns and exchange rate returns in the data for several industrialized countries.

3.2 Empirical results

Figures 5-19 shows the impulse responses of the six variables, for each of the countries in our country sample of industrialized countries, to a 10% positive equity market shock based on our Bayesian VAR model. The shaded areas indicate the 16 and 84 percentiles of the posterior distribution, following the convention in the literature. Table 3 summarizes the point estimates of the impulse responses at various time horizons.

As to the United States (Figure 5), a 10% increase in (relative) US equity prices leads to a substantial worsening in the US trade balance. The effect of the asset price shock increases gradually over time up to 16-20 quarters, when it reduces the US trade balances by 0.91 percentage points (p.p.) of US GDP. This effect of asset prices on the trade balance appears to stem from two channels, a first one through wealth effects and a second related to the exchange rate. The importance of wealth effects is evident by the strong and quite persistent increase in private consumption, which in turn leads to a higher demand for imports.

The role of the exchange rate channel is underlined by the significant appreciation of the REER after a positive asset price shock. The real appreciation is likely to be influenced both by the increase in domestic inflation and in domestic interest rates, though both of these responses are more short-lived as inflation and nominal interest rates revert back within 10 quarters. The rise in interest rates and real appreciation of the exchange rate is consistent with the evidence of the presence of a significant forward discount bias found in the literature (e.g. Engel 1996), as well as the more recent evidence stressing the importance of monetary policy or 'Taylor-rule' fundamentals for exchange rate determination (Engel and West 2005, Mark 2005, Clarida and Waldman 2007).[5]

Figures 6-19 shows the corresponding impulse responses for the other industrialized countries of the sample. With a few exceptions, the patterns of the impulse responses are quite similar across countries: the trade balance of most countries deteriorates in response to a positive equity price shock, though the permanence of this response is mostly somewhat lower than that of the United States. Moreover, the real exchange rate and private consumption always increases over the medium-run after an increase in equity prices, though again the permanence of this effect differs markedly across countries. The strength of the reaction of private consumption for most countries suggests that wealth effects constitute an important channel through which asset price shocks affect the trade balance of countries.

Nominal interest rates and inflation also rise in the short-run, though recall that we imposed this response for the first four quarters in order to identify equity price shocks. However, the magnitude and the persistence of the reaction of interest rates and inflation again differ substantially across countries. We also note and show the impulse responses for countries with somewhat puzzling results. For instance, the trade balance for the UK (Fig. 6), the Netherlands (Fig. 14) and Sweden (Fig. 17) improve in response to a positive domestic asset price shock. We will return to a detailed discussion of these and other cross-country differences in the subsequent section.

How robust are these findings across alternative specifications, country samples and time periods? We conduct several robustness tests on the benchmark model.[6] First, we

[5] Moreover, this positive effect of asset prices on the exchange rate is not necessarily inconsistent with the literature that finds a negative correlation between equity returns and exchange rate movements (Hau and Rey 2006, Andersen et al. 2007) as those correlations are unconditional ones and may stem from other types of shocks.

[6] We show here only the corresponding results for the United States, though the conclusions on the

use the current account instead of the trade balance, taking into account the fact that the dynamics of both can be considerably different for some countries. Figure 20 shows the impulse responses of this specification for the United States and confirms the basic thrust of the benchmark results as the current account declines considerably after a positive asset price shock. In fact, the reaction of the current account is somewhat stronger, as one would indeed expect, likely due to the decline not only of the trade balance but also of the income part of the current account.

Second, we use relative equity market capitalization,[7] rather than equity prices, to define asset price shocks. Figure 21 shows that the pattern of the impulse responses is unchanged for the United States (as well as for other industrialized countries, which are not shown for brevity reasons).

As a third robustness check, we shorten the time sample to 1990-2007 in order to allow for the possibility that asset price shocks may have become more important over time as countries have become more integrated financially and through trade. Figure 22 shows that the initial reaction of the trade balance is slightly larger and the response of private consumption significantly larger for the United States, lending some support to this conjecture. We will return to the discussion of various determinants and channels in the next section.

Finally, as a fourth robustness test we extend the country sample to include also emerging markets. Figure 23 again shows for the United States very similar impulse responses as for the benchmark specification, although the response of the trade balance is somewhat smaller at -0.6 to -0.7 p.p. after about 16 quarters.

In summary, asset price shocks appear to have a significant effect on the trade balance of countries, partly through wealth effects on domestic consumption and partly through an exchange rate channel that leads a real appreciation of the domestic currency. Moreover, there are substantial cross-country differences in the effect of equity price shocks, with the trade balance of the United States in particular exhibiting one of the largest reactions to asset price shocks.

4 Discussion

What explains the cross-country heterogeneity in the effects of asset price shocks? This section attempts to shed some light on this question by focusing on the role of financial openness and depth, trade openness as well as monetary policy and fiscal policy as potential determinants. It does not offer an empirical test of these different hypotheses, but its intention is rather to discuss how different factors may influence the transmission of an asset price shock to the trade balance of countries, and whether or not these are consistent with the findings of our empirical analysis.

Differences in *financial market depth* are one potential explanation that may account for the heterogeneity in the effect of asset price shocks. The channel via wealth effects of an asset price shock should be more important in an economy in which the size of financial wealth is larger, in which financial markets are more liquid and in which fewer households are liquidity constrained. Table 3 illustrates the heterogeneity of the point estimates at different time horizons, while Table 4 offers four proxies for financial market size and depth:

robustness checks are qualitatively similar for other countries.

[7] Relative equity market capitalization is measured as the difference in the log domestic market capitalization and the log rest-of-the-world market capitalization, both measured in US dollars. Using market exchange rate or PPP exchange rates does not change the findings in a meaningful way.

‘financial depth’ - defined as the ratio of equity market capitalization to GDP; ‘financial size’ - the ratio of domestic equity market capitalization to world equity market capitalization ($100 - w_i^*$); ‘financial domestic share’ - the share of domestic equity market capitalization owned by domestic investors; and ‘financial domestic size’ - the ratio of domestic equity market capitalization owned by domestic investors to domestic GDP.

For instance, the table shows - not surprisingly - that the United States has one of the deepest equity markets, not just in global size, but also as a share of domestic GDP. However, what matters for the role of the wealth channel is not the size of the domestic equity market, but how much of it is owned by domestic investors (and how much by foreigners). For the share of domestic equity market capitalization owned by domestic investors the United States is also special, as with 90% this share is the highest among all countries in the sample. For instance, although some small economies such as the Netherlands, Switzerland and Finland have larger equity markets than the US in terms of domestic GDP, much less of the equity wealth of the domestic market is owned by domestic investors in those countries.[8]

A second potential financial determinant of the strength of the wealth channel is the degree of *equity home bias*. Even if domestic equity markets are deep and liquid, consumption and thus the trade balance may be insensitive to an asset price shock if households have well diversified portfolios in which they hold a large share of their wealth in foreign assets. The larger the share of financial assets invested abroad - and thus the smaller the equity home bias and the higher risk sharing - the lower one would expect the response of the trade balance to be to a domestic equity price shock. Table 4 shows two, admittedly imperfect proxies of equity home bias: the ‘financial home weight’ for each country i - the share of domestic investors’ equity invested in domestic equity markets ($100 - w_i$); and the ‘financial home bias’, with $HB_i = 1 - w_i/w_i^*$ so that $HB_i = 0$ indicating no equity home bias and $HB_i = 1$ a perfect home bias.

Table 5 shows correlation coefficients between the potential financial determinants and the size of the impulse responses at 8 quarters and 16 quarters after a positive 10% equity market shock. The findings of the table indeed provide support for the hypotheses that financial depth and the degree of home bias play a role for the sensitivity of the trade balance to asset price shocks. For instance, focusing on the horizon of 16 quarters there is a sizeable negative correlation of -0.32 between the financial domestic share and the size of the trade balance response to equity shocks, suggesting that the trade balance is more sensitive to asset price shocks in economies in which domestic residents hold a lot of equity wealth (either as a share of the market or as a share of GDP). Similarly, the role of the home bias hypothesis is supported by the high negative correlations between the home weight or home bias and the response of the trade balance to equity shocks, suggesting that the wealth channel of asset price shocks is more important in economies where households have poorly diversified financial portfolios.

A third potential determinant is trade: ceteris paribus, an asset price shock should have a larger effect on net exports through the wealth channel in more open economies. However, Table 5 suggests that this may not be an important channel in practice as there is not a negative, but in fact a positive correlation between the response of the trade balance to equity shocks and trade openness (measured as the sum exports and imports over GDP). A telling example is again the US, which is relatively closed in terms of trade but whose trade balance is highly sensitive to asset price shocks.

[8] Several other proxies may of course be relevant. For instance, it would be useful to know cross-country differences in equity market participation in order to understand how many households hold equity wealth. Such data is, to the best of our knowledge, not available for a cross-section of countries.

A fourth factor may be the size of the government in the economy. The larger the size of the government in an economy, the lower may be the response of private consumption and thus the trade balance to an asset price shock.[9] There is mixed evidence for such a channel as the correlation between the response of net exports to asset price shocks and the size of the government (measured as the ratio of government consumption to GDP) is positive, but the correlation with consumption is negative.

A fifth candidate is monetary policy. An aggressive tightening of monetary policy in response to a positive asset price shock should dampen the effect of this shock on consumption and thus on net exports through the wealth channel, although, on the other hand, such a tightening may lead to an appreciation of the exchange rate and a worsening of the trade balance. Based on the impulse responses in Figures 5-19, there seems to be no clear-cut relationship between the response of private consumption, inflation and the trade balance across countries. This of course is no more than suggestive, and does not necessarily imply that monetary policy is not relevant for influencing the impact of asset prices on the trade balance. However, for instance for the United States Figures 5-19 suggest that the reaction of US short-term interest rates to asset price shocks is not systematically lower than that of other industrialized countries.

5 Conclusions

The paper has analyzed the effect of asset price shocks on the current account. Its focus has been on the experience of a broad set of industrialized countries, employing a Bayesian VAR with sign restrictions. We have used a simple theoretical closed-economy DSGE model in order not only to derived the identifying restrictions for asset price shocks, but also to ensure that we can distinguish this type of shock from other shocks, such as to productivity, monetary policy and government spending. The empirical evidence suggests that equity price shocks indeed exert a significant effect on the trade balance of countries, partly through a wealth channel of private consumption and partly via an exchange rate channel.

One of the central findings of the paper is the substantial cross-country heterogeneity that we detect in the sensitivity of the trade balance to asset price shocks. In particular the US trade balance seems to be among the most sensitive to relative asset price shocks, falling by 0.91 percentage points in response to a 10% increase in US equity prices relative to the rest of the world. By contrast, other countries' trade balances appear to be less responsive to asset price shocks.

What explains this cross-country heterogeneity? While the paper does not offer a systematic empirical analysis, the stylized facts suggest that financial depth and the degree of equity home bias are related to the sensitivity of the current account to asset prices. For instance, a given asset price shock tends to have a larger effect on the trade balance in countries with deep financial markets and in which domestic investors have a large home bias, i.e. hold a large share of their financial assets domestically. By contrast, trade openness does not appear to be related in the expected way to the impact of asset price on net exports, and the picture is also much less clear-cut for the role of monetary policy and the size of government consumption.

Many open questions remain and there are various future avenues for better understanding the importance of asset price shocks, both domestically and globally. In particular

[9] In a related vein, Corsetti and Mueller (2006, 2008) show for a set of OECD countries that the effect of fiscal policy shocks on net exports is smaller in a more closed economy due to terms of trade changes.

against the background of the financial market turmoil of 2007-08, the role of monetary policy for asset prices remains unclear. Similarly, the focus of the present paper has been only on equity markets. Extending the analysis to housing markets seems particularly relevant in the current financial market context. Another important avenue is to extend the analysis to emerging markets, which are rapidly becoming ever more important players in the global economy and international financial markets. We leave these avenues for future research.

6 Appendix: Implementation of the sign restrictions

In this appendix, we explain how we implement the sign restrictions in our sVAR. For a detailed explanation, we refer to Peersman (2003). Consider equation (23) in section (3). Since the shocks are mutually orthogonal, $E\left(\varepsilon_t \varepsilon_t^{'}\right) = I$, the variance-covariance matrix of equation (23) is equal to: $\Omega = BB'$. For any possible orthogonal decomposition B, we can find an infinite number of admissible decompositions of Ω, $\Omega = BQQ'B'$, where Q is any orthonormal matrix, i.e. $QQ' = I$. Possible candidates for B are the Choleski factor of Ω or the eigenvalue-eigenvector decomposition, $\Omega = PDP' = BB'$, where P is a matrix of eigenvectors, D is a diagonal matrix with eigenvalues on the main diagonal and $B = PD^{\frac{1}{2}}$. Following Canova and De Nicoló (2002) and Peersman (2003), we start from the latter in our analysis. More specifically, $P = \prod_{m,n} Q_{m,n}(\theta)$ with $Q_{m,n}(\theta)$ being rotation matrices of the form:

$$Q_{m,n}(\theta) = \begin{bmatrix} 1 & \cdots & 0 & \cdots & 0 & \cdots & 0 \\ \dots & \ddots & \dots & \dots & \dots & \dots & \dots \\ 0 & \cdots & \cos(\theta) & ... & -\sin(\theta) & \cdots & 0 \\ \vdots & \vdots & \vdots & 1 & \vdots & \vdots & \vdots \\ 0 & \cdots & \sin(\theta) & \cdots & \cos(\theta) & \cdots & 0 \\ \dots & \dots & \dots & \dots & \dots & \ddots & \dots \\ 0 & \cdots & 0 & \cdots & 0 & \cdots & 1 \end{bmatrix} \tag{24}$$

Since we have six variables in our model, there are $n(n-1)/2 = 15$ bivariate rotations of different elements of the VAR: $\theta = \theta_1, \cdots, \theta_{10}$, and rows m and n are rotated by the angle θ_i in equation (24). All possible rotations can be produced by varying the 15 parameters θ_i in the range $[0, \pi]$. For the contemporaneous impact matrix determined by each point in the grid, B_j , we generate the corresponding impulse responses:

$$R_{j,t+k} = A(L)^{-1} B_j \varepsilon_t \tag{25}$$

A sign restriction on the impulse response of variable p at lag k to a shock in q at time t is of the form:

$$R_{j,t+k}^{pq} \gtrless 0 \tag{26}$$

We impose the sign restrictions for $k = 4$ lags; choosing a different length, however, does not alter the findings in a meaningful way. Following Uhlig (2005) and Peersman (2003), we use a Bayesian approach for estimation and inference. Our prior and posterior belong to the Normal-Wishart family for drawing error bands. Because there are an infinite number of admissible decompositions for each draw from the posterior when using sign restrictions, we use the following procedure. To draw the "candidate truths" from the posterior, we take a joint draw from the posterior for the usual unrestricted Normal-Wishart posterior for the VAR parameters as well as a uniform distribution for the rotation matrices, using 1000 draws. We then construct impulse response functions. If all the imposed conditions of the impulse responses of the four different shocks are satisfied, we keep the draw. Decompositions that match only the criteria of three or less shocks are rejected. This means that these draws receive zero prior weight. Based on the draws kept, we calculate statistics and report the median responses, together with 84th and 16th percentile error bands.

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DATA APPENDIX

Appendix Table 1: Country sample

Benchmark sample	Extended sample with EMEs	
USA	Countries of benchmark	
UK	Argentina	Mexico
Germany	Austria	New Zealand
France	Brazil	Peru
Italy	Chile	Philippines
Canada	China	Poland
Japan	Colombia	Portugal
Australia	Czech Republic	Romania
Belgium	Greece	Russia
Denmark	Hong Kong	South Africa
Finland	Hungary	Singapore
Netherlands	India	Slovakia
Norway	Indonesia	South Korea
Spain	Ireland	Thailand
Sweden	Malaysia	Turkey
Switzerland		

Appendix Table 2: Data definitions and sources

Variable	Definition	Source
asset prices	difference between domestic equity returns and foreign equity returns, both measured in local currency terms	Bloomberg, mkt indices
trade balance	trade balance as a ratio to domestic GDP	IFS
current account	current account as a ratio to domestic GDP	IFS
REER	log real effective exchange rate using trade weights for a broad set of partner countries	IFS, OECD
consumption	difference in log private consumption in the domestic economy and log private consumption in the rest of the world, both expressed in US dollar (using end-of-period exchange rates)	IFS
inflation	percentage difference of domestic CPI inflation from that in the rest of the world	IFS
interest rate	percentage difference of domestic short-term (money market) rates from those in the rest of the world	IFS, OECD
Financial depth	ratio of market capit. to GDP	Bloomberg, CPIS
Financial size	ratio of dom. market capit. to world market capit. (1-w*)	Bloomberg, CPIS
Fin. dom. share	share of market capit. owned by dom. residents	Bloomberg, CPIS
Fin. dom. size	ratio of market capit. owned by dom. residents to GDP	Bloomberg, CPIS
Fin. home weight	domestic investors' share of equity invested in dom. equity market (1-w)	Bloomberg, CPIS
Fin. home bias	equity home bias: HB = 1- (w/w*)	Bloomberg, CPIS
Trade openness	ratio of exports plus imports to GDP	IFS
Size of governm.	ratio of government consumption to GDP	IFS, OECD
Real GDP growth	average growth rate p.a.	IFS
Productiv. growth	average growth rate p.a.	OECD
PPP weight	GDP weight in the world in PPP terms	OECD, WEO
PPP weight change	% change between 1990 and 2007	OECD, WEO

Notes: The variables in the VAR are quarterly over the period Q1/1974 – Q2/2007. The determinants are expressed in percentage terms and are averages over the period 2000-2007, except for the CPIS variables for which we take the 2003 figures.

Table 3: Impulse responses to a 10% domestic asset price shock

	USA	UK	Germany	France	Italy	Canada	Japan	Australia	Belgium	Denmark	Finland	Netherl.	Norway	Spain	Sweden	Switzerl.
1 quarter																
trade balance	-0.36	1.28	-0.09	-0.17	-0.70	-0.17	0.28	-0.31	0.57	-0.29	0.01	-0.17	-0.04	0.18	0.12	-0.06
REER	3.12	2.72	-0.66	0.62	0.95	1.62	3.43	3.89	0.77	0.55	0.12	-1.11	0.76	1.37	-0.29	0.18
consumption	4.88	4.37	0.80	4.34	4.57	3.57	4.06	3.97	6.58	1.45	0.61	10.20	1.23	1.86	3.62	1.02
inflation	0.75	2.48	0.71	0.81	1.01	1.23	1.69	1.57	0.72	2.70	0.50	2.19	0.34	0.41	1.06	1.33
interest rate	1.88	4.81	0.87	1.41	1.41	2.25	1.83	1.89	1.67	1.48	0.75	6.40	1.62	1.24	2.08	1.99
equity market	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
8 quarters																
trade balance	-0.66	0.28	-1.02	-0.58	-0.43	-0.04	0.21	-0.17	0.53	-0.76	-0.43	0.47	-0.56	-0.11	0.45	-0.10
REER	5.11	6.11	3.10	0.47	2.70	6.79	11.26	7.87	1.78	2.22	2.22	1.23	0.63	1.75	-1.49	2.06
consumption	7.09	5.19	9.31	0.75	2.94	9.59	13.13	8.36	2.83	6.72	3.43	13.14	0.97	4.76	-1.57	3.87
inflation	0.43	-1.25	0.24	0.29	0.67	0.06	0.38	0.81	-0.07	-0.22	0.04	1.42	0.62	-0.49	-1.39	-0.10
interest rate	0.69	-0.15	0.83	0.59	1.40	0.10	0.03	1.03	0.19	0.14	0.35	3.18	0.38	0.38	-0.15	0.05
asset prices	6.37	-0.70	0.70	-2.04	5.78	12.04	11.38	0.39	0.20	6.52	5.38	20.69	3.09	2.46	-1.98	11.92
16 quarters																
trade balance	-0.91	-0.16	-0.87	-0.06	0.32	-0.61	-0.25	0.19	0.04	-1.05	-0.63	0.78	-0.73	-0.34	0.36	-0.05
REER	4.64	1.99	1.47	-0.16	1.38	4.83	5.39	4.70	0.37	1.10	1.51	2.63	0.69	0.26	-4.15	-0.61
consumption	7.29	-0.10	5.38	-0.31	1.01	6.74	7.99	3.94	0.18	4.93	2.53	12.11	0.17	1.82	-4.81	-0.52
inflation	-0.03	-0.40	0.07	0.12	0.12	0.07	0.30	0.04	-0.11	0.19	0.01	1.05	0.32	-0.14	0.75	-0.55
interest rate	0.38	0.16	0.16	0.28	1.02	0.18	0.08	-0.02	-0.03	0.01	0.25	1.58	0.46	-0.41	-1.15	-0.34
asset prices	0.79	2.38	2.00	-0.16	1.63	10.86	-0.80	1.09	0.65	-3.29	0.79	18.68	-1.01	3.64	12.63	19.36

Notes: The table shows the responses of the various variables 1 quarter, 8 quarters and 16 quarters after a positive 10% shock to relative equity prices, i.e. a 10% rise of domestic asset prices relative to those in the rest of the world.

Table 4: Potential determinants of the heterogeneity in country responses to asset price shocks

	Financial depth	Financial size	Fin. dom. share	Fin. dom. size	Fin. home weight	Fin. home bias	Trade openness	Size of governm.	Real GDP growth	Productiv. growth	PPP weight	PPP weight change
Australia	96.1	1.8	80.0	76.9	83.8	83.5	41.6	18.1	3.23	1.21	1.05	-0.04
Belgium	63.8	0.7	76.4	48.8	47.3	46.9	169.0	22.7	2.01	1.52	0.58	-0.15
Canada	87.1	2.8	79.8	69.6	74.9	74.2	75.3	19.2	3.94	1.38	1.80	-0.22
Denmark	55.0	0.4	75.3	41.4	64.9	64.8	91.0	25.9	1.96	1.45	0.31	-0.07
Finland	124.2	0.7	50.0	62.1	66.5	66.3	76.1	21.5	1.24	1.52	0.28	-0.07
France	77.8	4.6	70.4	54.7	73.6	72.3	54.0	23.6	2.00	1.52	3.08	-0.95
Germany	43.5	3.5	68.9	30.0	62.9	61.5	73.1	18.8	1.44	1.52	4.13	-1.43
Italy	46.2	2.3	77.2	35.7	58.2	57.2	52.8	19.7	1.36	1.52	2.91	-1.19
Japan	76.6	11.2	85.0	65.2	90.3	89.1	24.8	17.7	1.73	2.47	6.58	-2.58
Netherlands	113.4	2.0	44.3	50.3	33.9	32.6	131.1	24.1	1.92	1.52	0.92	-0.19
Norway	46.0	0.4	81.1	37.3	48.9	48.7	72.7	20.7	2.53	2.54	0.32	-0.02
Spain	55.8	1.7	71.7	40.0	87.4	87.2	58.2	17.8	3.64	1.52	1.87	-0.18
Sweden	97.1	1.0	72.5	70.4	59.3	58.9	89.1	27.1	3.03	2.57	0.48	-0.11
Switzerland	237.6	2.6	63.8	151.6	50.5	49.2	88.9	11.5	1.97	1.27	0.43	-0.19
United Kingdom	134.6	8.6	65.3	87.9	69.7	66.8	56.3	20.7	2.74	2.13	3.32	-0.62
United States	111.7	43.5	90.0	100.6	86.2	75.6	25.6	15.5	2.54	2.49	20.17	-1.86

Notes: '*Financial depth'* is defined as the ratio of equity market capitalisation to GDP; '*financial size*' as the ratio of domestic equity market capitalisation to world equity market capitalisation (100-w_i*); '*financial domestic share*' as the share of domestic equity market capitalisation owned by domestic investors; '*financial domestic size*' as the ratio of domestic equity market capitalisation owned by domestic investors to domestic GDP; '*financial home weight*' as the share of domestic investors' equity invested in domestic equity markets (100-w_i); '*financial home bias*' as $HB_{i,t} = 1 - w_i / w_i^*$, with $HB_i=0$ indicating no equity home bias and $HB_i=1$ a perfect home bias; '*trade openness*' as the ratio of exports plus import to GDP; '*size of government*' as the ratio of government consumption to GDP; '*real GDP growth*´ and '*productivity growth*' as average annual growth rates; '*PPP weight*' as the ratio of domestic GDP to world GDP at PPP exchange rates; '*PPP weight change*' the total percentage change between 1990 and 2007. All numbers are in percent and are averages over the period 2000-2007 if not indicated otherwise.

Table 5: Correlation pattern between impulse responses and potential determinants

	Financial depth	Financial size	Fin. dom. share	Fin. dom. size	Fin. home weight	Fin. home bias	Trade openness	Size of governm.	Real GDP growth	Productiv. growth	PPP weight	PPP weight change
8 quarters												
trade balance	0.30	-0.30	-0.16	0.17	-0.36	-0.31	0.52	0.49	0.29	0.23	-0.40	0.37
REER	0.11	0.29	0.48	0.41	0.59	0.58	-0.53	-0.70	0.14	0.14	0.31	-0.50
interest rate	0.00	-0.06	-0.48	-0.32	-0.54	-0.56	0.25	0.10	-0.30	-0.38	-0.05	0.09
inflation	-0.16	0.10	-0.08	-0.23	-0.15	-0.18	0.00	-0.28	-0.37	-0.45	0.15	-0.22
consumption	0.06	0.17	-0.01	0.04	0.10	0.08	-0.13	-0.49	-0.02	-0.08	0.20	-0.36
16 quarters												
trade balance	0.05	-0.47	-0.32	-0.18	-0.56	-0.51	0.40	0.62	-0.03	-0.10	-0.51	0.37
REER	0.16	0.41	0.30	0.34	0.41	0.37	-0.40	-0.75	0.05	-0.11	0.42	-0.41
interest rate	0.08	0.10	-0.37	-0.19	-0.41	-0.46	0.10	-0.12	-0.47	-0.35	0.11	-0.17
inflation	0.08	-0.18	-0.37	-0.16	-0.51	-0.50	0.30	0.55	-0.14	0.15	-0.18	0.08
consumption	0.11	0.31	-0.10	0.04	0.00	-0.05	-0.07	-0.45	-0.11	-0.13	0.33	-0.33

Notes: The table shows the correlation coefficient between the impulse responses (of the various variables 8 quarters and 16 quarters after a positive 10% equity price shock) and the potential determinants. The outliers Denmark and Norway are excluded from the calculations.

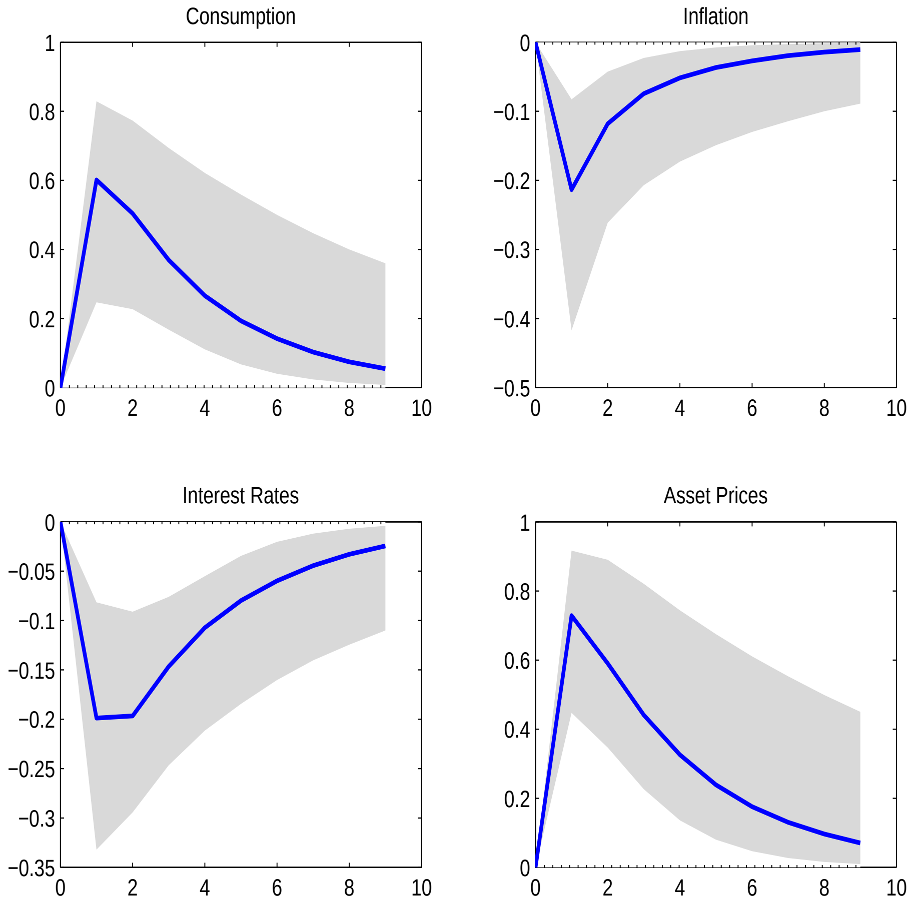

Figure 1: Theoretical Impulse Response following a Positive Technology Shock

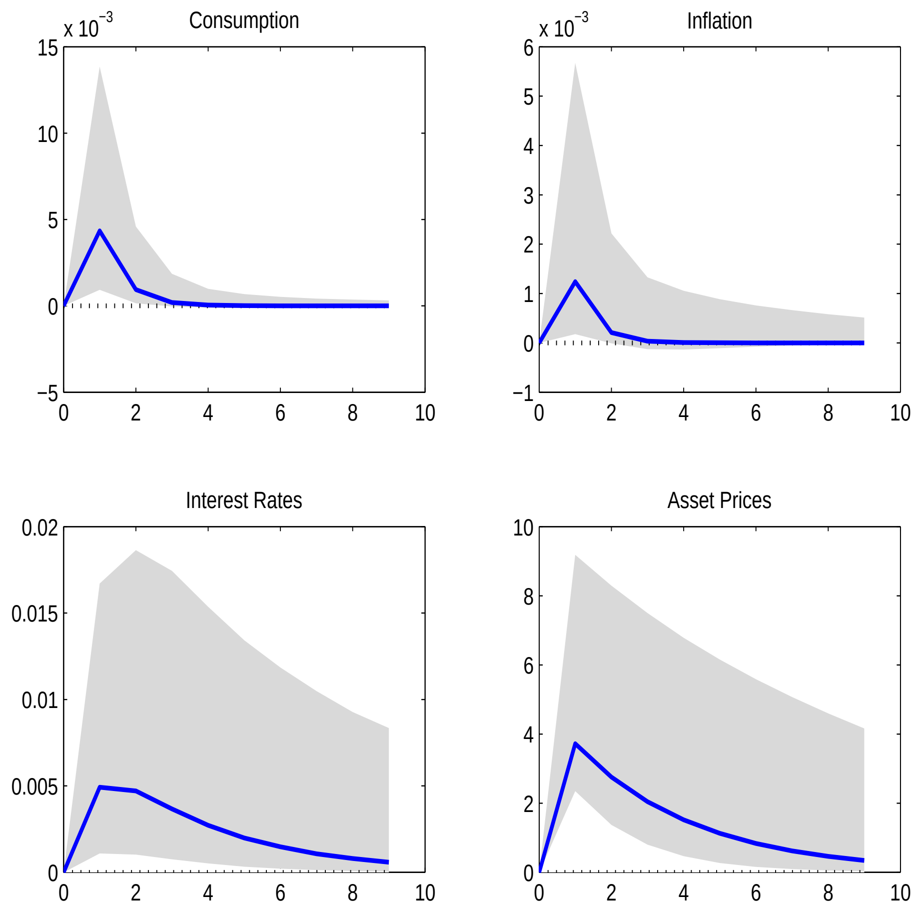

Figure 2: Theoretical Impulse Response following an Positive Asset Price Shock

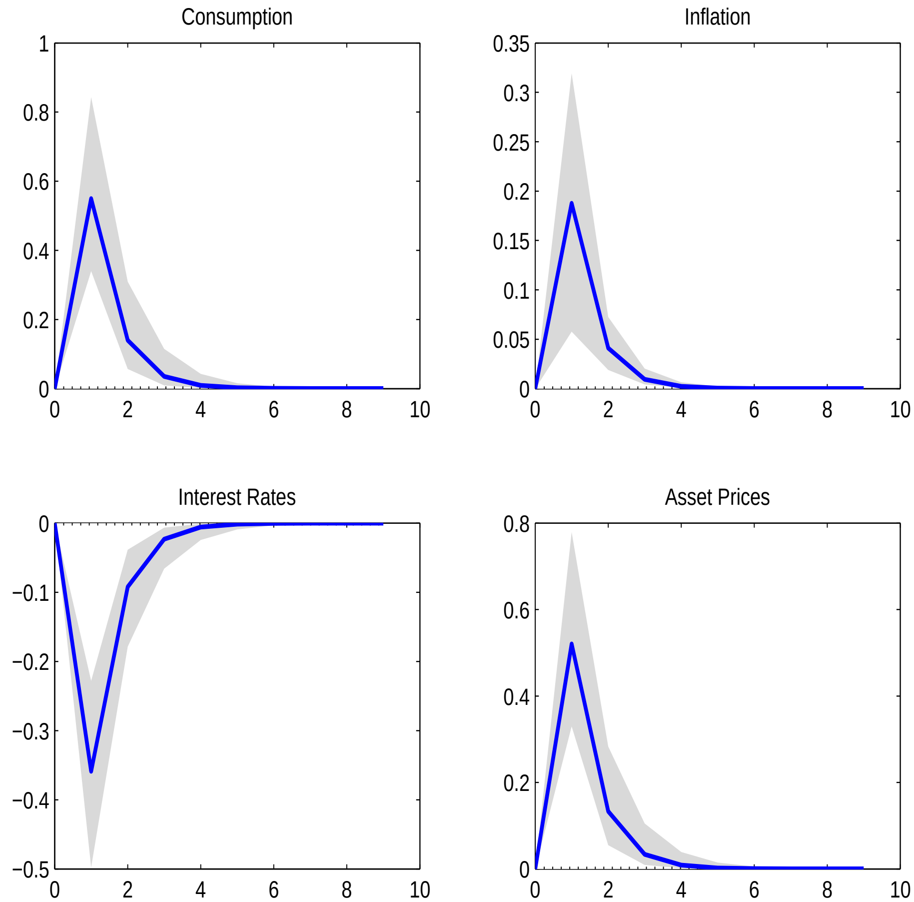

Figure 3: Theoretical Impulse Response following a Positive Monetary Policy Shock (reduction of interest rates)

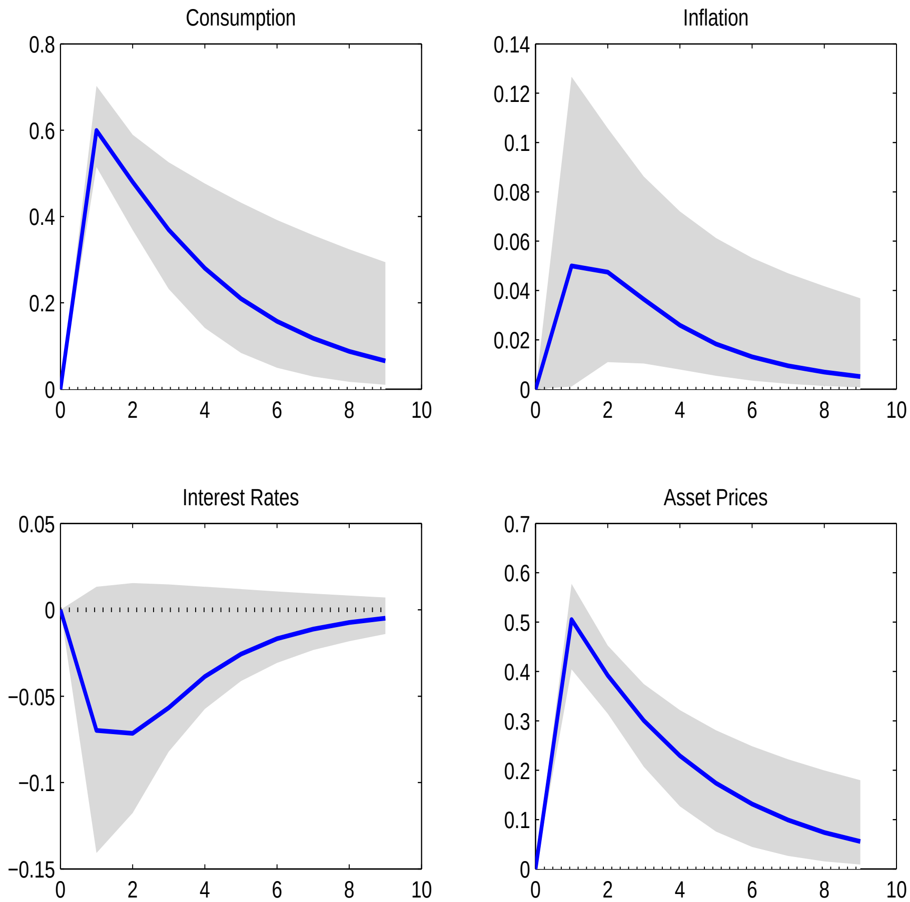

Figure 4: Theoretical Impulse Response following a Fall in Government Spending

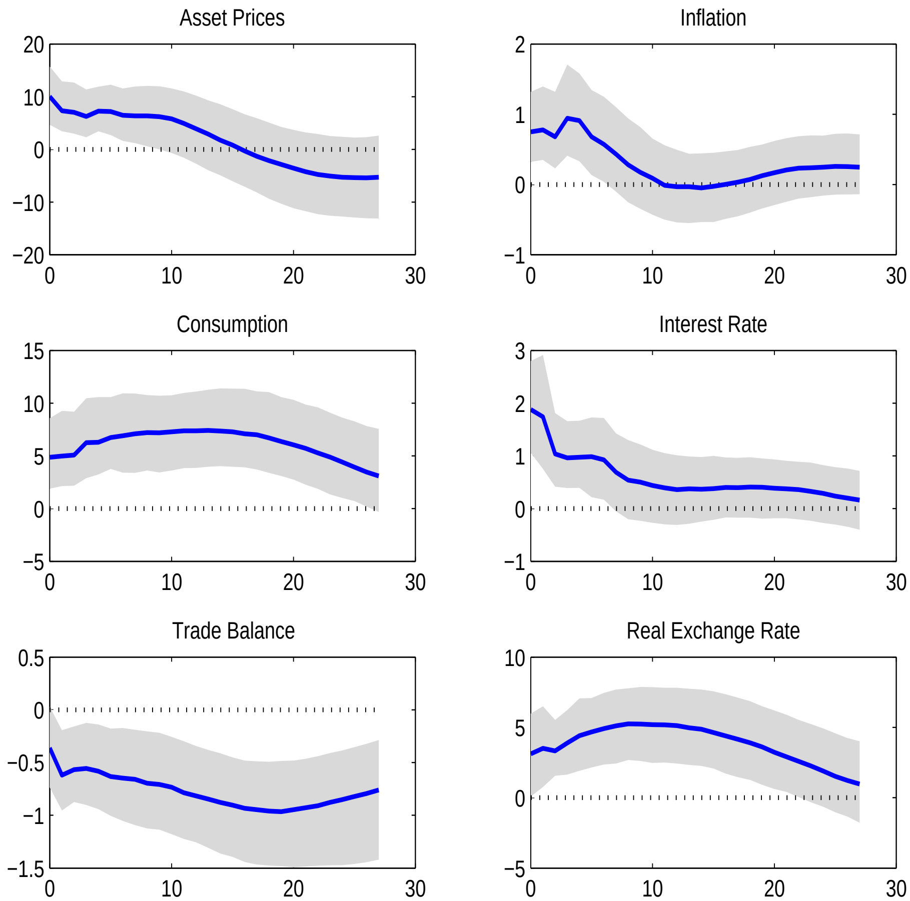

Figure 5: United States- Impulse Response following an Asset Price Shock

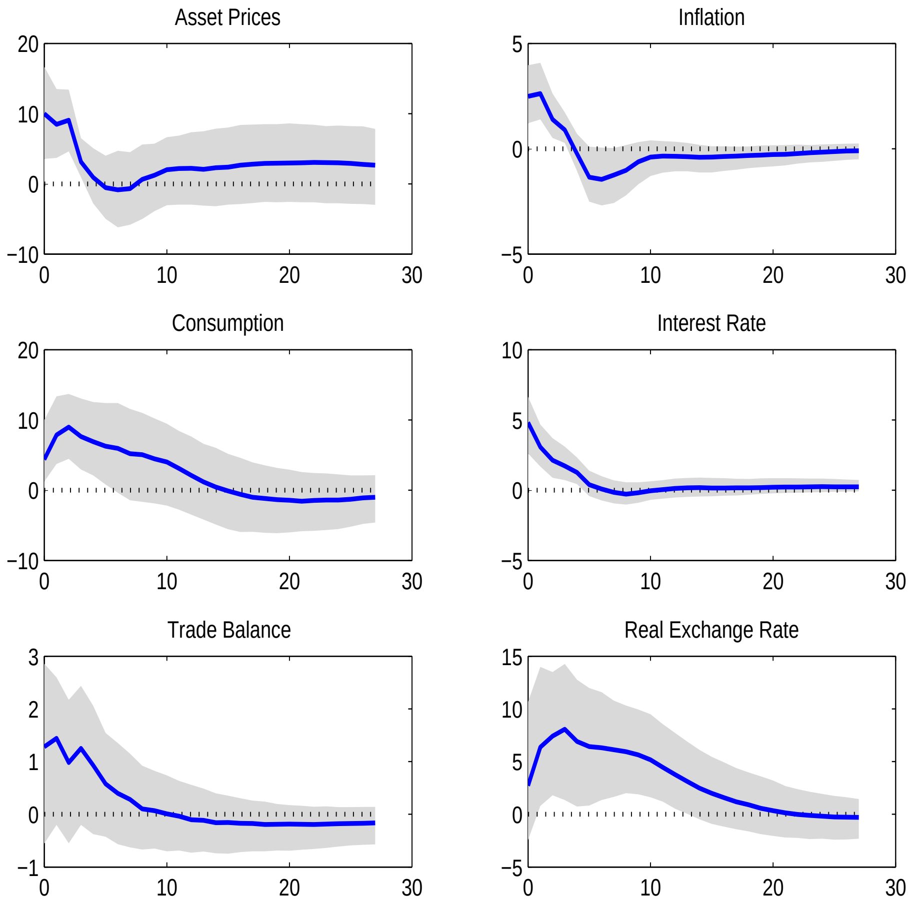

Figure 6: United Kingdom- Impulse Response following an Asset Price Shock

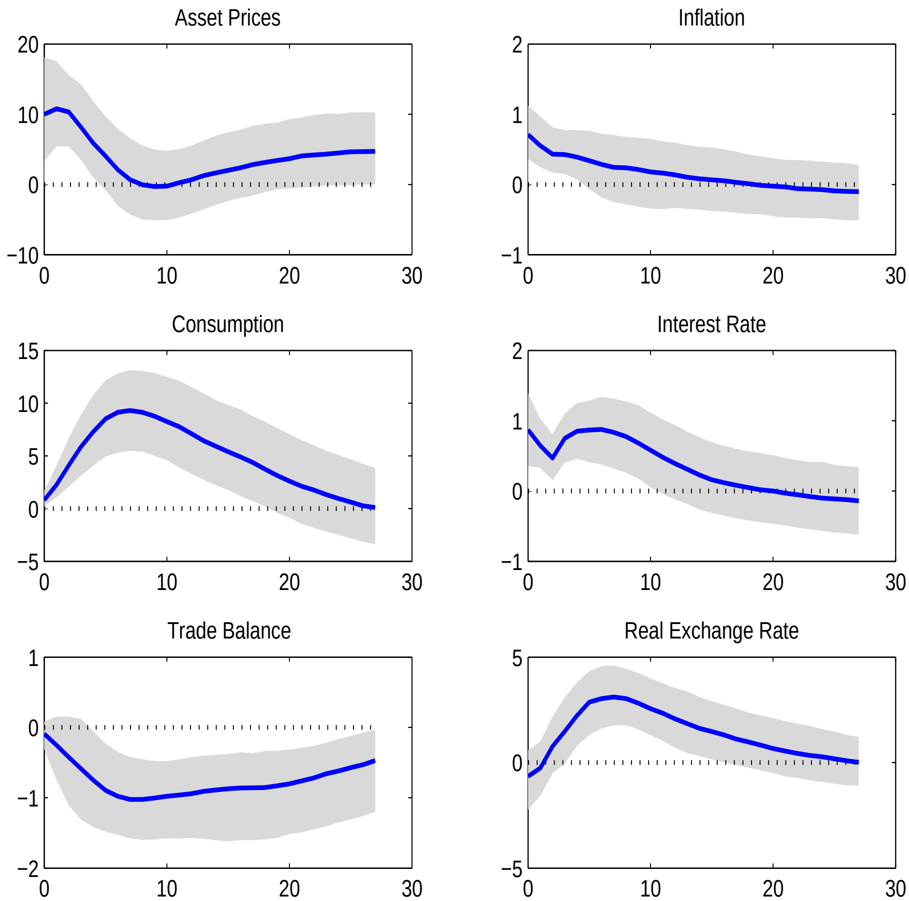

Figure 7: Germany- Impulse Response following an Asset Price Shock

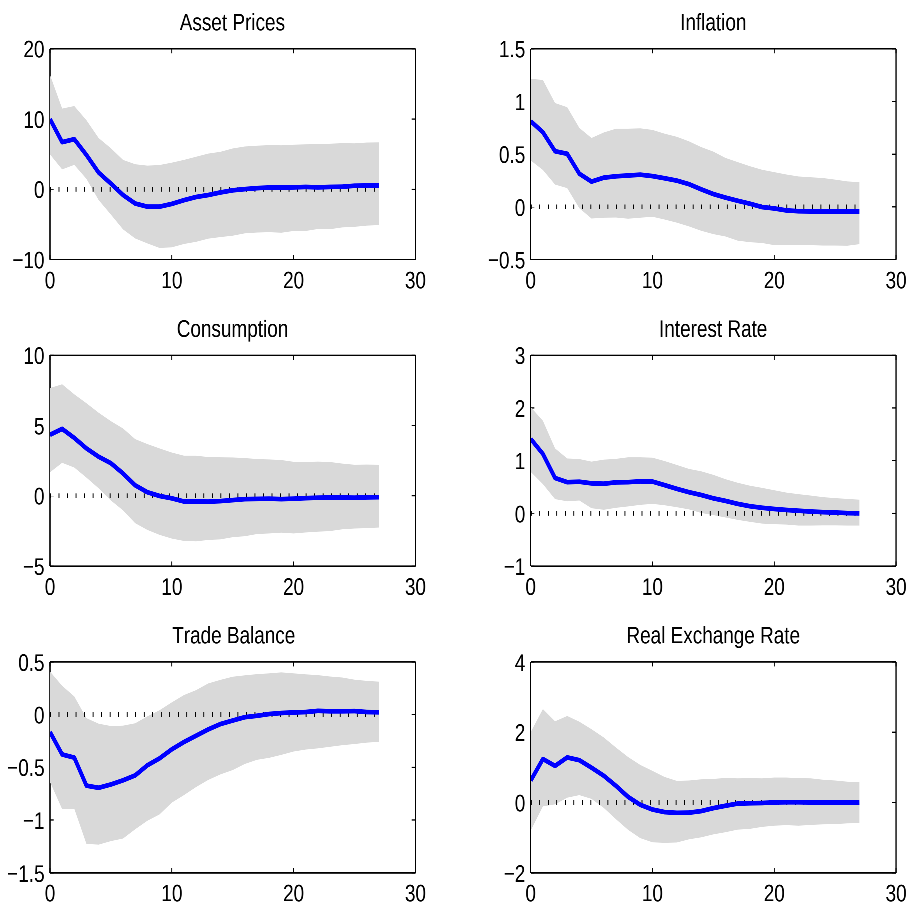

Figure 8: France- Impulse Response following an Asset Price Shock

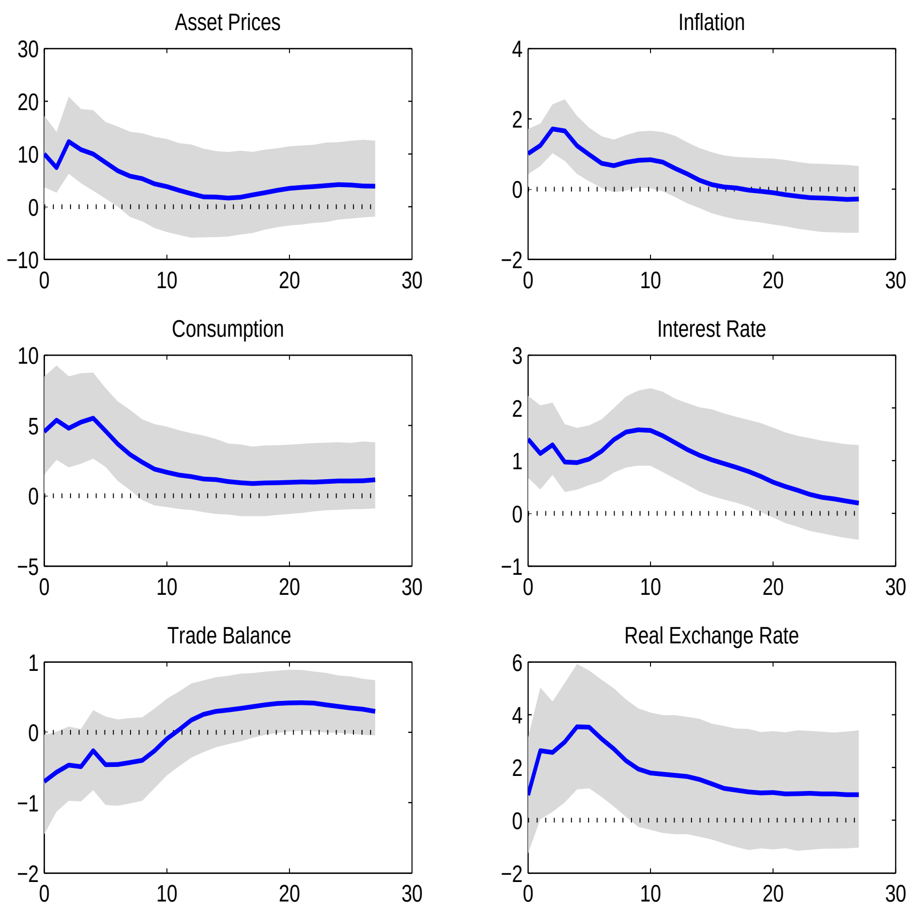

Figure 9: Italy- Impulse Response following an Asset Price Shock

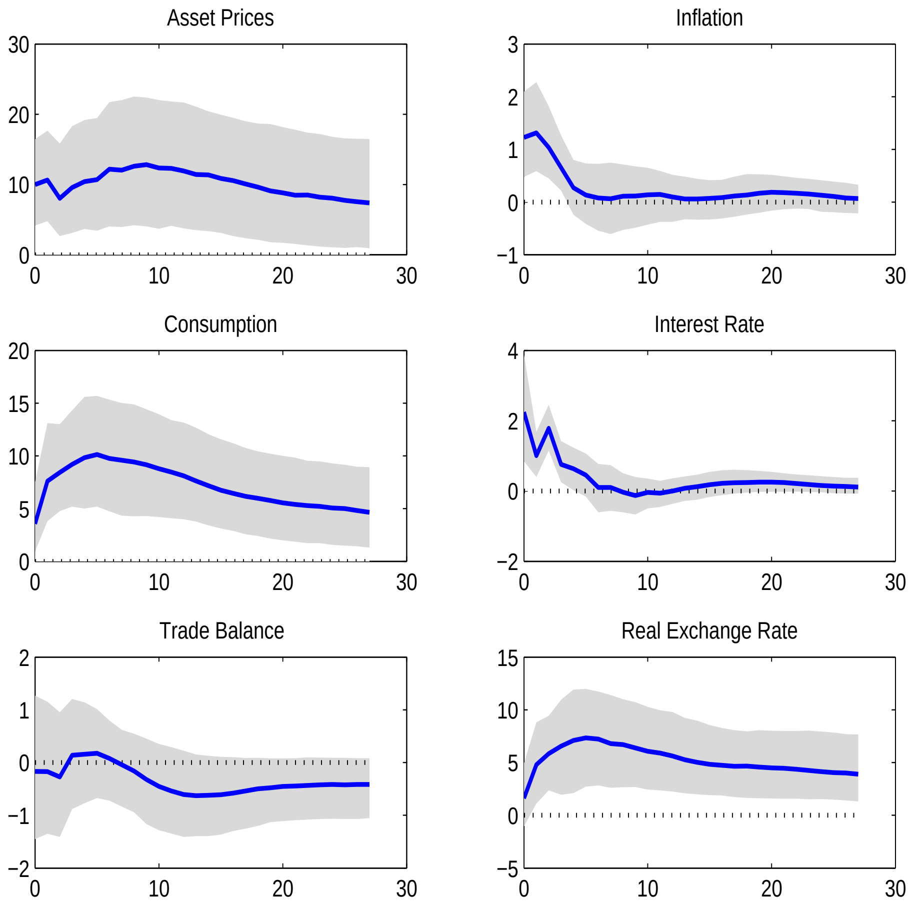

Figure 10: Canada- Impulse Response following an Asset Price Shock

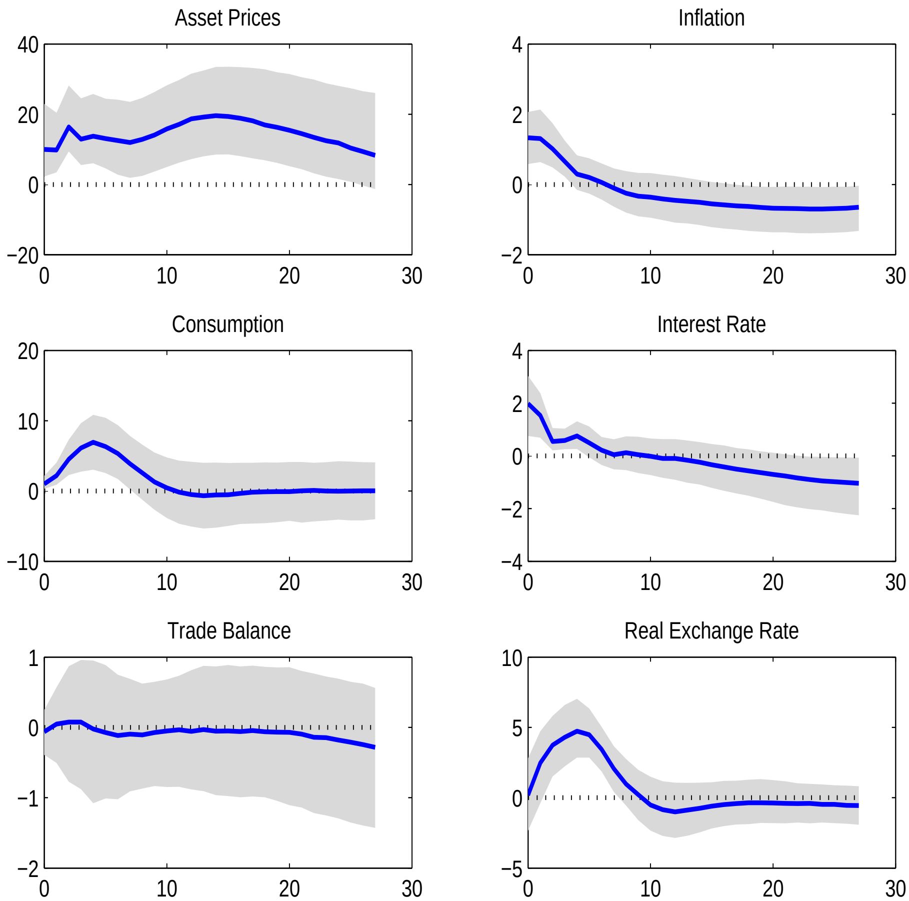

Figure 11: Switzerland- Impulse Response following an Asset Price Shock

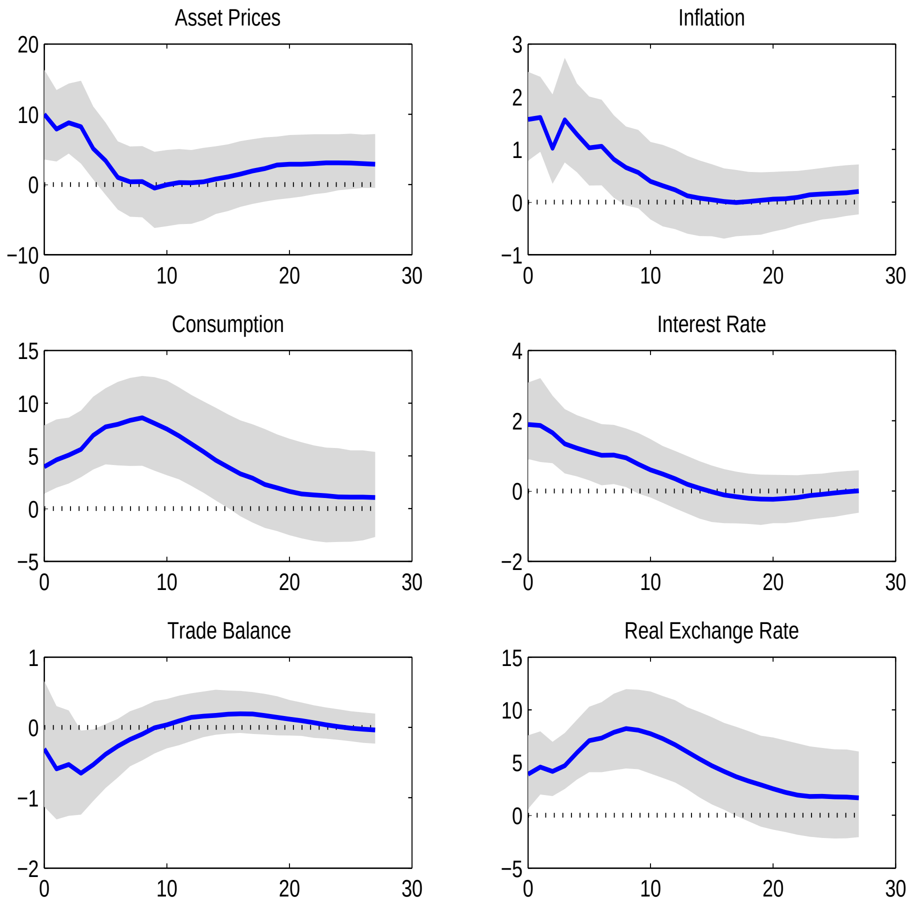

Figure 12: Australia- Impulse Response following an Asset Price Shock

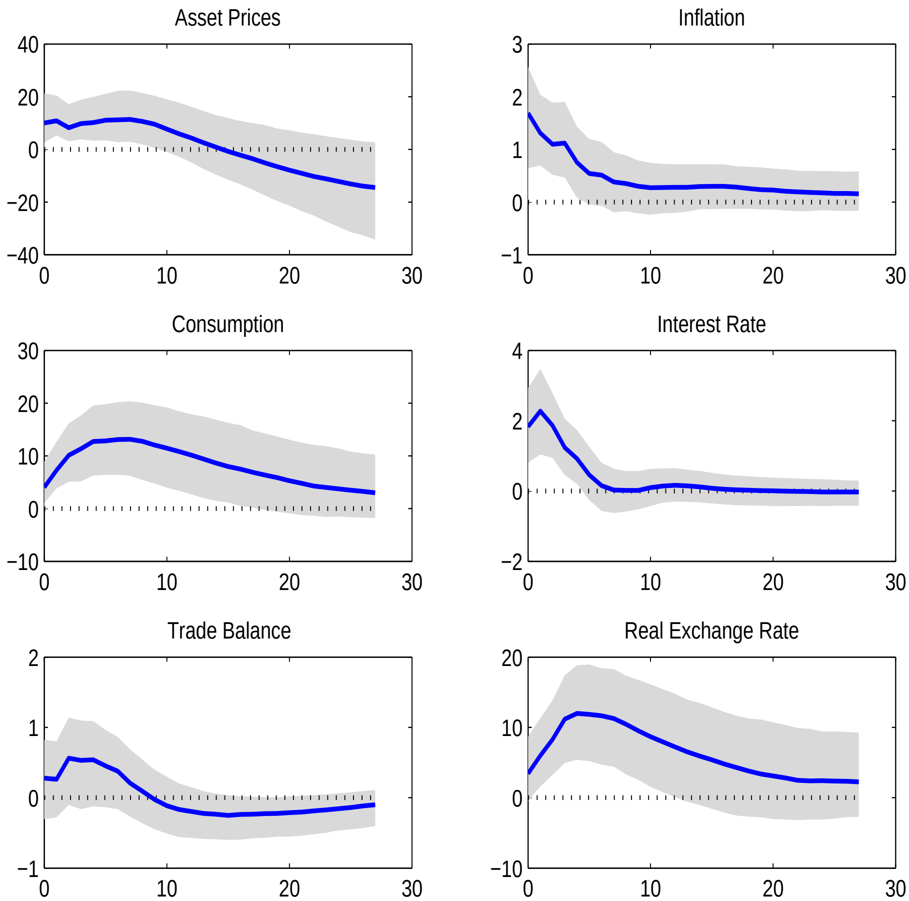

Figure 13: Japan- Impulse Response following an Asset Price Shock

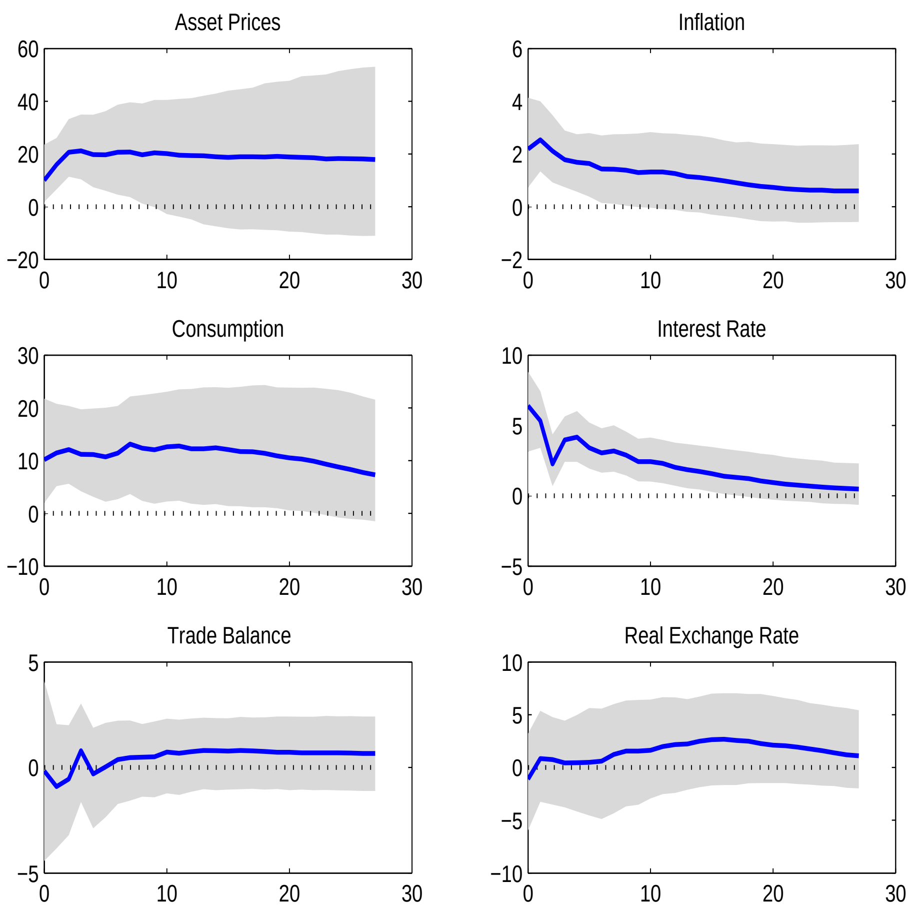

Figure 14: Netherlands- Impulse Response following an Asset Price Shock

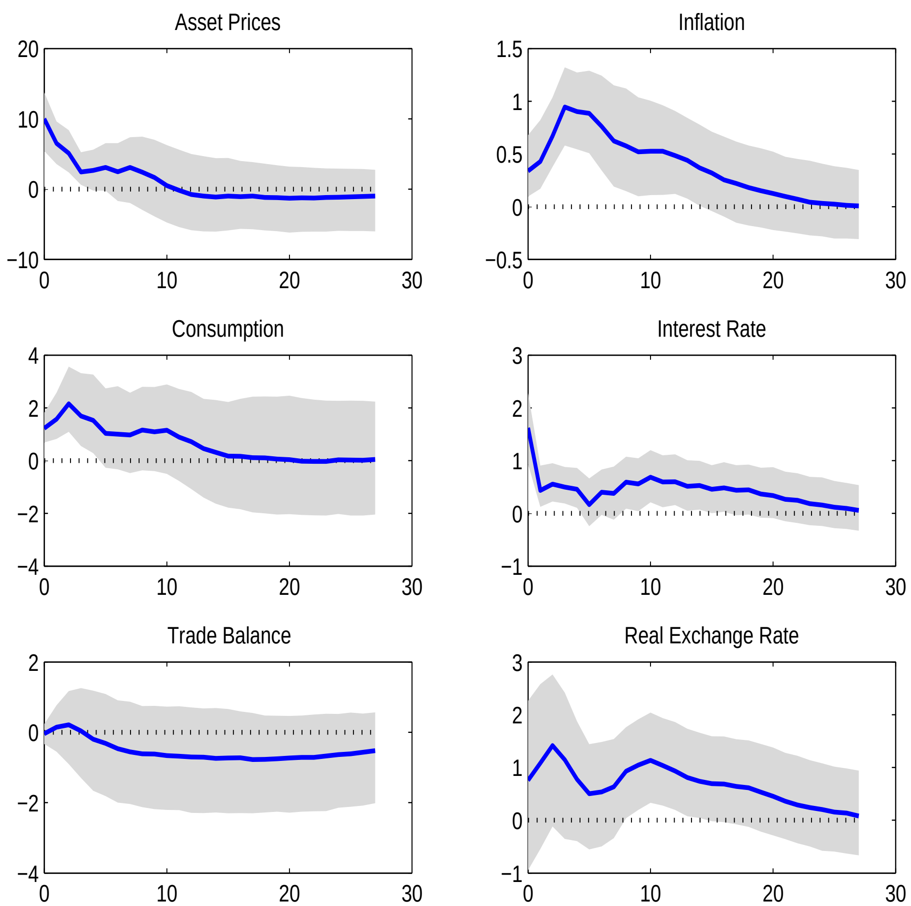

Figure 15: Norway- Impulse Response following an Asset Price Shock

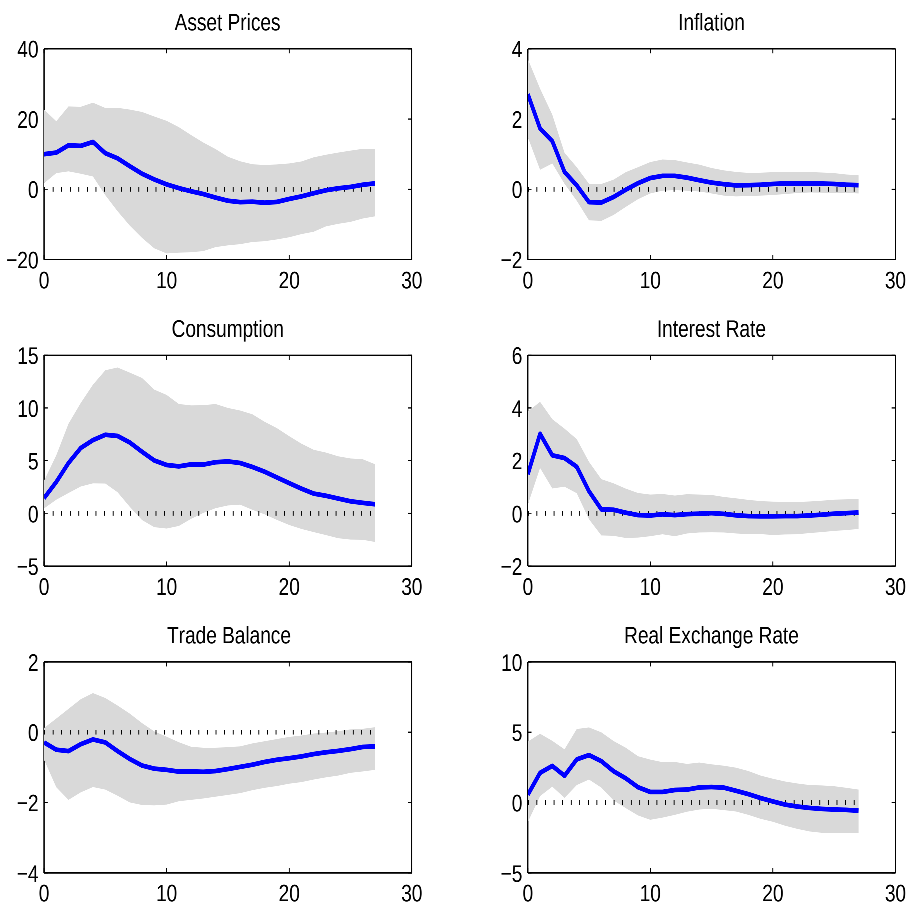

Figure 16: Denmark- Impulse Response following an Asset Price Shock

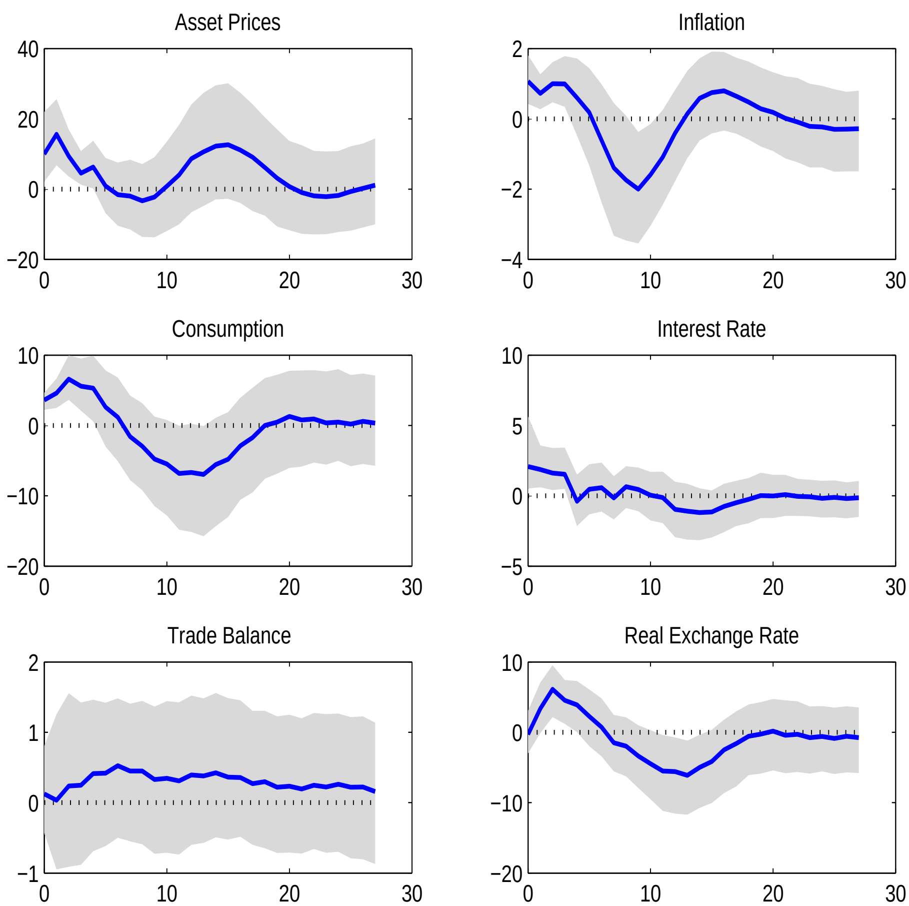

Figure 17: Sweden- Impulse Response following an Asset Price Shock

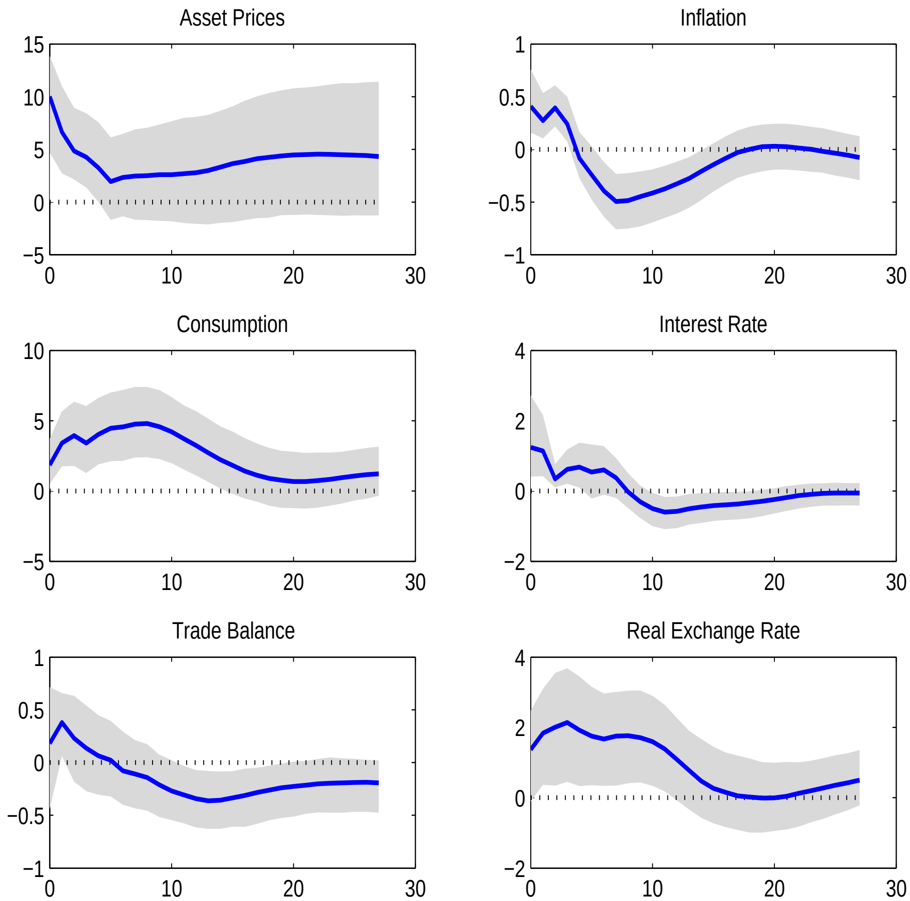

Figure 18: Spain- Impulse Response following an Asset Price Shock

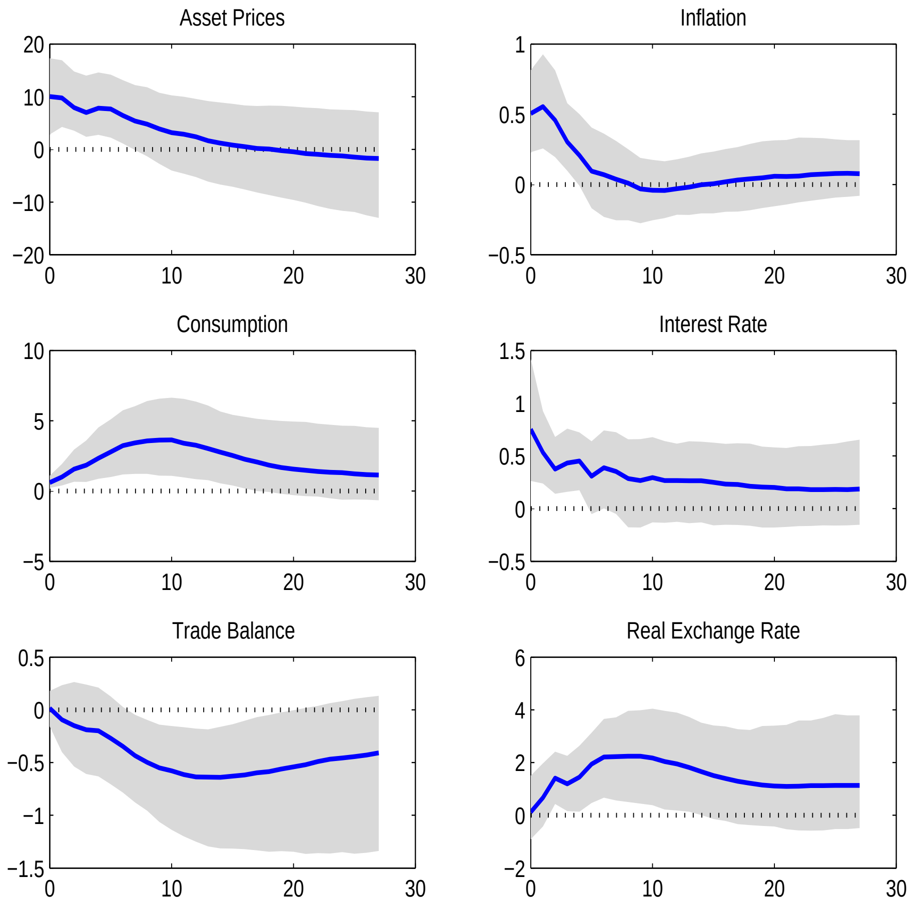

Figure 19: Finland- Impulse Response following an Asset Price Shock

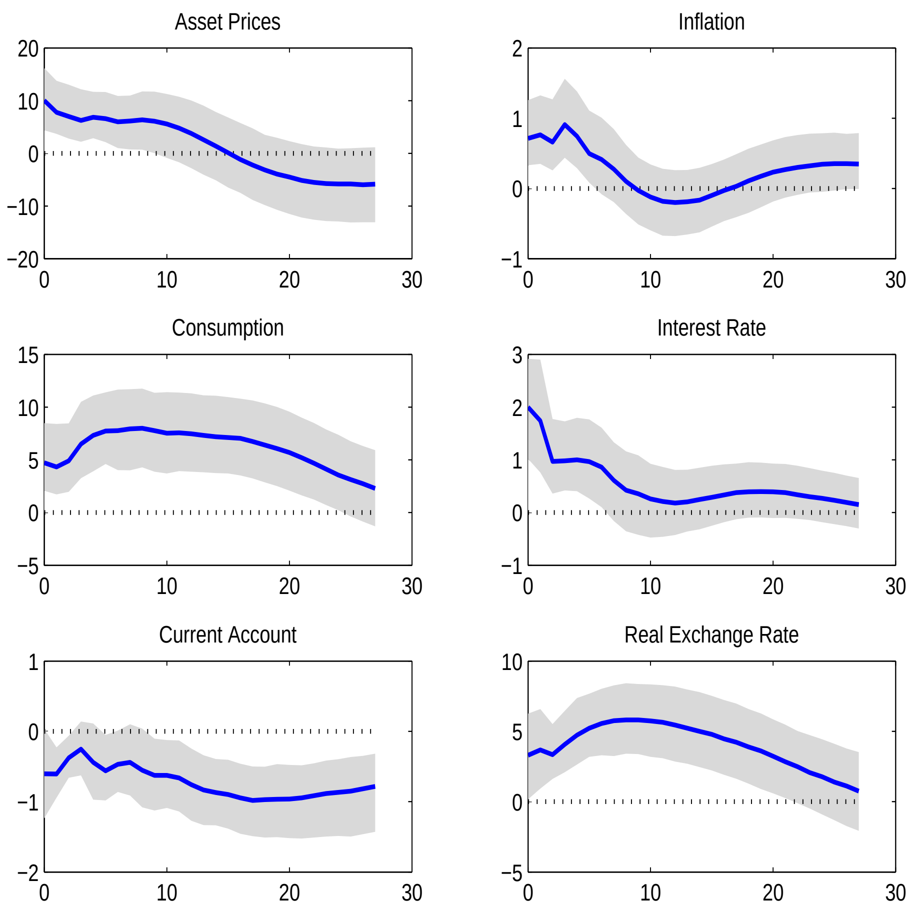

Figure 20: United States- Impulse Response following an Asset Price Shock with Current Account

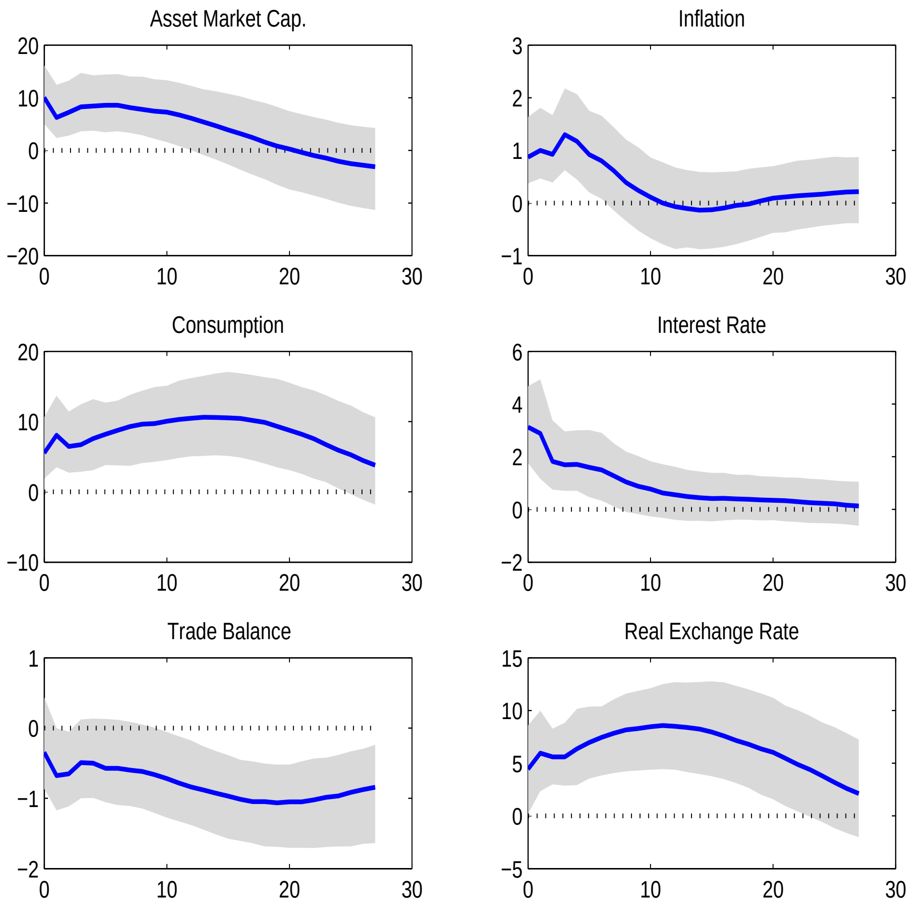

Figure 21: United States- Impulse Response following an Asset Price Shock with Equity Market Capitalization

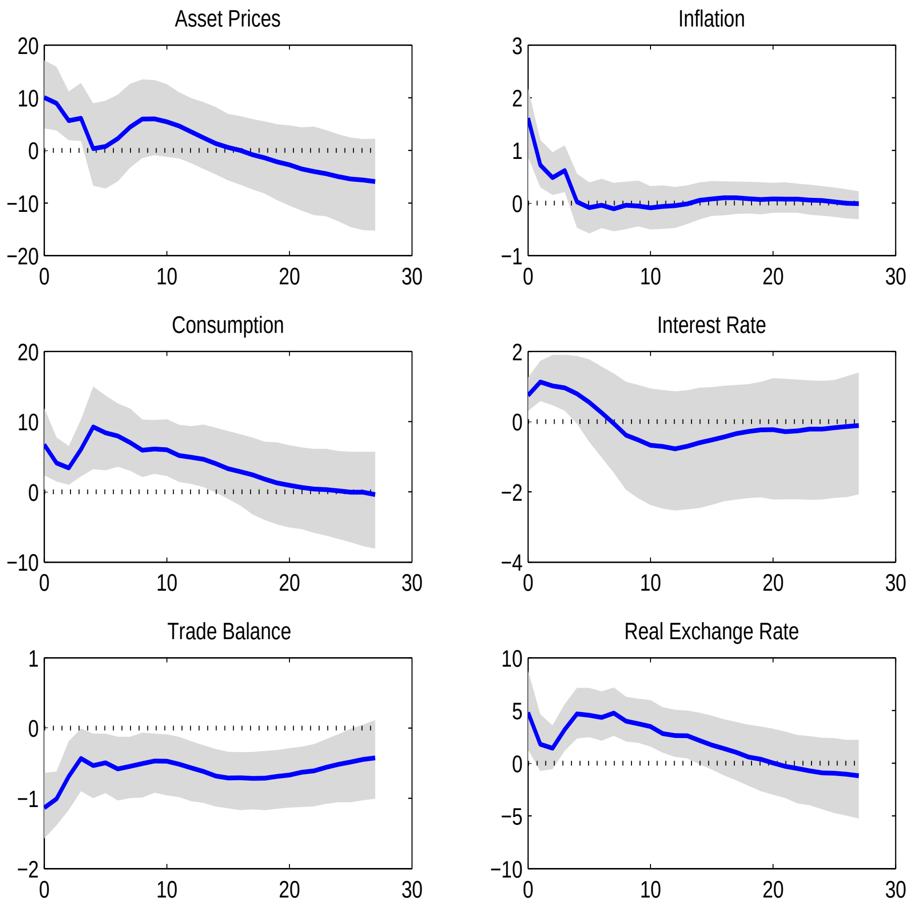

Figure 22: United States- Impulse Response following an Asset Price Shock with time sample 1990-2007

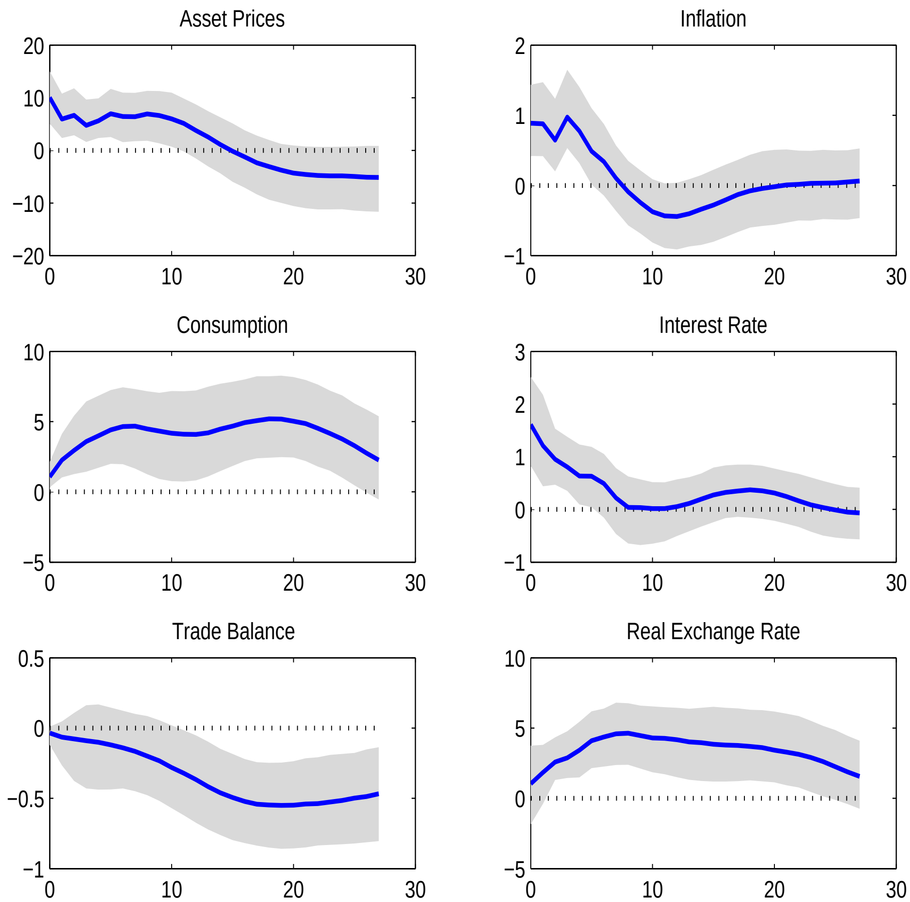

Figure 23: United States- Impulse Response following an Asset Price Shock with including emerging markets in the rest of the world sample