SVAR models and the short-run resilience effect

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Contents

1 Introduction

In an earlier study, the OECD examined whether some countries differ significantly in their responses to shocks and assessed if economies with structural policy settings that generates higher GDP growth and lower unemployment in the long run are also more resilient, i.e. they are in a better position to absorb shocks and to recover more quickly from adverse shocks.

To do so, part of the analysis was conducted by using structural VAR models (henceforth, SVAR) based on short-run restrictions as well as a block exogeneity assumption, similar to those developed by Cushman and Zha (1997), and Dungey and Pagan (2000). The short-run restrictions impose some contemporaneous feedback effects among the variables following the methodology described in the seminal papers of Bernanke (1986), Blanchard and Watson (1986) and Sims (1986). The block exogeneity assumption rests on the small open economy specification and means that the block of domestic variables has no impact—neither contemporaneously nor with lags—on the block of foreign variables in the VAR specification. In order to estimate each model and study the functions of interest (impulse-response functions, etc), all variables were detrended using the familiar HP filter.

The results show that there appear to have been major differences in the capacity of countries to deal with the shock driven by the bursting of the ICT and stock market bubbles. Two groups of countries emerge in terms of responses to this negative shock. On the one hand, the impact was largely contained in Australia, Canada, New Zealand, the United Kingdom, some Nordic countries and Spain. In particular, the United States experienced a quite rapidly rebound (following a large downswing). On the other hand, in large continental European countries, the shock has led to a protracted period of weakness. One explanation rests on the behavior of private consumption and residential investment. More specifically, the strength of these two demand components in the more resilient countries seems to contrast sharply with the weakness in other countries.

Nevertheless, some concerns have been raised regarding the methodology, especially the opportunity to use an HP filter uniformly across countries and variables (e.g. the same smoothness parameter) and its implications for the inference and estimation of SVAR models. Especially, in a companion paper, we show that pre-filtering data may induce some important distortions in the analysis (Guay and Pelgrin, 2006). In this respect, this paper re-examines the short-term economic resilience effect without HP-pre-filtering the data and by providing two new formal tests to disentangle the differences between the impulse-response of two countries.

The rest of the paper is organized as follows. In Section 2, we briefly describe the results of our companion paper, In section 3, we present the structural VAR methodology and we discuss the issues of VAR specification (selection of variables, lag determination, level versus first-differenced variables, trends, etc). Finally, we present the bootstrapping correction àla Kilian (1998). In Section 4, we present the impulse-responses functions as well as their bootstrapped confidence bands. In section 5, we propose two new tests to compare the country-specific impulse responses functions. In section 6, some robustness analysis is proposed. The last section concludes.

2 An overview of previous results

In a companion paper, we provide evidence on the following conclusions when one estimates a SVAR model using HP-filtered data. First, the value of the smoothness parameter (of the HP filter) is not critical in the sense that it affects marginally, at least for the set of variables considered in the OECD study, marginally the statistical properties of the filtered series. However, using the methodology proposed by Marcet and Ravn (2004), we showed that there is no prior reason to set the smoothness parameter homogenously across countries and variables. Second, as in Guay and St-Amant (2005), we argued that the HP filter may lead to important distortions and a spurious cyclical component, especially with near-integrated series, which have the typical Granger's (as in most macroeconomic time series). Third, as in Canova (1998), we evaluated the quantitative effects of alternative detrending techniques and concluded that the characteristics of the extracted cyclical components vary widely across methods. This directly pointed the question of the reliability of the results and the need to *prior* detrend the data in a SVAR model. In particular, the degree of persistence of each process as well as the presence of (near-) unit roots in the MA representation of the cyclical component can lead to substantial distortions in the SVAR estimation, especially given the inconsistency of estimates of the parameters. Note, however, that these effects are difficult to quantify with accuracy. Fourth, using a Monte-Carlo investigation based on a structural VAR model with short-run restrictions, we showed that the results obtained after HP filtering the data lead to conclude that (i) the amplitude of responses to structural shocks are clearly underestimated when the variables are persistent, (ii) the length of the adjustment period to a structural shock is also underestimated in this case and (iii) SVAR in level outperforms SVAR with HP filtered data. Fifth, using a Monte-Carlo investigation based on a RBC model, we found the same conclusions. Finally, a simplified version of the OECD model was used to show thatt the results are particularly sensitive to the choice of the detrending method.

In addition, one critical issue is the definition of the short-term economic resilience effect. Indeed, in the OECD paper, the speed of adjustment after a structural shock is measured by the number of periods before the impulse-response functions cross the zero line and not by the number of periods necessary to completely dissipate the effect of such a shock. This choice is not innocuous and yet may not have theoretical justifications.[1]. More importantly, other definitions may lead to opposite conclusions. For example, if the speed of adjustment, as a measure of resilience, is captured instead by the duration until the effect of the structural shock totally disappears, then conclusions are less clear cut. For example, the simple average of the speed of adjustment for the responses to the structural shocks on output increases to 15 periods for the United States compared to 12.9 periods for France (see Table 2, first and fourth rows). The implication is that France now appears as more resilient than the United States, reversing the earlier conclusion.[2] This directly raises the issue of how to properly define the resilience effect.

More fundamentally, we can question the interpretation of the impulse-response functions from the point of view of a dynamic structural economic model. This is particularly important since the concept of resilience is defined in the OECD paper as the ability to avoid long periods away from equilibrium following a negative shock. This interpretation is rather problematic if one considers RBC models or dynamic general equilibrium models with nominal (or real) rigidities. At least, in a prototypical Real Business Cycle economy, the response to a shock is Pareto-optimal. In other words, at any time, the economy is at the equilibrium. Business cycles thus reflect the optimal responses of economic agents to the economic environment. As a consequence, the impulse-response functions simulated from this economy then represent the dynamic adjustment to the

[1]For example, let us examine the first impulse-response function reported in figure 8 (see OECD WP1 document). This corresponds to the impulse response of a world GDP shock to the U.S. output. The adjustment time reported in Table 2 (see OECD WP1 document) for this impulse response is seven quarters. In fact, the impulse response crosses effectively zero after seven quarters but the effect of the initial shock only disappears after fourteen quarters. The difference is important and can change drastically the conclusion drawing from the speed of adjustment reported in Table 2 (see OECD WP1 document)

[2]The same comment applies if we look at the cumulative output gap reported in Table 3 (see OECD WP1 document).

steady state but not the periods away from the equilibrium (since impulse responses are the Pareto-optimal responses from the point of view of the representative agent). It is thus important to disentangle the concept of equilibrium and the steady state of an economy. The steady state corresponds to the deterministic state of the economy, e.g. when there is no shock. The shape of the impulse-response functions is defined by the number of periods away from the steady state and, along these impulse responses, the economy could be or not at the equilibrium depending on the structure of the economy. The interpretation of impulse-response functions as the adjustment process to the equilibrium needs then to be done with serious caution.

In the same spirit, we argue in appendix 3 of Guay and pelgrin (2006) that the definition of the resilience effect, which rests on impulse-response functions, may be problematic in the OECD study.

To overcome both types of criticisms, we estimate structural VARs model without *a prior* HP-filtering the data and we propose a univariate test to compare impulse-response functions at different horizons. The interpretation of the comparison of impulse-response functions as a measure of resilience among countries can be rationalized if we suppose that the exogenous dynamic process of the structural shocks disturbing economies is the same for each economy. Under this assumption, the difference in impulse-response function reflects a difference in the propagation mechanisms in the respective economy and can thus be interpreted as a difference in the degree of resilience to structural shocks.

3 Methodology

The first question is how to proceed in order to correctly identify the dynamic adjustment after a structural shock given the specification of the variables of interest in the VAR model. As is explained in Guay and Pelgrin (2006), a first attempt might be to proceed with the SVAR in level. Even in the case where the variables are non stationary, one may estimate a SVAR in level. The estimated coefficients of the VAR with possibly non stationary variables are consistent and the asymptotic distribution of individual estimated parameters is standard, i.e. a normal distribution (see Sims, Stock and Watson 1990)).[3] The impulse-response functions are also consistent estimators of the true impulse-response functions except in long run. In the long run, the responses do not

[3] See also Hamilton (1994, p.557) for a discussion.

converge to the true values with a probability one (see Phillips 1996). Consequently, a VAR can be estimated with non-stationary variables in level and the resulting impulse responses in the short- and medium-run are then reliable estimators of the true impulse responses. This holds also with cointegrated variables. This results comes from the fact that the VAR in level takes implicitly account of the cointegrated relationships (see Sims, Stock and Watson 1990)).

On the other hand, when variables include integrated processes, one might prefer estimating a VAR in first difference or specified as an error-correction model. If the restrictions that lead to these systems are correct, then imposing them may lead to more efficient estimates in a finite sample. If they are not correct then the system is misspecified and the estimator might be biased.[4] But again, as is pointed out by Sims et al. (1990), the common practice of transforming models into stationary representations by first-differencing or using cointegration operators is often unnecessary even if data appear likely to be integrated (at least asymptotically). The critical issue is whether the estimated coefficients or test statistics have a standard distribution and the reliability of the finite sample approximation. More specifically, they show that the OLS estimator is consistent whether or not the VAR contains integrated components, as long as the innovations in the VAR have enough moments and a zero mean, conditional on past values of Y_t. Finally, a two-step cointegrated VAR procedure (Engle and Granger, 1987) may be unnecessary, at leat asymptotically, because the asymptotic distribution of the level VAR coefficients is a singular normal one and is the same as in a model where we assume the cointegration relationships as given (e.g. as in a two-step procedure à la Engle and Granger (1987)). In addition, note that if the true data generating process is stationary, then differencing the data can result in a misspecified regression.

Finally, one may estimate the VAR in level and include linear trend into the specification. This procedure will be equivalent to detrend the data in a first step and then to apply standard OLS estimation. Note that this is not the case when one use HP filtered data.[5]

In what follows, we use indifferently the last two procedures, e.g. (i) we include a common linear trend or different linear trends or (ii) we detrend linearly the data, using the methodology proposed by Dungey and Pagan (2000). Before presenting results, a

[4] See Hamilton (1994, p.516) for a discussion.

[5] See Guay and Pelgrin, 2006.

number of issues related to the SVAR specification need to be adressed:

1. Should the small-open economy version be applied for each country ?
2. What type of restrictions should be retained (short-run identification scheme *versus* constrained short-run identification scheme, etc)?
3. Which variables should be included and over which period should the model be estimated?
4. What is the lag selection criterion? Does it matter for the results?

3.1 Specification issues

The OECD analysis was conducted by using structural VAR models (henceforth, SVAR) based on short-run restrictions as well as a block exogeneity assumption, similar to those developed by Cushman and Zha (1997), and Dungey and Pagan (2000). On the one hand, the short-run restrictions impose some contemporaneous feedback effects among the variables following the methodology described in the seminal papers of Bernanke (1986), Blanchard and Watson (1986) and Sims (1986). On the other hand, the block exogeneity assumption rests on the small open economy specification and means that the block of domestic variables has no impact—neither contemporaneously nor with lags—on the block of foreign variables in the VAR specification. However, this is only one possible strategy.

Indeed, while the theoretical literature on open or small open economies (Dynamic Stochastic General Equilibrium models) have been developing rapidly, the SVAR literature have been less promising than the closed economy SVAR one. Especially, a consistent set of features of actual economies that open economy models should incorporate is much more difficult to define. For example, there is no agreement on a core group of foreign variables that should belong to the VAR specification as well as the structural shocks. Therefore, some VAR specifications produce an exchange rate puzzle (depreciation after a contractionary monetary policy shock), others a price puzzle and conclusions on the uncovered interest parity may drastically differ. In this case, a common strategy is to include a large number of variables.[6] A first method is thus to adopt a marginal approach, e.g. variables are appended to a small benchmark VAR one at a time, and then withdrawn (Kim, 2001). A second method is to include simultaneously

[6]See Cushman and Zha (1997), Dungey and Pagan (2000), Jacobson et al. (2001), Kim and Roubini (2000), Bagliano and Favero (2001).

all variables and then to place some exclusion restrictions on several equations (Dungey and Pagan, 2000). In both cases (i.e. in the "specific-to-general" procedure or in the "general-to-specific" procedure), one has to deal with some methodological issues. More specifically, the selection of variables as well as the autoregressive lag structure are critical for the properties of the reduced form and thus for those of the structural form and the impulse-responses functions, etc.[7]

In what follows, we do not impose a block-exogeneity representation of the economy (as in the OECD's study). For large economies as the United states, Germany or France, the assumption of block-exogeneity is surely violated. Moreover, the unconstrained representation resulting by not imposing block-exogeneity provides consistent estimators whether the block-exogeneity is true or not (but not efficient under truly imposed block-exogeneity). However, imposing block-exogeneity when this hypothesis is false yields inconsistent estimators.

Following the OECD study, we assume that there are two blocks of structural equations: those for the foreign economy and those representing the domestic economy. In the benchmark specification, two foreign variables (world output and the oil price measured in domestic currency terms) enter in the former whereas six domestic variables ("external" demand, "internal" demand, domestic output, CPI inflation, government net lending as a share of GDP and the nominal interest rate) explain the domestic part of the model.

Finally, as is pointed out in the previous section, the modelling strategy requires some assumptions about the nature of the DGP of each variable (see before), at least in finite samples, and, especially, whether one needs to include a common linear trend or different trends in the VAR specification. As we explain before, we adopt two strategies. On the one hand, we include a common linear trend into the specification. However, as we will explain later on, this alters the small sample properties of the boostrapped confidence intervals for the impulse responses functions (see also Inouie and Kilian, 2002). On the other hand, we can proceed as in Dungey and Pagan (2000) and we first deterministically detrend such variables. This procedure is equivalent to estimating a linear trend for each variable in the VAR representation (under certain orthogonality

[7]In contrast to the OECD Secretariat study, the lag structure may differ across OECD country as well as the predominance of certain variables. This directly points out the question of comparison across non homogenous countries.

conditions).

3.2 Identification scheme

We consider two different identification schemes. In the first case, we estimate an unrestricted VAR model and apply a Cholesky decomposition (starting with the same ordering as in the OECD study). In the second case, we also use an unrestricted VAR model and the structural shocks are identified by taking into account the OECD restrictions on the contemporaneous matrix, which is estimated by maximum likelihood. This leads to overidentifying restrictions, which need to be tested at standard level.

First, we assume that the economy is described by a structural form equation

$$A(L)Y_t = e_t \tag{1}$$

where $A(L)$ is a matrix of polynomial in the lag operator L, $Y_t = (Y_{1t}', Y_{2t}')'$ is an $(n_1 + n_2) \times 1$ data vector (with $n_1 + n_2 = n$) and e_t is an $n \times 1$ structural disturbance. Moreover, the structural vector e_t is serially uncorrelated and $V(e_t) = \Delta$, where Δ is a diagonal matrix so that structural disturbances are mutually uncorrelated. Since the structural shocks of (1) are unobserved components, i.e. the structural parameters and the residuals are not estimable, we wish to estimate a reduced-form model and then identify the structural parameters with the estimates of the reduced form.

We can estimate a reduced-form equation

$$Y_t = B(L)Y_{t-1} + u_t \tag{2}$$

where $B(L)$ is a matrix polynomial in lag operator L and $Var(u_t) = \Omega$.

There are several ways of recovering the parameters and the structural shocks in (1) from the estimated parameters in the reduced form (2). In what follows, since the focus is on the short run resilience effect, we only consider the most two common identification schemes, namely the Choleski decomposition proposed by Sims (1980) and the more general (nonrecursive) modelling strategy developed by Blanchard and Watson (1986), Bernanke (1986) and Sims (1986). Let denote $A_0 = A(0)$ the contemporaneous matrix of the structural form, and $\widetilde{A}$ the coefficient matrix in $A(L)$ without A_0, i.e. $A(L) = A_0 + \widetilde{A}(L)$. Given equations (1) and (2), the parameters in the reduced-form model and those in the structural-form model are related by

$$e_t = A_0 u_t$$
$$B(L) = -A_0^{-1}\widetilde{A}(L).$$

This implies that $\Omega = A_0^{-1}\Delta A_0^{-1}$.

Sims (1980) proposed recovering the "orthogonalized" uncorrelated innovations by using the Choleski decomposition of the estimated covariance matrix $\widehat{\Omega}$.[8] In contrast, Blanchard and Watson (1986), Bernanke (1986), and Sims (1986) proposed alternative ways of looking at the factorization problem which impose more of an economic structure. Identification is achieved by imposing constraints on contemporaneous short-run effects of the shocks. A special case is the Choleski factorization.[9] Since Ω contains $n(n+1)/2$ parameters, by normalizing n elements of A_0 to 1's, $n(n-1)/2$ additional restrictions on A_0 are necessary to achieve identification. Finally, if we impose more exclusion restrictions (as in the OECD's study), then the VAR model can be estimated by GMM and an overidentifying restrictions test can be performed to judge the validity of the exclusion restrictions (see Bernanke and Mihov, 1998)

3.3 Data

In the benchmark specification, we use the same definition of variables as in the OECD study except for the world output. Indeed, this variable is built without including the domestic country studied. In the case of Germany, we use harmonized data to take into account the reunification process. Otherwise, all variables correspond to the one defined in Annexe 2 of the OECD study. Finally, the sample covers the period 1975:Q1-

[8]It is worth noting that choosing the Choleski decomposition to derive the P matrix implies that the system has a recursive structure (Wold-causal chain). Specifically, the innovation in the first equation contemporaneously affects the second equation but is not affected by it in the current period. This means that the order in which the variables are arranged will affect the resulting impulse response function. In other words, there is a different factorization for every ordering of the variables, so it will be impossible to examine all of them for systems with a high number of variables. Finally, the Choleski factorization imposes a "semi-structural" interpretation on a mechanical procedure. Unless the underlying "semi-structural" model can be identified from the reduced-form VAR model, the innovations on a Choleski factorization do not have a direct economic interpretation.

[9]Other types of identification restrictions can be imposed, as for instance coefficient restrictions, symmetry restrictions or variance restrictions. However, such identification constraints may be difficult to always justify on *a priori* grounds.

2004:Q4.[10]

As we explain before, to test the robustness of our results, we use other variables as well as different ordering. Second, "short-run" SVAR are sensitive to the ordering of variables and the definition of variables. In this respect, we will assess to what extent the definition of the internal- and external-driven component matters for our results. We also take into account the impact of the exchange rate as well as the terms of trade. Third, as is shown in Kilian and Chang (2000), the number of variables may matter for the accuracy of confidence intervals for impulse-response functions. Therefore, it is necessary to control for this high dimensionality problem and use alternative specifications with less variables.

3.4 Lag selection

An important step in the estimation of the large VAR model is the lag selection. This matters not only for OLS estimates of the autoregressive coefficients (see bootstrapping method) but also in impulse-response functions analysis. In a recent paper, Ivanov and Kilian (2001) assess the implications of alternative lag order selection criteria for the accuracy of the impulse responses functions. More specifically, they use as a benchmark criterion the mean-squared error of the implied impulse response functions and show that the Hannan-Quinn Criterion appears to be the most accurate lag selection criterion for quarterly data. However, in the case of samples larger than 120, they recommend the Schwarz information criterion. Interestingly, their results are robust to the horizon of interest (of the impulse-response functions) and to the number of variables in the model. Therefore, due to our sample period, we consider both criteria in order to determine the optimal number of lags. For almost all countries, the optimal lag order is found to be two.

3.5 Boostrapping method

In the presence of persistent series, it is well known that the OLS estimates are biased downward. Since the impulse response functions are a nonlinear function of the reduced form parameters, it is important to correct for this small-sample effect. As well, confidence bands for impulse response functions are often based on an asymptotic normal

[10]Our sample is slightly larger than the one used in the OECD study. However, our results are robust to alternative samples.

distribution (Lütkepohl, 1990).[11] However, higher moments of the impulse responses functions (as for instance the skewness) rarely follow the normal distribution. In addition, the finite sample properties of this method (as well as the nonparametric bootstrap method or the Monte-Carlo integration technique) are often weak.

In this respect, we consider the methodology proposed by Kilian (1998)—the bootstrap-after-bootstrap method—to derive the confidence intervals of the impulse responses functions. This bias-corrected bootstrap confidence intervals explicitly account for the bias and skewness of the small-sample distribution of the impulse response estimator. More specifically, this procedure aims to correct for undesirable features of classical bootstrapping confidence intervals when the replications are performed by using a biased (but consistent) estimator of the true vector of parameters, say Θ. The biased estimator obtained by OLS, say $\hat{\Theta}$ is transformed into another estimator, say $\widetilde{\Theta}$, which has smaller bias. Using Monte-Carlo simulations or data-driven procedures, Kilian (1998) states that this procedure appears to be more accurate than alternative available methods. Moreover, this procedure also performs well regardless of whether variables are estimated in level, deviations from a linear trend or first differences.

At the same time, it is important to note that the accuracy of confidence intervals for large-dimensional VARs is an important issue. Kilian and Chang (2001) recommend to discount interval estimates for higher horizons and to take into account the frequency of the data. In the case of quarterly data, using a Monte-Carlo study, the authors provide evidence that the coverage rates of intervals is reasonably correct over the 16 first quarters. Moreover, they find important differences in accuracy across alternative procedures to compute confidence intervals. Bayesian Monte-Carlo integration method proposed by Sims and Zha (1999) and bias corrected method of Kilian (1998) described above outperform other procedures.

3.6 Tests

We now propose two new tests to evaluate the difference in resilience between two countries measured by impulse-response functions for a given structural shock.

To present the statistic tests, let us consider the structural moving average representa-

[11] Other traditional methods include the nonparametric bootstrap method (Runkle, 1987) and the parametric Monte Carlo integration procedure (Doan, 1990).

tion for the vector of variables of interest Y_t:

$$Y_t = C(L)e_t.$$

The impulse response of the structural shock j on the variable i for a given country can be represented as:

$$Y_{i,t} = C_{ij}(L)e_{j,t}$$

where $C_{ij}(L) = \sum_{k=0}^{\infty} c_{ij,k}L^k$.

The first one consists in evaluating the difference between the response for a given horizon k for both countries with respect to the same structural shock up to a chosen horizon K. The statistic is then based on the difference between $c_{ij,k}$ for $k = 1, \ldots, K$ for a chosen K for the two countries of interest. Under the null of no difference in the resilience, the difference between the impulse responses of both countries should be not significantly different of zero. Differences in the individual impulse are computed for a structural shock j for country l and m, namely; $c_{lj,k} - c_{mj,k}$ and confidence intervals are calculated by bootstrap procedure as presented earlier. Under the null, $c_{lj,k} - c_{mj,k} = 0$ for $k = 1, \ldots, K$ for a chosen K. It is worth noticing that the bootstrap procedure must take into account the possible correlation among reduced-form shocks between both countries of interest (resulting from the estimation of the VAR for each country). To do so, the permutations of the errors terms resulting from the draws are taken to be the same for both countries. Consequently, the structure of the covariance among the reduced-form shocks for the two countries is preserved.

The second statistic test captures the difference for the two countries in the total impact of a shock j to a variable i up to a chosen horizon K. This corresponds to the difference in the area of the impulse responses from zero. More precisely, the measure of the resilience corresponds to the cumulative sum of the absolute values of responses for a structural shock j on variable i up to a horizon K for a given country. The test is based on the difference of these two cumulative sums. The intuition goes as follows. Ceteris paribus, a more resilient country should have a sum of the moving average coefficients significantly smaller than a less resilient country.

Let us now present more formally this second statistic test. Consider the decomposition of the structural moving average as:

$$Y_{i,t} = \sum_{k=0}^{K} c_{ij,k} L^k e_{j,t} + \sum_{k=K+1}^{\infty} c_{ij,k} L^k e_{j,t}.$$

The statistic of the test called $CS_K^{l,m}$ for the country l versus the country m is thus given by:

$$CS_K^{l,m} = \sum_{k=0}^{K} \left[|c_{ij,k}^{l}| - |c_{ij,k}^{m}| \right].$$

Under the null of no difference in the resilience for the country l and m, this statistic is not significantly different from zero. The confidence interval of this statistic is also calculated by a bootstrap procedure which takes into account the covariance structure between the reduced form residuals for both countries.

4 Estimation

In this section, we report the benchmark estimation for the United states and Germany and the corresponding impulse-response functions obtained with the bootstrap bias-corrected procedure. These two countries are first investigated because the United States are considered as a representative resilient country and Germany as one of the less resilient country.

4.1 Benchmark estimation

We estimate an unrestricted VAR model and apply a Cholesky decomposition (starting with the same ordering as in the OECD study) to the SVAR specification of the OECD study. Since the Monte-Carlo simulations of Kilian (1998) and Kilian and Chang (2001) provide strong evidence that the bootstrap-after-bootstrap method leads to better finite sample properties, we adopt, in the sequel, their methodology. The number of lags in the VAR is chosen using the Hannan-Quinn criterion. At this stage, two strategies can be implemented: (i) pre-detrending the data (as in Dungey and Pagan, 2000) or (ii) using a one-step estimation in which the individual trends are included in the specification. Both methods lead to comparable results. Both specifications appear to fit better the data than the one assuming a common trend across the variables of interest.[12]

[12]We conduct four specifications tests—serial correlation in the residuals, the RESET test, the Jarque-Bera test for normality and a test for heteroscedasticity. Without exception, all equations pass these tests when we consider a reduced-form with an individual trend for each variable.

In this section, we report the bootstrapped impulse-response functions when the VAR specification includes individual trends. To do so, we have used 2000 simulations and the error bands we present are 90% confidence intervals, not the 2 standard error bands commonly presented in the VAR literature.

The eight ordered variables in the VAR are: world GDP, oil shock, the globalized component of demand (real exports of goods and services plus business investment), internally-focused demand (private consumption plus residential investment), aggregate output, CPI inflation, government net lending as a percent of GDP and nominal short-term interest rates. The short-run restrictions corresponds to this ordering. For example, the first shock associated to the world GDP shock affects contemporaneously all variables, the second shock affects contemporaneously all variables except the world GDP, and so on. Finally, the interest rates shock affect this variable contemporaneously and the other variables only a period later.

The structural shock thus identified with the world GDP equation can be interpreted as a shock to world economy different from the ones to the home economy. A shock to oil prices captures a shift in the relative price of oil in domestic currency terms. In the VAR literature, a shock to the interest rate is considered to be an monetary policy shock. A shock to government net lending is interpreted as a discretionary shock to fiscal policy. Shocks to GDP and its two broad sub-components (globalized and internally-focused) are more difficult to interpret. Those shocks are probably a linear combination of a permanent supply and transitory demand disturbances. The shock corresponding to the inflation equation has also no clear economic interpretation. In the OECD study, it is interpreted as a temporary supply shock, but there is no clear justification for this. It could correspond to a nominal shock to the economy. In the sequel, it will be referred to as the inflation shock, without further structural interpretation.

Figures 1 and 2 (3 and 4) report the impulse response functions on output for each structural for the United States (respectively in Germany).

[Insert Figures 1-2 and Figures 3-4]

Given the focus of this study, the impulse-response functions are scaled by the initial impact of a one standard error shock on the variable shocked itself. The size of the raw shock tend to be reasonably consistent in Germany and the United States. In particular, large oil price shocks are consistently estimated, while output shocks tend to be small.

Overall, the figures display plausible impulse responses functions. A positive world shock increases significantly domestic output for five quarters and the effect crosses zero after eight quarters. The oil prices shock induces an important negative response to output. The response is significant for the first ten quarters and totally disappears after 25 quarters. As expected, a shock to the GDP equation increases this variable significantly for the first three quarters and the impulse response function crosses zero after five quarters. A fiscal shock characterized by a shift in government net lending increases output for few quarters but this effect is never significant. Finally, a monetary policy shock (i.e. a disturbance to the interest rate equation) reduces output for 18 quarters but this effect is only slightly significant for responses between 5 to 9 quarters after the shock.

Figures 3 and 4 show that, in general, the effect of structural shocks to German GDP are "more" persistent than for United States. For example, the negative effect of oil prices shock persists until close to 30 quarters and this effect is significant for up to 20 quarters. The response to an innovation to the output equation is more important at the impact than for the United States and the shape of this responses is more protracted. The impact of the structural shock corresponding to inflation equation is positive while this shock has a negative effect on output in the United States and the effect for Germany is long lasting. The response to a government shock is positive as expected and persistent but never significant. The shock to the interest rate equation has a counter-intuitive slightly (positive) effect for the first eight quarters before turning negative for 18 quarters. Such an unusual output response suggests that the identified shock may be contaminated by factors other than monetary policy innovations.

4.2 A comparative study of impulse-response functions

As shown above, the identified structural shocks seem to induce more persistent effects on German GDP than on the US GDP. We now evaluate if those effects on both economies are significantly different using the two proposed tests described earlier. First, figures 5 and 6 report the difference between German GDP and US GDP impulse response functions to the eight structural shocks and the corresponding 90 % confidence intervals. Results show that the difference of the impulse response functions to structural shocks are not significant except for the first quarter in the cases of the structural shocks in the external and internal components of demand and the third and fourth quarters for the structural shock to output equation.

[Insert Figures 5-6]

While the individual response are not significant, their cumulative effects could be significant implying a significant difference in the resilience for both countries. Tables 1 to 6 contains the statistics $CS_K^{l,m}$ for l and m corresponding to German and US variables and K equals to $0, 4, 8, 12, 20$. The statistics thus reported measure the cumulative effects of structural shocks at the impact and after one, two, three and five years and the corresponding 90 % confidence interval. Tables show that the zero value is always contained in the 90 % confidence interval whatever the structural shocks considered and the horizon of the cumulative effect except for few exceptions. Those results hold also for the eight variables and for all horizons under investigation.

[Insert Tables 1 to 5]

In conclusion, while qualitative results seems to show more resilience in the US economy than in the German economy, the difference in the respective impulse response functions and their cumulative effects are never statistically significant. The two new statistical tests proposed here allow us to formally evaluate this difference in the responses to structural shocks otherwise than by the usual eye inspection. At the conventional confidence margin, we can not reject the hypothesis that the impulse response functions are statistically similar in all cases.

In the Annexe, the impulse response functions to the structural shocks for the eight variables are presented for the two countries (see figures 7 to 15). The variables and the structural shocks are numbered from one to eight corresponding to the ordering presented above. In general, these impulse responses functions are consistent with our expectations but the difference is never significant as shown by the results for the statistic tests based on the cumulative effects (see Tables 1 to 5).

5 Robustness analysis

In this section, the robustness of the previous conclusion is addressed in many dimensions. First, we allow for more conservative confidence bands, i.e. 16% and 84%. Second, we look at alternative specifications. Especially, we relax the assumption of the existence of a trend for each variable. Third, we take care about the number of variables in the VAR specification and the number of lags since this may matter for the bootstrapping procedure. Fourth, we consider alternative specifications by including the exchange rate, the terms of trade, etc. We also look at different ordering of variable in order to take into account of the standard criticism of the Cholesky decomposition. In addition, we impose the same types of restrictions as in the OECD study. Fifth, we estimate SVAR models in Canada, France, Italy, Japan, and the United Kingdom.[13]

5.1 Conservative tests

To study the impact of the confidence level, we compare the impulse-response functions between the US and Germany at the 16% level. Tables 6 - 9 show that there is still weak evidence of statistically significant differences across these two countries. This suggests that a higher confidence level should be considered in order to obtain significant patterns of the impulse-response functions.

[Insert Tables 6 to 9]

5.2 Alternative trend specifications

Figures 7 to 10 (respectively Figures 11 to 14) reports the differences between the benchmark and bias-corrected impulse-response functions in the United States (respectively in Germany) when the VAR specification includes trends for all variables, except for the inflation rate and the nominal interest rate (see Dungey and Pagan, 2000). Results are slightly different from the ones displayed in the previous section. But, there is still no significant differences between Germany and the United States.

[Insert Figures 7 to 14]

We find similar results if we now introduce a trend for all variable, except for the inflation rate. These results are confirmed by our two tests.[14]

[13]The SVAR model were also re-examined by considering sampling periods. Overall, our results are robust and we canmot get statistically significant different impulse-response functions between the US and Germany.

[14]Results are not reported but are available on request.

5.3 The number of variables

Starting form the benchmark specification of the OECD study, we re-estimate the model without the net lending ratio. Tables 10 to 13 report the differences of the cumulative impulse-response functions over the first 4 (respectively 20) quarters at the 5% confidence level (respectively 20%).

[Insert Tables 10 - 13]

Results show that there is no significant differences across these two countries.

5.4 Alternative specifications

To further investigate the sensitivity of our results to the chosen variables, we consider alternative specifications. First, we re-estimate the VAR model using the exchange rate or the terms of trade. However, there is still no significant results between the US and Germany. Second, the globalized- and internally-focused components of demand were replaced by the consumption, investment and exports variables. Overall, our results are still robust. Third, since the Cholesky's decomposition is sensitive to the ordering of variables, we consider different orderings of the domestic economy. Our conclusions are unchanged.[15] Note also that imposing restrictions on the contemporaneous and lagged matrices (as in the OECD study) does not change the results.

5.5 Other OECD countries

Finally, we estimate the VAR model in Canada, France, Italy, Japan and the United Kingdom.[16] In the case of France, impulse-responses functions are detailed in Figures 15 to 18. Tables 14 to 17 (respectively 18 to 21) report the results of the test, namely whether there are some statistical differences of the cumulative impulse-response functions between the US and France at 5% level (respectively 16% level). Overall, our results suggest that no statistical differences can be captured even if we consider a higher confidence level.

[Insert Tables 14 - 17], [Figures 15-18]

Similar results are also obtained in the case of Canada (Figures 19 to 22, Tables 22 to 29). Overall, there is no international evidence of statistically different impulse-response

[15] Results are not reported but are available on request.

[16] Results are reported for Canada and France. Other results are available on request.

functions and thus of a resilience effect. But again, this may also reflect the fact that we estimate the VAR model over a long period, i.e. impulse-response functions does not capture only the most recent period and thus to some extent the resilience effect.

6 Conclusion

In an earlier study, the OECD examined whether some countries differ significantly in their responses to shocks and identified a resilience effect. In the paper, we re-examine this empirical evidence. In particular, we provide two new tests to evaluate the difference in resilience between two countries measured by impulse-response functions for a given structural shock.

Overall, our results suggest that the empirical evidence is weak, e.g. it is difficult to find statistical differences of impulse-response functions across OECD countries. For instance, qualitative results seems to show more resilience in the US economy than in the German economy but the difference in the respective impulse response functions and their cumulative effects are never statistically significant. This result appear to be robust in any dimensions: choice of the sample period, the number of variables, the VAR specification, the method of estimation. At the same time, this should be only interpreted as the absence of a resilience effect using VAR model. Indeed, the resilience effect might be difficult to capture since it only concerns the end-of-sample. Other techniques may be used to characterize it.

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List of variables

Variable 1: World GDPV
Variable 2: Oil shock
Variable 3: External demand
Variable 4: Internal demand
Variable 5: GDPV
Variable 6: Inflation
Variable 7: Net lending ratio
Variable 8: Interest rate

Figure 1: Impulse-response functions on US output

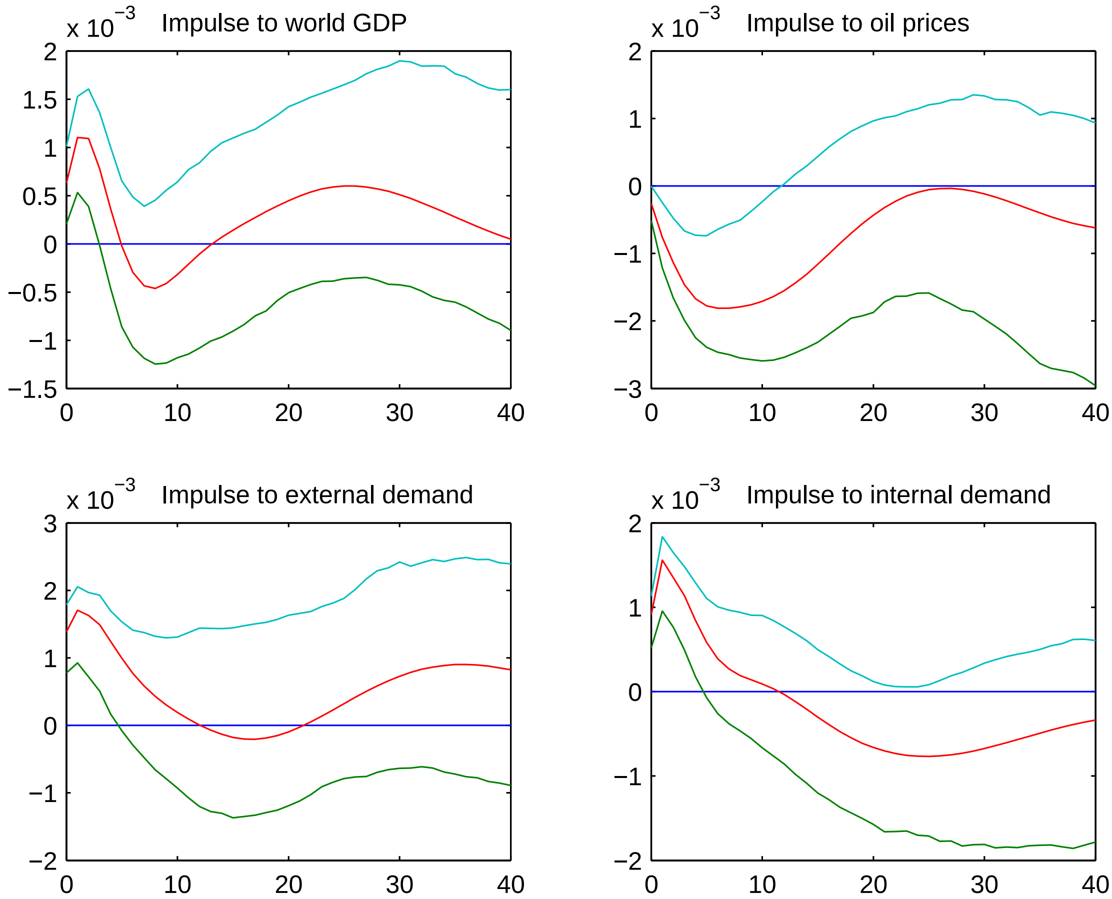

Figure 2: Impulse-response functions on US output

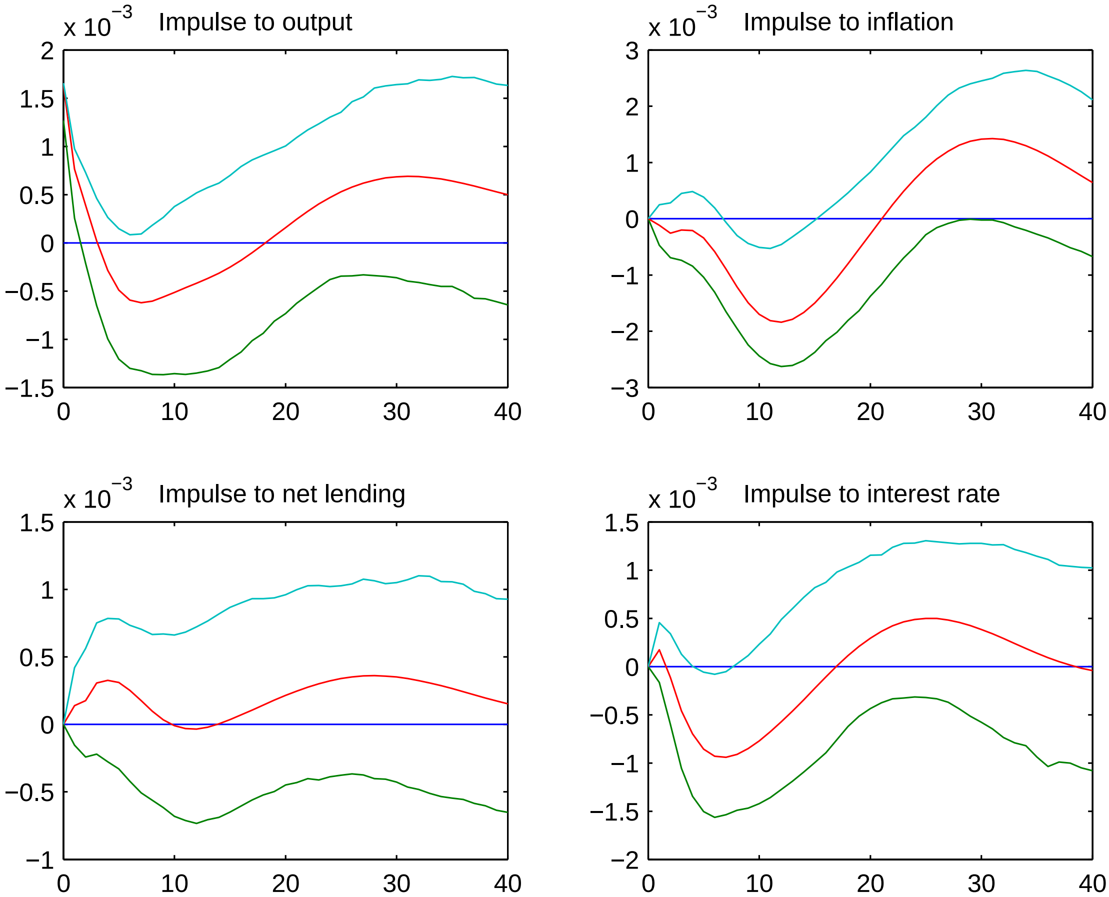

Figure 3: Impulse-response functions on German output

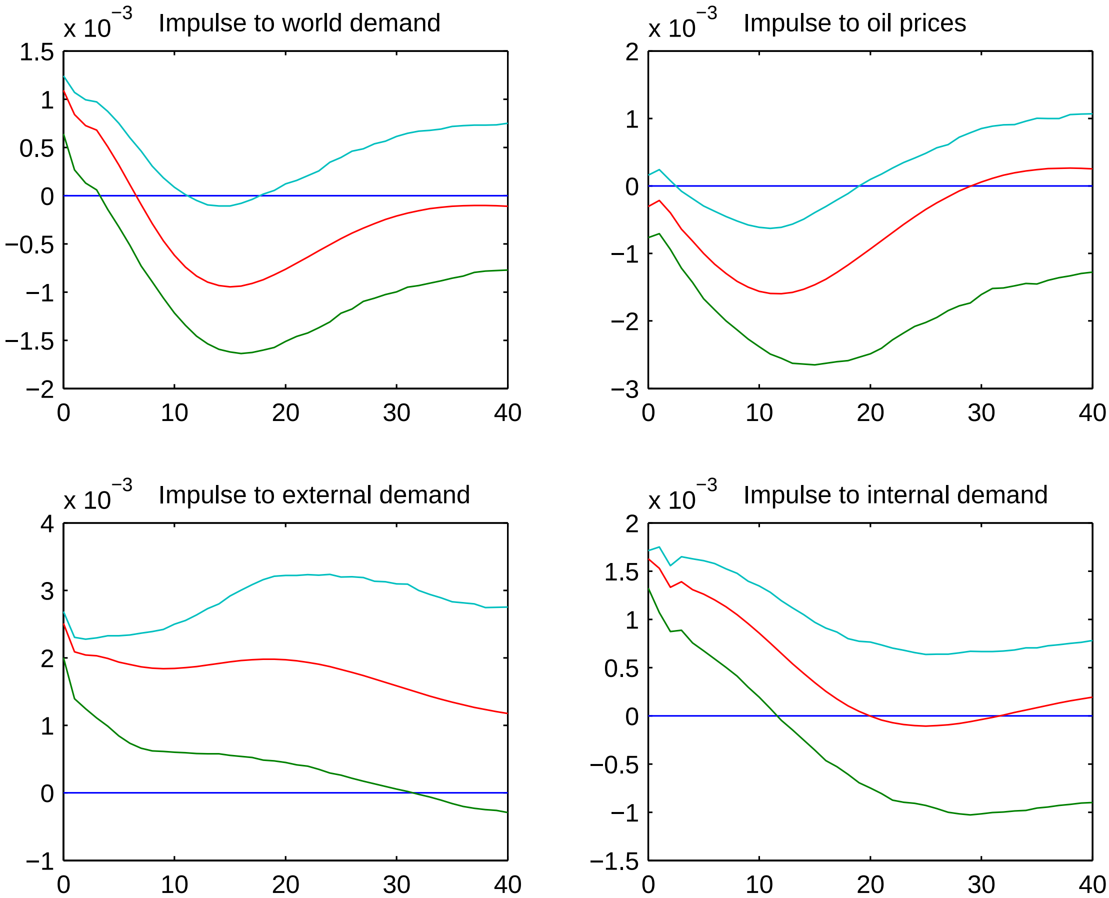

Figure 4: Impulse-response functions on German output

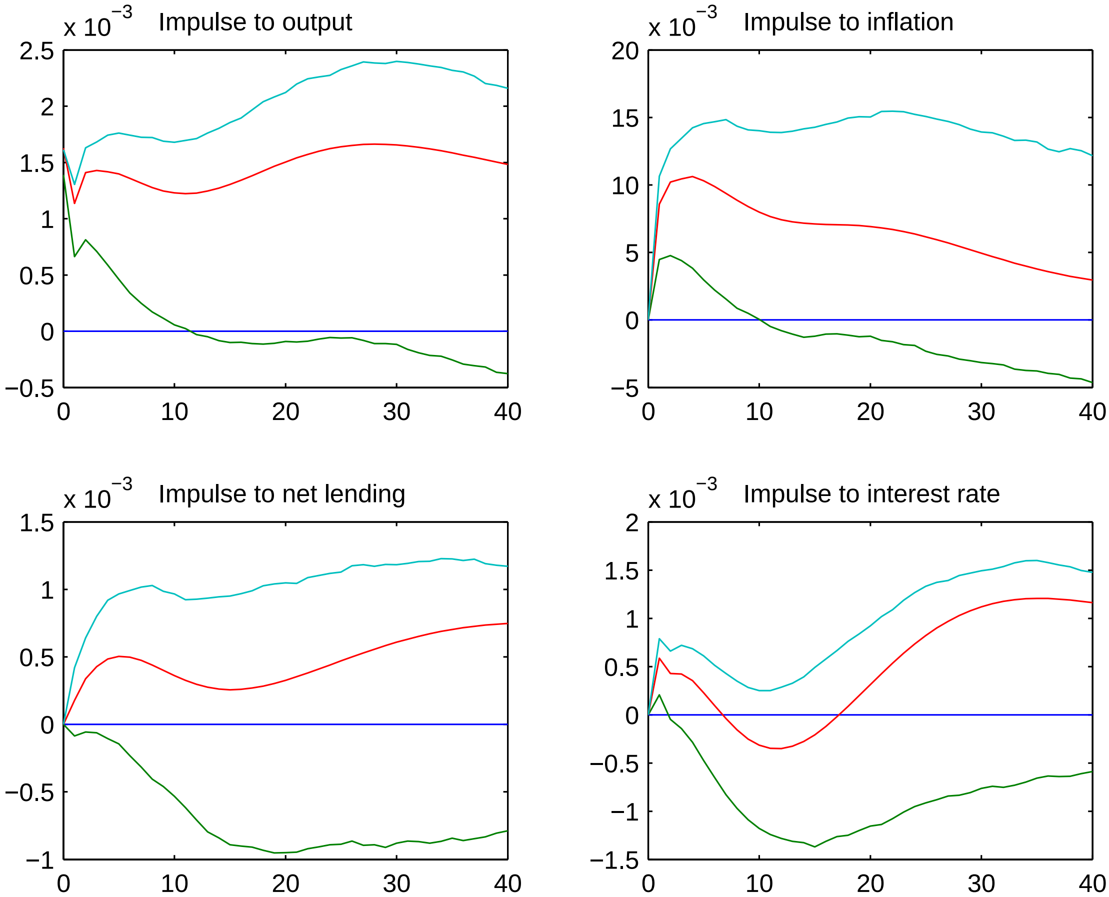

Figure 5: Difference for the impulse-response functions

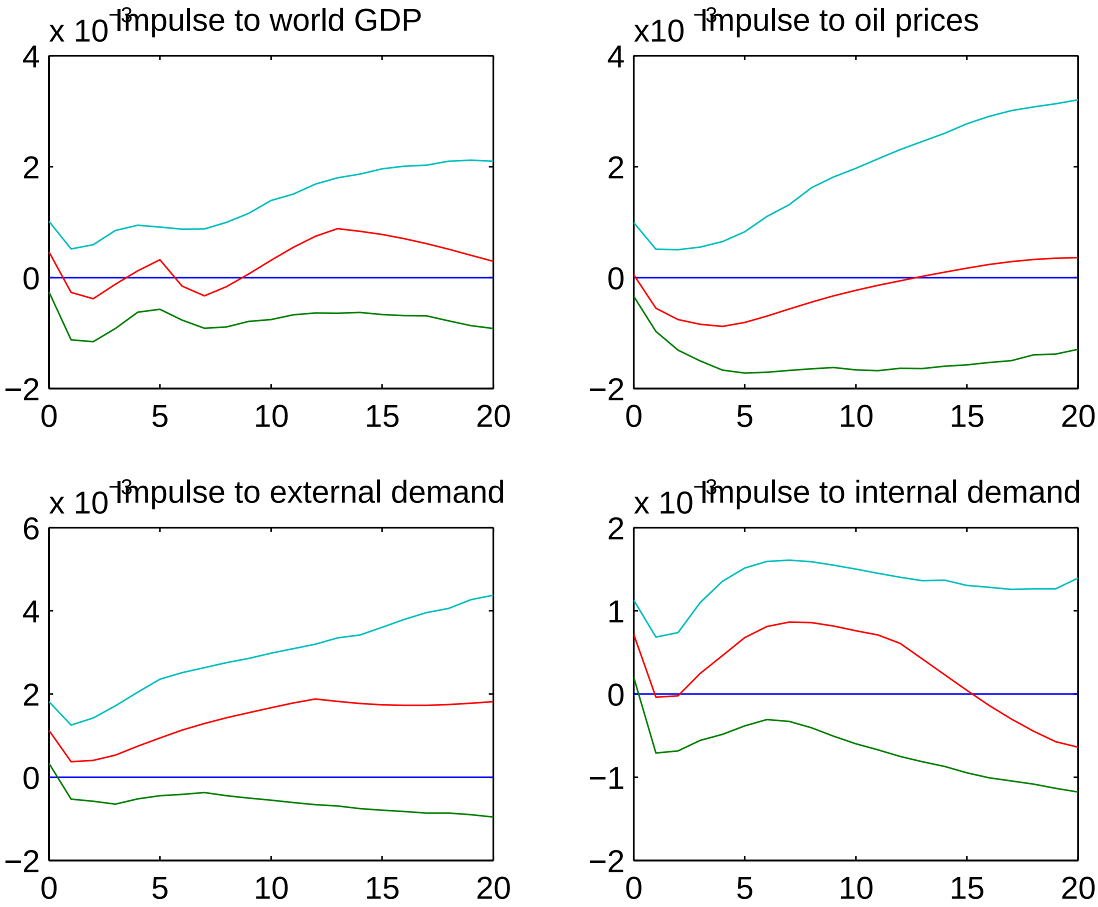

Figure 6: Difference for the impulse-response functions

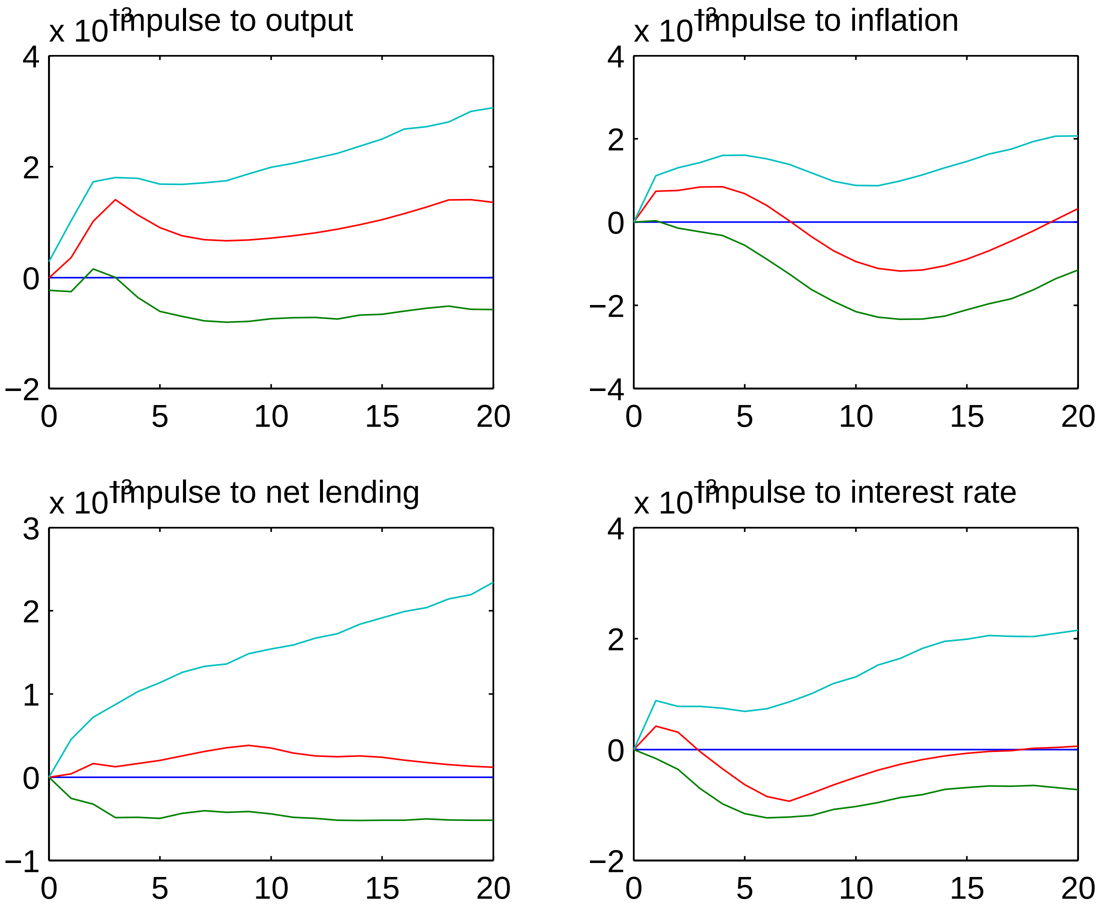

Table 1: Differences of impulse-response functions at the impact

	.05 quantile	value	.95 quantile	.05 quantile	value	.95 quantile
shocks	variable 1			variable 5		
1	-0.1021	-0.0011	0.0017	-0.0083	0.0005	0.0216
2	-0.1549	0.0000	-0.0035	-0.0256	0.0000	0.0344
3	-0.0563	0.0000	0.0449	-0.0074	0.0011	0.0575
4	-0.0554	0.0000	0.0207	-0.0083	0.0007	0.0224
5	-0.0264	0.0000	0.0585	-0.0064	-0.0000	0.0394
6	-0.0555	0.0000	0.0143	-0.0238	0.0000	0.0236
7	-0.0359	0.0000	0.0472	-0.0056	0.0000	0.0267
8	-0.0439	0.0000	0.0590	-0.0109	0.0000	0.0228
shocks	variable 2			variable 6		
1	-0.1541	0.0071	0.3050	-0.9835	-0.0082	0.9298
2	-0.5902	-0.0037	0.1604	-2.0133	-0.0341	0.2368
3	-0.3180	0.0000	0.4669	-1.5535	-0.0233	0.9682
4	-0.2953	0.0000	0.1840	-0.6772	-0.0025	1.1409
5	-0.3736	0.0000	0.2496	-1.2872	-0.0311	0.7222
6	-0.2824	0.0000	0.1996	-2.1350	-0.0207	0.3158
7	-0.1584	0.0000	0.2700	-0.5207	0.0000	0.9911
8	-0.1921	0.0000	0.2527	-1.1027	0.0000	0.7821
shocks	variable 3			variable 7		
1	-0.1102	0.0019	0.0162	-7.1312	-0.1243	0.3828
2	-0.1460	0.0010	0.0119	-11.0682	-0.0906	-0.5673
3	-0.1360	0.0029	0.0104	-7.7126	-0.1124	0.4196
4	-0.0860	0.0000	0.0094	-5.3306	-0.0827	0.8062
5	-0.0479	0.0000	0.0350	-3.1758	-0.0445	1.4546
6	-0.0641	0.0000	0.0189	-3.5732	-0.0145	0.9482
7	-0.0607	0.0000	0.0265	-2.9787	-0.0982	2.8832
8	-0.0528	0.0000	0.0407	-3.4841	0.0000	1.4879
shocks	variable 4			variable 8		
1	-0.0147	0.0003	0.0326	-0.3866	0.0000	0.2114
2	-0.0244	0.0008	0.0545	-0.3974	-0.0030	0.2058
3	-0.0130	0.0002	0.0753	-0.9032	-0.0091	0.1408
4	-0.0087	0.0012	0.0340	-0.3274	-0.0026	0.2518
5	-0.0174	0.0000	0.0476	-0.2162	0.0004	0.3435
6	-0.0434	0.0000	0.0246	-0.3706	0.0024	0.2013
7	-0.0073	0.0000	0.0371	-0.2803	-0.0036	0.2864
8	-0.0167	0.0000	0.0292	-0.1850	-0.0051	0.3163

Table 2: Differences of the cumulative impulse-response functions over the first 4 quarters

	.05 quantile	value	.95 quantile	.05 quantile	value	.95 quantile
shocks		variable 1			variable 5	
1	-0.0153	-0.0117	-0.0050	-0.0033	-0.0003	0.0027
2	-0.0064	-0.0039	4.5e-005	-0.0038	-0.0021	0.0022
3	-0.0057	-0.0030	0.0014	-0.0008	0.0025	0.0060
4	-0.0032	-0.0005	0.0014	-0.0014	0.0009	0.0033
5	-0.0018	0.0019	0.0032	1.7e-005	0.0028	0.0045
6	-0.0031	0.0007	0.0037	-0.0002	0.0024	0.0037
7	-0.0037	-0.0013	0.0012	-0.0010	0.0003	0.0020
8	-0.0035	-0.0010	0.0016	-0.0010	0.0007	0.0022
shocks		variable 2			variable 6	
1	-0.0070	0.0470	0.0830	-0.2742	-0.0291	0.1847
2	-0.0706	-0.0367	0.0222	-0.4642	-0.3318	-0.0420
3	-0.0197	0.02071	0.0397	-0.2589	-0.1405	0.1012
4	-0.0386	-0.0114	0.0212	-0.1293	0.0058	0.0847
5	-0.0238	0.0040	0.0321	-0.1873	-0.0268	0.0950
6	-0.0251	0.0055	0.0386	-0.3567	-0.2140	0.0493
7	-0.0188	0.0070	0.0270	-0.0929	0.0470	0.1373
8	-0.0180	0.0118	0.0391	-0.0692	0.0733	0.1864
shocks		variable 3			variable 7	
1	-0.0115	-0.0028	0.0051	-1.0645	-0.7706	-0.2018
2	-0.0046	0.0015	0.0061	-0.7485	-0.5307	0.0190
3	-0.0128	-0.0054	0.0045	-0.9953	-0.7107	-0.1374
4	-0.0038	-0.0008	0.0027	-0.4323	-0.2663	0.2134
5	-0.0032	1.5 e-005	0.0038	-0.2699	-0.0993	0.2607
6	-0.0036	0.0016	0.0068	-0.2176	0.1350	0.3614
7	-0.0060	-0.0036	0.0021	0.1959	0.6487	0.9921
8	-0.0033	0.0023	0.0062	-0.2260	-0.0037	0.1956
shocks		variable 4			variable 8	
1	-0.0011	-0.0001	0.0021	-0.0589	-0.0053	0.040
2	-0.0038	-0.0004	0.0040	-0.0512	-0.0080	0.037
3	-0.0001	0.0034	0.0060	-0.1196	-0.0760	-0.0105
4	0.0004	0.0030	0.0057	-0.0563	-0.0264	0.0255
5	-0.0019	-0.0003	0.0023	-0.0129	0.0394	0.0681
6	-0.0027	-0.0010	0.0015	-0.0270	0.0213	0.0522
7	-0.0006	0.0014	0.0027	-0.0559	-0.0120	0.0356
8	-0.0028	-0.0021	0.0004	-0.0454	-0.0086	0.0468

Table 3: Differences of the cumulative impulse-response functions over the first 8 quarters

	.05 quantile	value	.95 quantile	.05 quantile	value	.95 quantile
shocks		variable 1			variable 5	
1	-0.0365	-0.0267	-0.0062	-0.0041	-0.0003	0.0047
2	-0.0259	-0.0169	-0.0017	-0.0097	-0.005	0.0055
3	-0.0139	-7.0e-005	0.0092	-0.0018	0.0068	0.0154
4	-0.0094	-0.0037	0.0030	-0.0023	0.0037	0.0093
5	-0.0075	0.0072	0.0144	-0.0013	0.0063	0.01124
6	-0.0194	-0.0101	0.0032	-0.0022	0.0044	0.0090
7	-0.0118	-0.0027	0.0058	-0.0022	0.0012	0.0057
8	-0.0091	0.0011	0.0111	-0.0046	-0.0022	0.0036
shocks		variable 2			variable 6	
1	-0.0298	0.1042	0.1645	-0.5604	0.0069	0.5026
2	-0.2152	-0.1219	0.0636	-0.7739	-0.4324	0.0296
3	-0.0692	0.0623	0.1268	-0.7316	-0.3790	0.2626
4	-0.0919	-0.0208	0.0535	-0.3022	0.0823	0.2958
5	-0.0838	-0.0361	0.0652	-0.3659	0.0495	0.3006
6	-0.0968	0.0008	0.0933	-0.9557	-0.6098	0.1134
7	-0.0478	0.0044	0.0799	-0.2310	0.1392	0.4210
8	-0.0487	0.0512	0.1111	-0.2253	0.2185	0.4260
shocks		variable 3			variable 7	
1	-0.0296	-0.0092	0.0124	-2.1606	-1.432	-0.1689
2	-0.0254	-0.0105	0.0046	-2.2452	-1.626	-0.2837
3	-0.0414	-0.0255	0.0031	-2.4374	-1.8191	-0.1262
4	-0.0111	-0.0060	0.0055	-0.7432	-0.4741	0.3074
5	-0.0158	-0.0036	0.0092	-0.7986	-0.0822	0.7497
6	-0.0165	-0.0028	0.0136	-0.5347	0.1483	0.6645
7	-0.0202	-0.0132	0.0051	-0.3372	0.8877	1.8668
8	-0.0118	-0.0003	0.0093	-0.7644	-0.1824	0.4982
shocks		variable 4			variable 8	
1	-0.0055	-0.0023	0.0046	-0.1162	0.0212	0.1158
2	-0.0087	-0.0013	0.0107	-0.0753	0.023	0.0979
3	-0.0005	0.0095	0.016	-0.2737	-0.2001	-0.0091
4	-0.0008	0.0063	0.0139	-0.0651	-0.0024	0.0889
5	-0.0064	0.0003	0.0081	-0.0344	0.0955	0.1703
6	-0.0103	-0.0056	0.00339	-0.1215	-0.0220	0.1095
7	-0.0020	0.0042	0.00867	-0.1249	-0.0210	0.0989
8	-0.0087	-0.0075	0.0023	-0.0740	0.0400	0.1484

Table 4: Differences of the cumulative impulse-responses functions over the first 12 quarters

	.05 quantile	value	.95 quantile	.05 quantile	value	.95 quantile
shocks		variable 1			variable 5	
1	-0.0527	-0.0392	-0.0071	-0.0053	0.0004	0.0073
2	-0.0577	-0.0372	-0.0049	-0.0150	-0.0061	0.0116
3	-0.0225	0.0073	0.0184	-0.0034	0.0132	0.0248
4	-0.0204	-0.0096	0.0069	-0.0033	0.0068	0.0145
5	-0.0124	0.0176	0.0297	-0.0034	0.0093	0.0182
6	-0.0305	-0.0167	0.0045	-0.0080	0.0015	0.0128
7	-0.0186	0.0021	0.0162	-0.0033	0.0027	0.01192
8	-0.0164	0.0070	0.0248	-0.0082	-0.0043	0.0076
shocks		variable 2			variable 6	
1	-0.0647	0.1369	0.2325	-0.6489	0.1118	0.6782
2	-0.3478	-0.2076	0.0945	-0.9843	-0.5511	0.0213
3	-0.1319	0.1052	0.2277	-1.051	-0.5665	0.4585
4	-0.1491	-0.0294	0.0962	-0.4489	0.2556	0.5535
5	-0.1673	-0.0614	0.1323	-0.6304	0.0287	0.4667
6	-0.1474	-0.0047	0.1515	-1.234	-0.6909	0.2720
7	-0.0823	0.0020	0.1171	-0.3406	0.1343	0.5468
8	-0.0896	0.0590	0.1542	-0.5016	0.0113	0.4539
shocks		variable 3			variable 7	
1	-0.0478	-0.0196	0.0120	-3.2	-1.7918	0.1651
2	-0.0573	-0.0277	0.0048	-4.481	-3.099	-0.4379
3	-0.0714	-0.0487	0.0043	-3.799	-2.874	-0.0522
4	-0.0290	-0.0179	0.0062	-1.626	-0.9652	0.4835
5	-0.0248	-0.0007	0.0149	-1.483	-0.030	1.148
6	-0.0279	-0.0071	0.0172	-1.182	0.3599	0.9074
7	-0.0336	-0.0186	0.0112	-1.103	0.5124	2.094
8	-0.0219	-0.0006	0.0158	-1.592	-0.5946	0.7163
shocks		variable 4			variable 8	
1	-0.0105	-0.0014	0.0126	-0.1785	0.0043	0.1474
2	-0.0129	0.0009	0.0224	-0.1500	0.0185	0.1168
3	-0.0034	0.0147	0.0300	-0.4538	-0.3505	0.0298
4	-0.0029	0.0085	0.0209	-0.1069	-0.0014	0.1481
5	-0.0105	0.0021	0.0168	-0.0737	0.1220	0.2331
6	-0.0214	-0.0137	0.0070	-0.1827	-0.0817	0.1422
7	-0.0042	0.0058	0.0158	-0.1848	-0.0277	0.1623
8	-0.0136	-0.0103	0.0066	-0.0943	0.0743	0.2229

Table 5: Differences of the cumulative impulse-response functions over the first 20 quarters

	.05 quantile	value	.95 quantile	.05 quantile	value	.95 quantile
shocks		variable 1			variable 5	
1	-0.0941	-0.0624	-0.0036	-0.0084	0.0061	0.0209
2	-0.1418	-0.0979	-0.0065	-0.0222	-0.0037	0.0319
3	-0.0553	0.0185	0.0442	-0.0068	0.0280	0.0518
4	-0.0498	-0.0196	0.0192	-0.0071	0.0070	0.0209
5	-0.0225	0.0424	0.0593	-0.0061	0.0185	0.0358
6	-0.0502	-0.0168	0.01472	-0.0219	-0.0043	0.0218
7	-0.0347	0.0132	0.0404	-0.0054	0.0041	0.0234
8	-0.0384	0.0163	0.0538	-0.0111	-0.0051	0.0195
shocks		variable 2			variable 6	
1	-0.1411	0.1570	0.2975	-1.027	0.2054	0.8791
2	-0.5137	-0.3234	0.1824	-1.896	-1.061	0.1441
3	-0.2928	0.1781	0.4081	-1.361	-0.4792	0.8559
4	-0.2803	-0.0719	0.1559	-0.694	0.5534	1.034
5	-0.2839	-0.1056	0.2196	-1.148	-0.2748	0.7458
6	-0.2660	-0.0172	0.1728	-2.021	-1.207	0.3832
7	-0.1490	-0.0172	0.2264	-0.6355	0.1044	0.9505
8	-0.1864	0.05215	0.2090	-1.145	-0.3024	0.6669
shocks		variable 3			variable 7	
1	-0.1051	-0.0490	0.0156	-6.546	-3.627	0.2040
2	-0.1251	-0.0688	0.0054	-9.368	-6.755	-0.4805
3	-0.1302	-0.0838	0.0141	-7.641	-4.467	0.3179
4	-0.0783	-0.0521	0.0086	-4.871	-2.780	0.6488
5	-0.0452	0.0052	0.0330	-2.849	-0.488	1.642
6	-0.0585	-0.0161	0.0193	-2.982	-0.1318	1.040
7	-0.0546	-0.0231	0.0270	-2.646	-0.3071	2.835
8	-0.0462	0.0121	0.0391	-3.403	-0.4699	1.349
shocks		variable 4			variable 8	
1	-0.0150	0.0081	0.0326	-0.3695	-0.0288	0.2010
2	-0.0218	0.0128	0.0529	-0.3485	0.0056	0.1742
3	-0.0117	0.0254	0.0655	-0.8093	-0.5953	0.1257
4	-0.0078	0.0109	0.0322	-0.2853	-0.0761	0.2373
5	-0.0174	0.0119	0.0399	-0.1899	0.1475	0.3696
6	-0.0426	-0.0238	0.0192	-0.3622	-0.1640	0.1796
7	-0.0090	0.0082	0.0308	-0.2834	-0.0533	0.2435
8	-0.0180	-0.0112	0.0227	-0.1910	0.0772	0.2733

Table 6: Differences of the cumulative impulse-response functions over the first 4 quarters

	.16 quantile	value	.84 quantile	.16 quantile	value	.84 quantile
shocks	variable 1			variable 5		
1	-0.0132	-0.0118	-0.0068	-0.0022	-0.0003	0.0013
2	-0.0051	-0.0040	-0.0011	-0.0027	-0.0021	0.0008
3	-0.0042	-0.0030	0.0001	0.0004	0.0025	0.0046
4	-0.0019	-0.0005	0.0006	-0.0004	0.0009	0.0024
5	-0.0007	0.0019	0.0022	0.0009	0.0028	0.0036
6	-0.0016	0.0007	0.0025	0.0005	0.0024	0.0029
7	-0.0025	-0.0013	0.0004	-0.0004	0.0003	0.0013
8	-0.0023	-0.0010	0.0009	-0.0005	0.0007	0.0014
shocks	variable 2			variable 6		
1	0.01184	0.0470	0.0633	-0.1743	-0.0291	0.1041
2	-0.0506	-0.0366	0.0045	-0.3813	-0.3318	-0.1212
3	-0.0074	0.0207	0.0277	-0.1932	-0.1405	0.0375
4	-0.0242	-0.0113	0.0091	-0.0834	0.0058	0.0458
5	-0.0127	0.0040	0.0184	-0.1209	-0.0268	0.0407
6	-0.0118	0.0055	0.0212	-0.2697	-0.2140	-0.0258
7	-0.0091	0.0070	0.0168	-0.0430	0.0470	0.0891
8	-0.0076	0.0119	0.0269	-0.0206	0.0733	0.1369
shocks	variable 3			variable 7		
1	-0.0080	-0.0028	0.0018	-0.9008	-0.7706	-0.3897
2	-0.0024	0.0015	0.0037	-0.6183	-0.5308	-0.1436
3	-0.0091	-0.0055	0.0009	-0.8399	-0.7107	-0.3151
4	-0.0023	-0.0008	0.0015	-0.3054	-0.2663	0.0590
5	-0.0018	1.5e-005	0.0023	-0.1686	-0.0993	0.1181
6	-0.0016	0.0016	0.0044	-0.0979	0.1350	0.2280
7	-0.0044	-0.00362	0.0005	0.3191	0.6489	0.8214
8	-0.0013	0.0023	0.0042	-0.1433	-0.0037	0.0939
shocks	variable 4			variable 8		
1	-0.0005	-0.0001	0.0013	-0.0422	-0.0053	0.02023
2	-0.0023	-0.0004	0.0023	-0.0322	-0.0080	0.0207
3	0.0010	0.0034	0.0047	-0.0954	-0.0760	-0.0315
4	0.0014	0.0030	0.0047	-0.0389	-0.0265	0.0092
5	-0.0012	-0.0003	0.0013	0.0025	0.0394	0.0524
6	-0.0019	-0.0011	0.0007	-0.0089	0.0213	0.0388
7	-0.0001	0.0014	0.0019	-0.0376	-0.01199	0.01856
8	-0.0021	-0.0021	-0.0002	-0.0273	-0.0086	0.0294

Table 7: Differences of the cumulative impulse-response functions over the first 8 quarters

	.16 quantile	value	.84 quantile	.16 quantile	value	.84 quantile
shocks		variable 1			variable 5	
1	-0.0298	-0.0267	-0.0119	-0.0026	-0.0003	0.0024
2	-0.0218	-0.0170	-0.0069	-0.0072	-0.0050	0.0018
3	-0.0071	-7.0e-005	0.0052	0.0010	0.0068	0.0115
4	-0.0061	-0.0037	0.0006	-0.0002	0.0037	0.0069
5	-0.0020	0.0072	0.0104	0.0008	0.0064	0.0082
6	-0.0150	-0.0107	-0.0013	-0.0003	0.0044	0.0067
7	-0.0076	-0.0027	0.0027	-0.0010	0.0012	0.0039
8	-0.0049	0.0011	0.0078	-0.0031	-0.0022	0.0017
shocks		variable 2			variable 6	
1	0.01016	0.1042	0.1220	-0.3002	0.0069	0.3092
2	-0.1567	-0.1219	0.0109	-0.5473	-0.4324	-0.0982
3	-0.0314	0.06238	0.0794	-0.4999	-0.3790	0.0876
4	-0.0579	-0.0209	0.0282	-0.1875	0.0822	0.1711
5	-0.0491	-0.0362	0.0386	-0.2252	0.0495	0.1447
6	-0.0537	0.0008	0.0555	-0.7527	-0.6098	-0.0986
7	-0.0224	0.0044	0.0446	-0.0868	0.1392	0.2847
8	-0.0242	0.05120	0.0722	-0.090	0.2185	0.2895
shocks		variable 3			variable 7	
1	-0.0193	-0.0092	0.0044	-1.686	-1.432	-0.4942
2	-0.0180	-0.0104	0.0004	-1.817	-1.626	-0.6520
3	-0.0321	-0.0254	-0.0047	-1.882	-1.819	-0.5521
4	-0.0074	-0.0059	0.0016	-0.5215	-0.4741	0.0874
5	-0.0093	-0.0036	0.0043	-0.5134	-0.0822	0.4270
6	-0.0108	-0.0028	0.0080	-0.2723	0.1483	0.4344
7	-0.0144	-0.0132	0.0009	0.0601	0.8877	1.407
8	-0.0065	-0.0003	0.0047	-0.5050	-0.1825	0.2135
shocks		variable 4			variable 8	
1	-0.0036	-0.0023	0.0023	-0.0666	0.0212	0.0713
2	-0.0056	-0.0014	0.0062	-0.0471	0.0234	0.0623
3	0.0023	0.0095	0.0127	-0.2258	-0.2001	-0.0542
4	0.0022	0.0063	0.0110	-0.0389	-0.0024	0.0532
5	-0.0040	0.00027	0.0051	-0.0050	0.0955	0.1201
6	-0.0077	-0.0056	0.0007	-0.0727	-0.0220	0.0661
7	-0.0004	0.0042	0.0059	-0.0865	-0.0210	0.0489
8	-0.0064	-0.0075	-0.0001	-0.0251	0.0400	0.1032

Table 8: Differences of the cumulative impulse-response functions over the first 12 quarters

	.16 quantile	value	.84 quantile	.16 quantile	value	.84 quantile
shocks		variable 1			variable 5	
1	-0.0413	-0.0392	-0.0140	-0.0031	0.0004	0.0042
2	-0.0481	-0.0373	-0.0154	-0.0104	-0.0061	0.0058
3	-0.0126	0.0073	0.01081	0.0011	0.0132	0.0185
4	-0.0122	-0.0096	0.0025	-0.0002	0.0069	0.0109
5	-0.0022	0.0176	0.0211	-0.0002	0.0093	0.0130
6	-0.0214	-0.0167	-0.0001	-0.0051	0.0015	0.0080
7	-0.0108	0.0021	0.0098	-0.0011	0.0027	0.0074
8	-0.0063	0.0070	0.0179	-0.0050	-0.0043	0.0037
shocks		variable 2			variable 6	
1	-0.0032	0.1369	0.1638	-0.3907	0.1118	0.4394
2	-0.2527	-0.2076	0.0047	-0.7651	-0.5511	-0.1928
3	-0.0661	0.1052	0.1396	-0.6665	-0.5665	0.1489
4	-0.0948	-0.02943	0.0538	-0.2368	0.2556	0.3851
5	-0.0973	-0.06140	0.0689	-0.4243	0.0287	0.2115
6	-0.0877	-0.0047	0.0807	-0.9043	-0.6909	0.0074
7	-0.0374	0.0020	0.0726	-0.1667	0.1343	0.3619
8	-0.0344	0.0590	0.0948	-0.3111	0.0113	0.2469
shocks		variable 3			variable 7	
1	-0.0353	-0.0196	0.0023	-2.423	-1.792	-0.4226
2	-0.0436	-0.0277	-0.0053	-3.519	-3.100	-1.142
3	-0.0520	-0.0487	-0.0079	-2.845	-2.875	-0.5578
4	-0.0190	-0.0179	0.0005	-1.151	-0.965	0.0490
5	-0.0155	-0.0007	0.0073	-0.8992	-0.0300	0.5003
6	-0.0165	-0.0071	0.0089	-0.6590	0.3599	0.5388
7	-0.0218	-0.0186	0.0036	-0.4424	0.5124	1.485
8	-0.0120	-0.0006	0.0091	-0.9505	-0.5946	0.2401
shocks		variable 4			variable 8	
1	-0.0058	-0.0014	0.0068	-0.1056	0.0043	0.0828
2	-0.0074	0.0009	0.0147	-0.08639	0.0185	0.0588
3	0.0021	0.01468	0.0228	-0.3541	-0.3505	-0.0668
4	0.0016	0.0085	0.0160	-0.0564	-0.0014	0.0942
5	-0.0055	0.00212	0.0112	-0.0189	0.1220	0.1622
6	-0.0167	-0.0137	0.0012	-0.1223	-0.0817	0.0761
7	-0.0010	0.00580	0.0107	-0.1150	-0.0277	0.0880
8	-0.0092	-0.0103	0.0025	-0.0353	0.07429	0.1452

Table 9: Differences of the cumulative impulse-response functions over the first 20 quarters

	.16 quantile	value	.84 quantile	.16 quantile	value	.84 quantile
shocks		variable 1			variable 5	
1	-0.0719	-0.0624	-0.0154	-0.0035	0.0061	0.0119
2	-0.1086	-0.0979	-0.0314	-0.0139	-0.0037	0.0177
3	-0.0308	0.0185	0.0235	0.0016	0.0280	0.0373
4	-0.0325	-0.0196	0.0061	-0.0017	0.0070	0.0141
5	-0.0080	0.0424	0.0402	-0.0006	0.01847	0.0245
6	-0.0339	-0.0168	0.0013	-0.0135	-0.0043	0.0104
7	-0.0181	0.0132	0.0240	-0.0019	0.0041	0.0142
8	-0.0178	0.0163	0.0352	-0.0062	-0.0051	0.0108
shocks		variable 2			variable 6	
1	-0.0464	0.1569	0.2010	-0.5917	0.2054	0.5304
2	-0.3659	-0.3234	0.0451	-1.421	-1.0614	-0.2391
3	-0.1402	0.1781	0.2248	-0.8707	-0.4791	0.3359
4	-0.1821	-0.0718	0.0714	-0.3172	0.5534	0.7105
5	-0.1715	-0.1056	0.1116	-0.8208	-0.2747	0.2765
6	-0.1598	-0.0172	0.0658	-1.542	-1.2072	-0.2229
7	-0.0706	-0.0172	0.1301	-0.2639	0.1044	0.5641
8	-0.0906	0.05214	0.1302	-0.7131	-0.3023	0.3187
shocks		variable 3			variable 7	
1	-0.0774	-0.0490	-0.0037	-5.080	-3.627	-0.6909
2	-0.0972	-0.0687	-0.0116	-7.425	-6.755	-2.080
3	-0.0898	-0.0837	-0.0078	-5.374	-4.467	-0.6759
4	-0.0563	-0.0521	-0.0033	-3.428	-2.780	-0.1810
5	-0.0259	0.00520	0.0168	-1.789	-0.487	0.4951
6	-0.0360	-0.0160	0.0053	-1.880	-0.1318	0.3275
7	-0.0361	-0.0230	0.0117	-1.532	-0.3071	1.614
8	-0.0224	0.01210	0.0244	-1.924	-0.4699	0.4689
shocks		variable 4			variable 8	
1	-0.0070	0.0081	0.0188	-0.2350	-0.0288	0.1121
2	-0.0094	0.0128	0.0339	-0.2172	0.0056	0.0834
3	0.0019	0.02541	0.0475	-0.5755	-0.5953	-0.0449
4	0.0002	0.01099	0.0227	-0.1595	-0.0761	0.1335
5	-0.0061	0.0119	0.0280	-0.0826	0.1475	0.2185
6	-0.0291	-0.0237	0.0041	-0.2059	-0.1640	0.0866
7	-0.0023	0.0082	0.0202	-0.1784	-0.0533	0.1255
8	-0.0111	-0.01117	0.0109	-0.0983	0.07724	0.1811

Table 10: Differences of the cumulative impulse-response functions over the first 4 quarters without the net lending ratio and no trend for inflation

	.05 quantile	value	.95 quantile	.05 quantile	value	.95 quantile
shocks		variable 1			variable 5	
1	-0.0176	-0.0141	-0.0057	-0.0029	-0.0003	0.0028
2	-0.0054	-0.0023	0.0008	-0.0040	-0.0022	0.0019
3	-0.0056	-0.0021	0.0015	-0.0012	0.0022	0.0055
4	-0.0033	-0.0001	0.0015	-0.0014	0.0009	0.0036
5	-0.0016	0.0023	0.0037	0.0002	0.0027	0.0043
6	-0.0019	0.0017	0.0034	7.5 e-005	0.0027	0.0040
7	-0.0034	-0.0003	0.0017	-0.0006	0.0014	0.0029
shocks		variable 2			variable 6	
1	-0.0382	0.0119	0.06014	-0.2978	-0.0965	0.1447
2	-0.0530	-0.0187	0.0378	-0.3393	-0.1289	0.1566
3	-0.0238	0.0184	0.0396	-0.4018	-0.1874	0.0861
4	-0.0370	-0.0135	0.0184	-0.1249	0.0106	0.1475
5	-0.0184	0.0127	0.0295	-0.1598	-0.0001	0.1109
6	-0.0238	-0.0003	0.0245	-0.209	-0.0183	0.2057
7	-0.0240	0.0035	0.0278	-0.1661	-0.0224	0.1116
shocks		variable 3			variable 7	
1	-0.0114	-0.0039	0.0059	-0.0810	-0.0324	0.0285
2	-0.0052	0.0017	0.0073	-0.0467	-0.00217	0.0446
3	-0.0132	-0.0055	0.0033	-0.1177	-0.0718	-0.0100
4	-0.0042	-0.0013	0.0028	-0.0512	-0.0194	0.0319
5	-0.0035	-0.0010	0.0039	-0.0121	0.04482	0.0659
6	-0.0040	0.0012	0.0064	-0.0248	0.02716	0.0524
7	-0.0041	0.0015	0.0059	-0.0386	0.0027	0.0538
shocks		variable 4				
1	-0.0018	-0.0005	0.0017			
2	-0.0039	-0.0009	0.0033			
3	-0.0012	0.0018	0.0051			
4	0.00015	0.0028	0.0056			
5	-0.0021	-0.0008	0.0017			
6	-0.0019	0.00016	0.0024			
7	-0.0024	-0.0013	0.0010			

Table 11: Differences of the cumulative impulse-response functions over the first 20 quarters without the net lending ratio and no trend for inflation

	.05 quantile	value	.95 quantile	.05 quantile	value	.95 quantile
shocks		variable 1			variable 5	
1	-0.0998	-0.0727	-0.0003	-0.0185	-0.0035	0.0136
2	-0.1049	-0.0515	0.0263	-0.0237	-0.0041	0.0272
3	-0.0546	0.0045	0.0373	-0.01098	0.0184	0.0455
4	-0.0380	-0.0054	0.0238	-0.0057	0.0092	0.0230
5	-0.0189	0.0414	0.0651	-0.0104	0.0129	0.0328
6	-0.0333	0.0146	0.0405	-0.0062	0.0177	0.0332
7	-0.0260	0.0259	0.0587	-0.0092	-0.0003	0.0215
shocks		variable 2			variable 6	
1	-0.2674	0.06443	0.2212	-2.168	-1.249	0.3863
2	-0.3742	-0.1511	0.2747	-1.911	-0.7196	1.038
3	-0.2299	0.1846	0.4066	-2.314	-1.289	0.9727
4	-0.2600	-0.0669	0.1949	-1.346	-0.1115	1.128
5	-0.2596	-0.0334	0.2446	-2.107	-1.151	0.7842
6	-0.1604	0.04596	0.2337	-1.506	-0.0865	1.658
7	-0.1493	0.04547	0.2250	-1.122	-0.1955	0.9578
shocks		variable 3			variable 7	
1	-0.0881	-0.0241	0.0177	-0.4029	-0.0681	0.1176
2	-0.1131	-0.0455	0.0245	-0.3391	0.0359	0.2407
3	-0.1401	-0.0828	0.0032	-0.9248	-0.6257	0.0418
4	-0.0602	-0.0249	0.0113	-0.2451	0.0753	0.2943
5	-0.0560	-0.0054	0.0320	-0.2156	0.2120	0.3594
6	-0.0679	-0.0188	0.0226	-0.4596	-0.1487	0.26322
7	-0.0364	0.0259	0.0390	-0.2629	-0.0040	0.2477
shocks		variable 4				
1	-0.0259	-0.0041	0.0204			
2	-0.0225	0.0085	0.0439			
3	-0.0116	0.0305	0.0613			
4	-0.0073	0.0135	0.0355			
5	-0.0189	0.0123	0.0407			
6	-0.0196	0.0052	0.0342			
7	-0.0175	-0.0080	0.0254			

Table 12: Differences of the cumulative impulse-response functions over the first 4 quarters without the net lending ratio and no trend for inflation

	.16 quantile	value	.84 quantile	.16 quantile	value	.84 quantile
shocks		variable 1			variable 5	
1	-0.0150	-0.0141	-0.0076	-0.0019	-0.0003	0.0015
2	-0.0040	-0.0023	-0.0002	-0.0030	-0.0022	0.0003
3	-0.0038	-0.0021	0.0004	0.0001	0.0022	0.0042
4	-0.0021	-0.0001	0.0007	-0.0004	0.0009	0.0026
5	-0.0004	0.0023	0.0027	0.0011	0.00267	0.0035
6	-0.0007	0.0017	0.0023	0.0008	0.0026	0.0031
7	-0.0019	-0.0003	0.0010	-5.9e-005	0.0014	0.0021
shocks		variable 2			variable 6	
1	-0.0174	0.0120	0.0391	-0.2174	-0.0965	0.0526
2	-0.0357	-0.019	0.0177	-0.2341	-0.1289	0.0559
3	-0.0099	0.0184	0.0280	-0.2880	-0.1874	-0.0054
4	-0.0246	-0.0135	0.0072	-0.0737	0.0106	0.0844
5	-0.0080	0.0127	0.0184	-0.0983	-0.0001	0.0560
6	-0.0125	-0.0003	0.0147	-0.1309	-0.0183	0.1193
7	-0.0138	0.0035	0.0161	-0.1059	-0.0224	0.0670
shocks		variable 3			variable 7	
1	-0.0084	-0.0039	0.0026	-0.0593	-0.0325	0.0051
2	-0.0025	0.0016	0.0046	-0.0262	-0.0022	0.0278
3	-0.0102	-0.0055	5.5e-005	-0.0957	-0.0719	-0.0327
4	-0.0025	-0.0013	0.0015	-0.0340	-0.0194	0.0144
5	-0.0020	-0.0010	0.0021	0.0031	0.0448	0.0498
6	-0.0020	0.0012	0.0043	-0.0070	0.0271	0.0385
7	-0.0019	0.0015	0.0038	-0.0218	0.0027	0.0371
shocks		variable 4				
1	-0.0010	-0.0005	0.0010			
2	-0.0028	-0.0009	0.0015			
3	-0.0002	0.0018	0.0037			
4	0.0013	0.0028	0.0046			
5	-0.0016	-0.0008	0.0008			
6	-0.0012	0.0002	0.0015			
7	-0.0019	-0.0013	0.0003			

Table 13: Differences of the cumulative impulse-response functions over the first 20 quarters without the net lending ratio and no trend for inflation

	.16 quantile	value	.84 quantile	.16 quantile	value	.84 quantile
shocks		variable 1			variable 5	
1	-0.0759	-0.0727	-0.0145	-0.0105	-0.0035	0.0069
2	-0.0733	-0.0515	0.0055	-0.0147	-0.0041	0.0133
3	-0.0329	0.0046	0.0195	-0.0033	0.0184	0.0322
4	-0.0226	-0.0055	0.0127	-0.0016	0.0092	0.0155
5	-0.0022	0.0414	0.0467	-0.0029	0.01297	0.0231
6	-0.0156	0.01460	0.0242	-0.0007	0.0178	0.0242
7	-0.0053	0.02594	0.0411	-0.0031	-0.0003	0.0128
shocks		variable 2			variable 6	
1	-0.1423	0.0644	0.1305	-1.566	-1.249	-0.0198
2	-0.2299	-0.1511	0.12497	-1.336	-0.7196	0.2804
3	-0.1190	0.1846	0.2245	-1.512	-1.289	0.1905
4	-0.1463	-0.0668	0.0876	-0.8676	-0.1115	0.6752
5	-0.1465	-0.0333	0.1426	-1.459	-1.151	0.1579
6	-0.0810	0.0459	0.1364	-0.9272	-0.0865	0.8852
7	-0.0633	0.0454	0.1329	-0.6667	-0.1955	0.4789
shocks		variable 3			variable 7	
1	-0.0588	-0.0241	0.0016	-0.2557	-0.0681	0.0385
2	-0.0792	-0.0456	0.0069	-0.1931	0.0359	0.1289
3	-0.0955	-0.0829	-0.0136	-0.6730	-0.6257	-0.1098
4	-0.0389	-0.0249	0.0020	-0.1092	0.0753	0.1877
5	-0.0318	-0.0054	0.0180	-0.0889	0.2120	0.2435
6	-0.0374	-0.0188	0.0113	-0.2950	-0.1487	0.1304
7	-0.0158	0.02591	0.0250	-0.1343	-0.0040	0.1542
shocks		variable 4				
1	-0.0149	-0.0040	0.01105			
2	-0.0111	0.0085	0.0262			
3	-0.0016	0.0305	0.0412			
4	0.0015	0.0135	0.0241			
5	-0.0090	0.0123	0.0277			
6	-0.0118	0.0052	0.0220			
7	-0.0098	-0.0081	0.0128			

Table 14: Differences between the cumulative impulse-response functions over the first 4 quarters (USA-France)

	.05 quantile	value	.95 quantile	.05 quantile	value	.95 quantile
shocks		variable 1			variable 5	
1	-0.0149	-0.0108	-0.0043	-0.0030	-0.0003	0.0015
2	-0.0062	-0.0035	1.8e-005	-0.0038	-0.0022	0.0003
3	-0.0054	-0.0022	0.0014	-0.0037	-0.0015	0.0018
4	-0.0025	0.0007	0.0025	-0.0024	-0.0010	0.0009
5	-0.0025	0.0002	0.0019	-0.0012	0.0004	0.0012
6	-0.0046	-0.0015	0.0015	-0.0013	-0.0004	0.0008
7	-0.0034	-0.0014	0.0013	-0.0011	-7.6e-005	0.0010
8	-0.0020	0.0015	0.0041	-0.0012	-0.0002	0.0006
shocks		variable 2			variable 6	
1	-0.0297	0.0139	0.049	-0.2670	-0.0067	0.2516
2	-0.1099	-0.0765	-0.0162	-0.4437	-0.2691	0.0494
3	-0.0225	0.0191	0.0340	-0.2508	-0.1339	0.1536
4	-0.0364	-0.0154	0.0141	-0.1201	0.0958	0.2057
5	-0.0297	-0.0104	0.0155	-0.1132	0.1642	0.2721
6	-0.0108	0.0279	0.0480	-0.2190	-0.0108	0.2116
7	-0.0141	0.0234	0.0375	-0.0929	0.0167	0.1153
8	-0.0224	0.0044	0.0257	-0.1482	-0.0474	0.0928
shocks		variable 3			variable 7	
1	-0.0148	-0.0067	0.0003	-0.9314	-0.5131	-0.0480
2	-0.0059	-0.0002	0.0028	-0.7705	-0.4776	-0.0175
3	-0.0157	-0.0099	-0.0004	-1.013	-0.8075	-0.2230
4	-0.0042	-0.0009	0.0016	-0.3930	-0.1389	0.2350
5	-0.0036	0.0009	0.0026	-0.2924	-0.1062	0.1528
6	-0.0052	-0.0015	0.0024	-0.2409	-0.0172	0.1772
7	-0.0053	-0.0013	0.0028	-0.2430	0.1952	0.5623
8	-0.0036	-0.0004	0.0017	-0.2369	-0.0301	0.1379
shocks		variable 4			variable 8	
1	-0.0016	-0.0002	0.0010	-0.0765	-0.0319	0.0134
2	-0.0046	-0.003	-0.0002	-0.0482	-0.0039	0.0360
3	-0.0027	-0.0007	0.0016	-0.0783	-0.0362	0.0191
4	-0.0019	-1.2e-005	0.0023	-0.0585	-0.0261	0.0149
5	-0.0027	-0.0017	0.0002	-0.0276	0.0139	0.0351
6	-0.0034	-0.0028	-0.0004	-0.0403	0.0051	0.0326
7	-0.0008	0.0003	0.0012	-0.0713	-0.0470	0.00123
8	-0.0025	-0.0012	0.0004	-0.0700	-0.0345	0.0172

Table 15: Differences between the cumulative impulse-response functions over the first 8 quarters (USA-France)

	.05 quantile	value	.95 quantile	.05 quantile	value	.95 quantile
shocks		variable 1			variable 5	
1	-0.0362	-0.0248	-0.0066	-0.0042	-0.0003	0.0033
2	-0.0258	-0.0162	-0.0017	-0.0107	-0.0068	0.0005
3	-0.0151	-0.0045	0.0029	-0.0061	-0.0011	0.0049
4	-0.0101	-0.0024	0.0039	-0.0030	0.0018	0.0058
5	-0.0123	-0.0005	0.0066	-0.0038	0.0009	0.0034
6	-0.0215	-0.0134	0.0004	-0.0045	-0.0012	0.0020
7	-0.0133	-0.0065	0.0037	-0.0024	0.0015	0.0042
8	-0.0084	0.0046	0.0140	-0.0053	-0.0017	0.0023
shocks		variable 2			variable 6	
1	-0.0706	0.0263	0.0769	-0.5772	-0.0284	0.5303
2	-0.2937	-0.2239	-0.0429	-0.7214	-0.3584	0.2350
3	-0.0628	0.0539	0.0892	-0.6526	-0.3992	0.2941
4	-0.0826	-0.0067	0.0556	-0.3177	0.0658	0.3984
5	-0.0962	-0.0315	0.0468	-0.2363	0.4353	0.6283
6	-0.0423	0.0626	0.1333	-0.5097	0.0136	0.6978
7	-0.0503	0.0305	0.0607	-0.2754	0.0790	0.3787
8	-0.0673	0.0092	0.0409	-0.3012	-0.0570	0.2077
shocks		variable 3			variable 7	
1	-0.0346	-0.0157	0.0083	-2.123	-1.287	-0.0303
2	-0.0259	-0.0093	0.0036	-2.439	-1.849	-0.3775
3	-0.0407	-0.0272	0.0013	-2.341	-1.819	-0.2560
4	-0.0126	-0.0067	0.0043	-0.7179	-0.2036	0.4725
5	-0.0161	-0.0016	0.0062	-0.9234	-0.3837	0.3219
6	-0.0188	-0.0104	0.0053	-0.6220	0.1690	0.6293
7	-0.0150	-0.0010	0.0126	-0.7957	0.2335	1.096
8	-0.0112	0.00144	0.0082	-0.6346	0.1468	0.6340
shocks		variable 4			variable 8	
1	-0.0063	-0.0017	0.0028	-0.1411	-0.0301	0.0609
2	-0.0122	-0.0076	0.0011	-0.0885	-0.0029	0.0616
3	-0.0052	-0.0010	0.0037	-0.2171	-0.1175	0.0374
4	-0.0031	0.0029	0.0095	-0.0845	-0.0398	0.0282
5	-0.0091	-0.0063	0.0007	-0.0544	0.0581	0.0863
6	-0.0121	-0.0098	-0.0023	-0.1243	-0.0385	0.0647
7	-0.0032	0.0002	0.0031	-0.1467	-0.0883	0.0222
8	-0.0076	-0.0033	0.0025	-0.1173	-0.0590	0.0501

Table 16: Differences between the cumulative impulse-response functions over the first 12 quarters (USA-France)

	.05 quantile	value	.95 quantile	.05 quantile	value	.95 quantile
shocks		variable 1			variable 5	
1	-0.0513	-0.0362	-0.0065	-0.0064	-0.0009	0.0054
2	-0.0560	-0.0384	-0.0070	-0.0172	-0.0113	0.0016
3	-0.0263	-0.0002	0.0074	-0.0086	0.0006	0.0091
4	-0.0194	-0.0066	0.0076	-0.0030	0.0062	0.0119
5	-0.0191	0.0034	0.0146	-0.0072	0.0006	0.0054
6	-0.0339	-0.0200	0.0008	-0.0109	-0.0038	0.0040
7	-0.0220	-0.0105	0.0068	-0.0028	0.0051	0.0093
8	-0.0189	0.0033	0.0198	-0.0086	-0.0029	0.0045
shocks		variable 2			variable 6	
1	-0.1275	0.0418	0.1091	-0.7214	0.0718	0.8684
2	-0.4461	-0.3536	-0.0311	-0.8377	-0.4742	0.2453
3	-0.1364	0.0789	0.1435	-0.9382	-0.5328	0.5152
4	-0.1226	0.0172	0.1286	-0.4411	0.0680	0.5470
5	-0.1715	-0.0354	0.0872	-0.4248	0.6789	1.097
6	-0.1131	0.0758	0.1648	-0.7216	0.2538	1.093
7	-0.0777	0.0534	0.1018	-0.3723	0.2067	0.6795
8	-0.1142	0.0320	0.0765	-0.6287	-0.1142	0.3124
shocks		variable 3			variable 7	
1	-0.0525	-0.0236	0.0089	-3.290	-1.972	-0.0273
2	-0.0568	-0.0280	0.0022	-4.696	-3.529	-0.7865
3	-0.0704	-0.0475	0.0052	-3.955	-2.472	-0.0888
4	-0.0267	-0.0194	0.0081	-1.567	-0.799	0.6446
5	-0.0290	-0.0026	0.0117	-1.586	-0.3501	0.5791
6	-0.0286	-0.0121	0.0097	-1.031	0.7752	1.299
7	-0.0239	0.0007	0.0250	-1.483	0.0494	1.589
8	-0.0254	0.0002	0.0132	-1.261	0.2464	1.187
shocks		variable 4			variable 8	
1	-0.0113	-0.0015	0.0074	-0.1980	-0.0275	0.0897
2	-0.0207	-0.0112	0.0043	-0.1614	-0.0107	0.0720
3	-0.0116	-0.0045	0.0063	-0.3878	-0.2375	0.0750
4	-0.0050	0.0065	0.0169	-0.1226	-0.0578	0.0723
5	-0.0159	-0.0109	0.0023	-0.0998	0.0810	0.1502
6	-0.0251	-0.0190	-0.0023	-0.2086	-0.1003	0.0890
7	-0.0064	0.0007	0.0067	-0.2034	-0.0979	0.0785
8	-0.0126	-0.0044	0.0060	-0.1692	-0.0609	0.0666

Table 17: Differences between the cumulative impulse-response functions over the first 20 quarters (USA-France)

	.05 quantile	value	.95 quantile	.05 quantile	value	.95 quantile
shocks		variable 1			variable 5	
1	-0.0954	-0.0587	-0.0051	-0.0106	0.0009	0.0103
2	-0.1492	-0.1056	-0.0169	-0.0307	-0.0174	0.0071
3	-0.0632	0.0072	0.0167	-0.0162	0.0002	0.0111
4	-0.0493	-0.0077	0.0204	-0.0073	0.0097	0.0201
5	-0.0406	0.0181	0.0237	-0.0133	0.0024	0.0103
6	-0.0590	-0.0200	0.0045	-0.0206	-0.0037	0.0137
7	-0.0430	-0.0124	0.0127	-0.0057	0.0122	0.0215
8	-0.0445	-0.0024	0.0263	-0.0107	-0.0012	0.0105
shocks		variable 2			variable 6	
1	-0.2124	0.0817	0.1733	-0.9920	0.0575	1.113
2	-0.6633	-0.4389	0.0040	-1.881	-1.105	0.2306
3	-0.3180	0.0800	0.1741	-1.341	-0.559	0.9265
4	-0.2027	0.0742	0.2725	-0.5905	0.2544	1.255
5	-0.3126	-0.0451	0.1843	-0.8703	1.063	1.730
6	-0.2037	0.0523	0.2006	-1.359	0.0557	1.449
7	-0.1419	0.0667	0.1883	-0.4930	0.3352	1.267
8	-0.1965	0.0722	0.1497	-1.015	-0.0803	0.7616
shocks		variable 3			variable 7	
1	-0.1079	-0.0544	0.0084	-6.784	-3.614	0.059
2	-0.1428	-0.0794	0.0009	-10.342	-7.205	-0.9479
3	-0.1406	-0.0825	0.0018	-7.744	-3.474	0.3328
4	-0.0800	-0.0495	0.0115	-4.976	-2.648	0.6983
5	-0.0574	-0.0119	0.0112	-3.396	-0.746	0.7954
6	-0.0525	-0.0053	0.0247	-2.824	1.258	2.045
7	-0.0487	-0.0039	0.0376	-3.493	-0.8458	1.664
8	-0.0490	0.00141	0.0236	-2.700	0.4189	1.518
shocks		variable 4			variable 8	
1	-0.020	0.0005	0.0155	-0.4103	-0.1023	0.0972
2	-0.034	-0.012	0.0094	-0.4611	-0.0818	0.073
3	-0.028	-0.0160	0.0113	-0.8357	-0.5387	0.0852
4	-0.011	0.01149	0.0278	-0.3078	-0.0936	0.1889
5	-0.028	-0.0168	0.0071	-0.2485	0.0871	0.2139
6	-0.042	-0.0263	0.0048	-0.3507	-0.1358	0.1179
7	-0.010	0.0066	0.01881	-0.3151	-0.0804	0.1822
8	-0.016	-0.0003	0.0141	-0.2683	-0.0650	0.0816

Table 18: Differences between the cumulative impulse-response functions over the first 4 quarters (USA-France)

	.16 quantile	value	.84 quantile	.16 quantile	value	.84 quantile
shocks		variable 1			variable 5	
1	-0.0128	-0.0108	-0.0066	-0.0021	-0.0003	0.0010
2	-0.0048	-0.0035	-0.0010	-0.0031	-0.0022	-0.0006
3	-0.0040	-0.0022	0.0003	-0.0026	-0.0015	0.0006
4	-0.0014	0.0007	0.0016	-0.0018	-0.0010	0.0003
5	-0.0016	0.0002	0.0010	-0.0007	0.0004	0.0008
6	-0.0035	-0.0015	0.0003	-0.0008	-0.0004	0.0003
7	-0.0024	-0.0014	0.0004	-0.0006	-7.6e-005	0.0005
8	-0.0005	0.0016	0.0032	-0.0008	-0.0002	0.0003
shocks		variable 2			variable 6	
1	-0.0127	0.0139	0.0337	-0.1573	-0.0066	0.1591
2	-0.0890	-0.0765	-0.0314	-0.3499	-0.2691	-0.0417
3	-0.0100	0.0191	0.0225	-0.1719	-0.1339	0.0625
4	-0.0248	-0.0153	0.0061	-0.0608	0.0958	0.1345
5	-0.0179	-0.0104	0.0077	-0.0354	0.1641	0.1956
6	0.00144	0.0279	0.0368	-0.1290	-0.0108	0.1363
7	-0.0057	0.0233	0.0252	-0.0556	0.0167	0.0672
8	-0.0123	0.0044	0.0147	-0.0944	-0.0474	0.0445
shocks		variable 3			variable 7	
1	-0.0115	-0.0067	-0.0025	-0.7536	-0.5131	-0.2260
2	-0.0036	-0.0002	0.0013	-0.6338	-0.4775	-0.1811
3	-0.0123	-0.0100	-0.0033	-0.8615	-0.8075	-0.3868
4	-0.0027	-0.0009	0.0007	-0.2783	-0.1388	0.0929
5	-0.0019	0.0009	0.0015	-0.1946	-0.1061	0.0534
6	-0.0033	-0.0015	0.0013	-0.1339	-0.0171	0.0928
7	-0.0037	-0.0014	0.0013	-0.0906	0.1952	0.3953
8	-0.0019	-0.0004	0.0009	-0.1410	-0.0300	0.0642
shocks		variable 4			variable 8	
1	-0.0010	-0.0002	0.0004	-0.0609	-0.0320	-0.0024
2	-0.0037	-0.0029	-0.0011	-0.0289	-0.0040	0.0228
3	-0.0018	-0.0007	0.0006	-0.0595	-0.0362	-0.0009
4	-0.0011	-1.2e-005	0.0015	-0.0422	-0.0262	0.0036
5	-0.0021	-0.0017	-0.0004	-0.0124	0.0139	0.0233
6	-0.0027	-0.0028	-0.0011	-0.0221	0.0051	0.0203
7	-0.0004	0.0003	0.0007	-0.0551	-0.0470	-0.0114
8	-0.0019	-0.0012	-0.0002	-0.0515	-0.0345	0.0020

Table 19: Differences between the cumulative impulse-response functions over the first 8 quarters (USA-France)

	.16 quantile	value	.84 quantile	.16 quantile	value	.84 quantile
shocks		variable 1			variable 5	
1	-0.0299	-0.0248	-0.0113	-0.0027	-0.0003	0.0016
2	-0.0210	-0.0162	-0.0066	-0.0087	-0.0068	-0.0021
3	-0.0096	-0.0045	0.0005	-0.0036	-0.0011	0.0027
4	-0.0061	-0.0024	0.0014	-0.0013	0.0018	0.0041
5	-0.0074	-0.0005	0.0033	-0.0025	0.0009	0.0019
6	-0.0166	-0.0134	-0.0031	-0.0029	-0.0012	0.0008
7	-0.0091	-0.0065	0.0011	-0.0011	0.0015	0.0029
8	-0.0028	0.0046	0.0099	-0.0036	-0.0017	0.0009
shocks		variable 2			variable 6	
1	-0.0345	0.0263	0.0483	-0.3319	-0.0284	0.3161
2	-0.2352	-0.2239	-0.0847	-0.4825	-0.3583	0.0241
3	-0.0300	0.0539	0.0636	-0.4573	-0.3992	0.1238
4	-0.0465	-0.0067	0.0327	-0.1750	0.0657	0.2101
5	-0.0636	-0.0315	0.0219	-0.0992	0.4353	0.4474
6	-0.0057	0.0626	0.0958	-0.2941	0.0136	0.4525
7	-0.0214	0.0305	0.0389	-0.1223	0.0790	0.2576
8	-0.0397	0.0091	0.0264	-0.1960	-0.0571	0.0892
shocks		variable 3			variable 7	
1	-0.0268	-0.01575	-0.0022	-1.651	-1.287	-0.3951
2	-0.0189	-0.0094	-0.0009	-2.008	-1.849	-0.8237
3	-0.0322	-0.0273	-0.0066	-1.947	-1.819	-0.6898
4	-0.0083	-0.0067	0.0010	-0.473	-0.2037	0.1974
5	-0.0108	-0.0016	0.0024	-0.668	-0.3837	0.1121
6	-0.0129	-0.0104	0.0016	-0.293	0.1691	0.3676
7	-0.0090	-0.0010	0.0074	-0.3972	0.2336	0.7248
8	-0.0066	0.0015	0.0046	-0.3294	0.1469	0.3946
shocks		variable 4			variable 8	
1	-0.0044	-0.0017	0.0011	-0.0991	-0.0302	0.0187
2	-0.0098	-0.0076	-0.0018	-0.054	-0.0028	0.0301
3	-0.0035	-0.0010	0.0017	-0.1567	-0.1175	-0.0112
4	-0.0005	0.0029	0.0068	-0.0582	-0.0398	0.0063
5	-0.0070	-0.0063	-0.0008	-0.0227	0.0581	0.0589
6	-0.0099	-0.0099	-0.0039	-0.0782	-0.038	0.030
7	-0.0016	0.0002	0.0016	-0.1111	-0.0883	-0.0096
8	-0.0054	-0.0033	0.0007	-0.0804	-0.0590	0.0172

Table 20: Differences between the cumulative impulse-response functions over the first 12 quarters (USA-France)

	.16 quantile	value	.84 quantile	.16 quantile	value	.84 quantile
shocks		variable 1			variable 5	
1	-0.0415	-0.0362	-0.0134	-0.0040	-0.0009	0.0024
2	-0.0457	-0.0384	-0.0154	-0.0137	-0.0113	-0.0023
3	-0.0166	-0.0002	0.0026	-0.0046	0.0006	0.0050
4	-0.0125	-0.0066	0.0028	-0.0003	0.0062	0.0086
5	-0.0105	0.0033	0.0088	-0.0043	0.0006	0.0027
6	-0.0248	-0.0200	-0.0035	-0.0073	-0.003839	0.0007
7	-0.0152	-0.0106	0.0021	-0.0006	0.0051	0.0065
8	-0.0098	0.00333	0.0137	-0.0057	-0.0029	0.0022
shocks		variable 2			variable 6	
1	-0.0618	0.0418	0.0686	-0.3783	0.0718	0.5102
2	-0.3554	-0.353	-0.0893	-0.6631	-0.4742	-0.0204
3	-0.0633	0.0789	0.0938	-0.5632	-0.5328	0.2393
4	-0.0653	0.0172	0.0916	-0.2461	0.0680	0.3322
5	-0.1033	-0.0354	0.0454	-0.1662	0.6789	0.7253
6	-0.0458	0.0758	0.1179	-0.3287	0.2538	0.7434
7	-0.0311	0.0534	0.0688	-0.1738	0.2067	0.4051
8	-0.0633	0.0320	0.0421	-0.3846	-0.1142	0.1288
shocks		variable 3			variable 7	
1	-0.0403	-0.0236	-0.0014	-2.521	-1.972	-0.5089
2	-0.0424	-0.0280	-0.0077	-3.884	-3.529	-1.537
3	-0.0533	-0.0475	-0.0088	-2.852	-2.472	-0.6954
4	-0.0176	-0.0194	0.0020	-1.080	-0.7993	0.1507
5	-0.0190	-0.0026	0.0038	-0.9701	-0.3501	0.2263
6	-0.0175	-0.0121	0.0036	-0.4812	0.7752	0.8403
7	-0.0150	0.00068	0.0146	-0.8870	0.0494	0.9126
8	-0.0144	0.00024	0.0073	-0.6568	0.2464	0.7475
shocks		variable 4			variable 8	
1	-0.0067	-0.0015	0.0032	-0.1324	-0.0275	0.0364
2	-0.0156	-0.0112	-0.0002	-0.1000	-0.0106	0.0242
3	-0.0074	-0.0045	0.0028	-0.2865	-0.2375	-0.0105
4	-0.0004	0.0064	0.01274	-0.0801	-0.0578	0.0329
5	-0.0119	-0.01096	-0.0004	-0.0414	0.0810	0.1032
6	-0.0202	-0.0190	-0.0069	-0.1338	-0.1002	0.0342
7	-0.0030	0.0007	0.0042	-0.1464	-0.0979	0.0188
8	-0.0087	-0.0044	0.0031	-0.1137	-0.0609	0.0195

Table 21: Differences between the cumulative impulse-response functions over the first 20 quarters (USA-France)

	.16 quantile	value	.84 quantile	.16 quantile	value	.84 quantile
shocks		variable 1		variable 5		
1	-0.0722	-0.0587	-0.0174	-0.0066	0.0009	0.0045
2	-0.1184	-0.1056	-0.0362	-0.0218	-0.0174	-0.0014
3	-0.0401	0.00723	0.0049	-0.0095	0.0002	0.0062
4	-0.0301	-0.0077	0.0093	-0.0024	0.0097	0.0127
5	-0.0219	0.01814	0.0147	-0.0077	0.0024	0.0048
6	-0.0397	-0.0200	-0.005	-0.0136	-0.0037	0.0061
7	-0.0283	-0.0123	0.0049	-0.0015	0.0122	0.0139
8	-0.0238	-0.00239	0.0174	-0.0068	-0.0012	0.0051
shocks		variable 2			variable 6	
1	-0.1071	0.0817	0.0985	-0.5498	0.0575	0.6211
2	-0.4851	-0.4389	-0.0960	-1.437	-1.104	-0.1733
3	-0.1705	0.0800	0.1017	-0.8795	-0.5598	0.3828
4	-0.0872	0.0742	0.1891	-0.2966	0.2544	0.7494
5	-0.1964	-0.0451	0.0881	-0.3885	1.062	1.097
6	-0.1091	0.0523	0.1192	-0.8955	0.0557	0.7727
7	-0.0577	0.0667	0.1169	-0.2089	0.3352	0.7381
8	-0.1129	0.0722	0.0872	-0.6713	-0.0803	0.3914
shocks		variable 3			variable 7	
1	-0.0806	-0.0543	-0.0071	-5.104	-3.614	-0.7881
2	-0.1102	-0.0794	-0.0180	-8.104	-7.204	-2.349
3	-0.0974	-0.0825	-0.0139	-5.381	-3.474	-0.6309
4	-0.0575	-0.0494	-0.0010	-3.509	-2.647	-0.0773
5	-0.0364	-0.0119	0.0022	-2.011	-0.7459	0.2204
6	-0.0313	-0.0053	0.0113	-1.389	1.258	1.135
7	-0.0304	-0.0039	0.0192	-2.201	-0.8458	0.8684
8	-0.0274	0.0014	0.0116	-1.428	0.4189	0.8339
shocks		variable 4			variable 8	
1	-0.0118	0.00051	0.0061	-0.2561	-0.1023	0.0310
2	-0.0228	-0.0124	0.0017	-0.2973	-0.0818	0.0097
3	-0.0176	-0.0159	0.0038	-0.5838	-0.5387	-0.0716
4	-0.0025	0.0114	0.0190	-0.1807	-0.0936	0.1029
5	-0.0175	-0.0168	0.00023	-0.1152	0.0871	0.1338
6	-0.0318	-0.0262	-0.0034	-0.2099	-0.1358	0.0544
7	-0.0048	0.0066	0.0112	-0.2015	-0.0804	0.0841
8	-0.0099	-0.0003	0.0076	-0.1730	-0.0650	0.0251

Table 22: Differences between the cumulative impulse-response functions over the first 4 quarters (USA-Canada)

	.05 quantile	value	.95 quantile	.05 quantile	value	.95 quantile
shocks		variable 1			variable 5	
1	-0.0076	-0.0006	0.0066	-0.0025	0.0006	0.0033
2	-0.0033	0.0015	0.0059	-0.0037	-0.0027	0.0009
3	-0.0044	-0.0009	0.0040	-0.0046	-0.0017	0.0015
4	-7.4e-005	0.0059	0.0086	-0.0001	0.0032	0.0055
5	-0.0015	0.0035	0.0059	0.0025	0.0059	0.0067
6	-0.0049	-0.0032	0.0020	-0.0012	-2.4e-005	0.0015
7	-0.0010	0.0042	0.0072	-0.0008	0.0009	0.0022
8	-0.0031	-0.0009	0.0030	-0.0008	0.0006	0.0020
shocks		variable 2			variable 6	
1	-0.0394	0.0044	0.0453	-0.3898	-0.2505	0.0444
2	-0.0646	-0.0178	0.0363	-0.3140	-0.0386	0.2778
3	-0.0228	0.0207	0.0360	-0.2461	-0.1003	0.1476
4	-0.0353	-0.0044	0.0312	-0.0667	0.1726	0.2780
5	-0.0220	0.0122	0.0397	-0.1620	-0.0229	0.1123
6	-0.0293	-0.0060	0.0201	-0.2102	0.0281	0.2399
7	-0.0060	0.0369	0.0518	-0.0946	0.0089	0.1208
8	-0.0264	-0.0048	0.0237	-0.1163	0.0396	0.1830
shocks		variable 3			variable 7	
1	-0.0191	-0.0105	-0.0004	-0.7056	-0.0734	0.6245
2	-0.0050	0.0009	0.0074	-0.6344	-0.5008	0.2661
3	-0.0059	0.0034	0.0123	-0.4816	0.2631	0.8774
4	-0.0007	0.0066	0.0094	-0.0092	0.6480	1.060
5	-0.0029	0.0006	0.0041	-0.1937	-0.0786	0.4214
6	-0.0048	-0.0013	0.0033	0.0270	0.7077	0.9884
7	-0.0056	-0.0024	0.0030	0.2673	1.047	1.348
8	-0.0039	-0.0007	0.0038	-0.0739	0.3698	0.6479
shocks		variable 4			variable 8	
1	-0.0012	-4.1e-005	0.0023	-0.0752	-0.0382	0.0077
2	-0.0038	-0.0019	0.0013	-0.0478	-0.0141	0.0335
3	-0.0024	-0.0011	0.0017	-0.0679	-0.0166	0.0390
4	0.0013	0.0051	0.0071	-0.0365	-0.0039	0.0333
5	-0.0011	0.0015	0.0035	-0.0320	-0.0023	0.0211
6	-0.0033	-0.0030	2.4e-005	-0.0424	-0.0210	0.0183
7	-0.0003	0.0016	0.0026	-0.0675	-0.0432	0.0040
8	-0.0018	0.0003	0.0021	-0.0521	-0.0134	0.0331

Table 23: Differences between the cumulative impulse-response functions over the first 8 quarters (USA-Canada)

	.05 quantile	value	.95 quantile	.05 quantile	value	.95 quantile
shocks		variable 1			variable 5	
1	-0.0231	-0.0069	0.0125	-0.0031	0.0037	0.0089
2	-0.0166	-0.0016	0.0151	-0.0103	-0.0078	0.0020
3	-0.0115	0.0008	0.0098	-0.0077	-0.0025	0.0054
4	-0.0041	0.0065	0.0144	0.0002	0.0098	0.0151
5	-0.0109	0.0026	0.0121	0.0022	0.0129	0.0159
6	-0.0203	-0.0154	0.0032	-0.0037	0.0009	0.0054
7	-0.0074	0.0081	0.0172	-0.0022	0.0012	0.0059
8	-0.0115	-0.0017	0.0113	-0.0032	0.0028	0.0082
shocks		variable 2			variable 6	
1	-0.0822	0.0354	0.0926	-0.7338	-0.4546	0.0983
2	-0.1842	-0.0528	0.1094	-0.4037	0.2204	0.7145
3	-0.0854	0.0467	0.0910	-0.4992	-0.0436	0.5627
4	-0.0873	-0.0021	0.0853	-0.1729	0.2862	0.4636
5	-0.0756	0.0392	0.1270	-0.3935	-0.0542	0.2783
6	-0.0891	-0.0112	0.0717	-0.7486	-0.3459	0.2759
7	-0.0394	0.0697	0.1152	-0.2182	0.1910	0.4363
8	-0.0655	0.0026	0.0737	-0.2378	0.2633	0.5011
shocks		variable 3			variable 7	
1	-0.0403	-0.0203	0.0065	-1.687	-0.4066	1.162
2	-0.0258	-0.0111	0.0102	-2.220	-1.693	0.3628
3	-0.0242	0.00293	0.0266	-1.501	0.0758	1.677
4	-0.0059	0.0121	0.0202	-0.1573	1.316	2.269
5	-0.0144	0.0002	0.0107	-0.6753	0.0559	1.260
6	-0.0177	-0.0042	0.0108	-0.1865	1.068	1.816
7	-0.0192	-0.0085	0.0097	-0.0752	1.809	2.702
8	-0.0126	-0.0018	0.0110	-0.1613	1.441	2.226
shocks		variable 4			variable 8	
1	-0.0058	-0.0025	0.0042	-0.1583	-0.07602	0.0172
2	-0.0104	-0.0039	0.0052	-0.0891	-0.0003	0.0744
3	-0.0042	0.0003	0.0074	-0.1748	-0.0393	0.0923
4	0.00053	0.0106	0.0165	-0.0390	0.0448	0.0961
5	-0.0043	0.0041	0.0112	-0.0775	-0.0023	0.0506
6	-0.0119	-0.0098	-0.0005	-0.1403	-0.0767	0.0272
7	-0.0020	0.0025	0.0065	-0.1463	-0.0935	0.0156
8	-0.0055	0.0011	0.0074	-0.1020	-0.0478	0.0440

Table 24: Differences between the cumulative impulse-response functions over the first 12 quarters (USA-Canada)

	.05 quantile	value	.95 quantile	.05 quantile	value	.95 quantile
shocks		variable 1			variable 5	
1	-0.0392	-0.0111	0.0184	-0.0035	0.0072	0.0160
2	-0.0435	-0.0144	0.0165	-0.0167	-0.0113	0.0054
3	-0.0177	0.0157	0.0242	-0.0080	-0.0015	0.0090
4	-0.0098	0.0087	0.0213	-0.0001	0.0133	0.0208
5	-0.0195	0.0004	0.0167	0.0005	0.0187	0.0263
6	-0.0313	-0.0212	0.0043	-0.0102	-0.0017	0.0079
7	-0.0142	0.0120	0.0260	-0.0032	0.0022	0.0103
8	-0.0245	-0.0057	0.0163	-0.0047	0.0046	0.0146
shocks		variable 2			variable 6	
1	-0.1071	0.0654	0.1619	-0.9174	-0.3387	0.3932
2	-0.3012	-0.0553	0.2305	-0.5760	0.3829	1.021
3	-0.1415	0.0776	0.1831	-0.7228	0.09117	1.015
4	-0.1538	-0.0241	0.1210	-0.3224	0.5044	0.8255
5	-0.1425	0.0661	0.2241	-0.5937	-0.1103	0.5216
6	-0.1438	-0.0091	0.1277	-0.9963	-0.4421	0.4653
7	-0.0666	0.0894	0.1841	-0.2416	0.5024	0.8294
8	-0.1008	0.0364	0.1210	-0.4322	0.3447	0.7364
shocks		variable 3			variable 7	
1	-0.0575	-0.0241	0.0144	-2.697	-0.4741	2.108
2	-0.0550	-0.0299	0.0104	-4.188	-3.111	0.5032
3	-0.0483	-0.0009	0.0407	-2.579	-0.4349	2.516
4	-0.0192	0.0022	0.0238	-0.7567	0.9964	2.801
5	-0.0223	0.0077	0.0260	-1.214	0.6694	2.320
6	-0.0279	-0.0034	0.0176	-0.7242	1.313	2.442
7	-0.0299	-0.0119	0.0171	-0.4975	2.741	4.012
8	-0.0257	-0.0075	0.0145	-0.4984	2.165	3.442
shocks		variable 4			variable 8	
1	-0.0106	-0.0027	0.0087	-0.2260	-0.0969	0.0396
2	-0.0165	-0.0032	0.0132	-0.1546	0.01577	0.1097
3	-0.0082	0.0028	0.0167	-0.3187	-0.0897	0.1515
4	-0.0025	0.0138	0.0257	-0.0903	0.0583	0.1680
5	-0.0079	0.0089	0.0223	-0.1316	-0.0212	0.1041
6	-0.0243	-0.0198	-0.0013	-0.2223	-0.0854	0.066
7	-0.0044	0.0022	0.0111	-0.2228	-0.1195	0.0385
8	-0.0085	0.0032	0.0134	-0.1539	-0.0551	0.0625

Table 25: Differences between the cumulative impulse-response functions over the first 20 quarters (USA-Canada)

	.05 quantile	value	.95 quantile	.05 quantile	value	.95 quantile
shocks		variable 1			variable 5	
1	-0.0756	-0.0324	0.0212	-0.0056	0.0136	0.0267
2	-0.1205	-0.0671	0.0194	-0.0265	-0.0163	0.0138
3	-0.0364	0.0478	0.0576	-0.0120	0.0098	0.0233
4	-0.0277	0.0277	0.0565	-0.0009	0.0172	0.0263
5	-0.0301	0.0148	0.0438	0.0003	0.0275	0.0400
6	-0.0509	-0.0066	0.0170	-0.0212	-0.0106	0.0104
7	-0.0281	0.0192	0.0439	-0.0055	0.0041	0.0186
8	-0.0505	-0.0227	0.0234	-0.0085	0.0066	0.0208
shocks		variable 2			variable 6	
1	-0.2072	0.1707	0.3183	-1.070	0.0340	0.9758
2	-0.4496	-0.0343	0.4284	-1.546	-0.3131	1.039
3	-0.2583	0.1729	0.3728	-0.9913	0.2654	1.604
4	-0.2784	-0.0999	0.2691	-0.4383	0.6728	1.440
5	-0.2837	0.0511	0.3908	-0.9861	-0.3443	1.149
6	-0.2491	-0.0394	0.2133	-1.746	-1.041	0.6692
7	-0.1189	0.1435	0.3932	-0.3536	1.102	1.742
8	-0.2130	0.0677	0.2891	-0.9982	0.3514	1.321
shocks		variable 3			variable 7	
1	-0.1079	-0.0535	0.0145	-5.588	-1.758	2.716
2	-0.1335	-0.0825	0.0119	-9.119	-6.353	1.240
3	-0.0979	-0.0171	0.0552	-5.388	-1.843	3.752
4	-0.0682	-0.0199	0.0360	-3.381	-0.3741	3.448
5	-0.0323	0.03364	0.0647	-1.742	2.261	5.677
6	-0.0578	-0.0092	0.0265	-2.422	2.079	3.651
7	-0.0577	-0.0213	0.0358	-1.693	4.245	6.694
8	-0.0513	-0.0040	0.0251	-1.799	2.945	4.679
shocks		variable 4			variable 8	
1	-0.0180	0.0010	0.0176	-0.4659	-0.1775	0.0664
2	-0.0262	0.0048	0.0311	-0.4273	-0.0403	0.1688
3	-0.0150	0.0155	0.0446	-0.7200	-0.2751	0.2108
4	-0.0052	0.0149	0.0316	-0.3303	-0.0467	0.2421
5	-0.0111	0.0210	0.0459	-0.2412	-0.0897	0.1929
6	-0.0439	-0.0364	0.0042	-0.3722	-0.0822	0.1528
7	-0.0089	0.0015	0.0236	-0.3401	-0.1620	0.0989
8	-0.0115	0.0093	0.0261	-0.2643	-0.0154	0.1328

Table 26: Differences between the cumulative impulse-response functions over the first 4 quarters (USA-Canada)

	.16 quantile	value	.84 quantile	.16 quantile	value	.84 quantile
shocks		variable 1			variable 5	
1	-0.0047	-0.0006	0.0036	-0.0013	0.0006	0.0022
2	-0.0015	0.0015	0.0041	-0.0029	-0.0027	-0.0003
3	-0.0028	-0.0009	0.0019	-0.0034	-0.0017	0.0003
4	0.0017	0.0059	0.0070	0.0009	0.0032	0.0044
5	-0.0002	0.0034	0.0044	0.0032	0.0059	0.0058
6	-0.0035	-0.0032	0.0006	-0.0006	-2.4e-005	0.0007
7	0.0006	0.0042	0.0057	-0.0002	0.0008	0.0016
8	-0.0017	-0.0009	0.0018	-0.0003	0.0006	0.0014
shocks		variable 2			variable 6	
1	-0.0193	0.0045	0.0272	-0.3056	-0.2505	-0.0463
2	-0.0432	-0.0178	0.0125	-0.1927	-0.0385	0.1481
3	-0.0100	0.0207	0.0229	-0.1599	-0.1003	0.0818
4	-0.0239	-0.0044	0.0172	-0.0118	0.1726	0.2054
5	-0.0097	0.0122	0.02661	-0.0956	-0.0229	0.0614
6	-0.0159	-0.0060	0.0114	-0.1162	0.0281	0.1545
7	0.0042	0.0369	0.0398	-0.0383	0.0089	0.0678
8	-0.0155	-0.0048	0.0141	-0.0564	0.0397	0.1213
shocks		variable 3			variable 7	
1	-0.0148	-0.0105	-0.0039	-0.4793	-0.0734	0.3154
2	-0.0026	0.0009	0.0042	-0.4908	-0.5008	0.0172
3	-0.0024	0.0034	0.0084	-0.2164	0.2631	0.6217
4	0.0013	0.0066	0.0073	0.1885	0.6479	0.8311
5	-0.0013	0.0006	0.0025	-0.1020	-0.0786	0.2504
6	-0.0032	-0.0013	0.0018	0.1753	0.7077	0.7890
7	-0.0041	-0.0024	0.0011	0.4837	1.047	1.126
8	-0.0022	-0.0007	0.0020	0.0496	0.3698	0.4920
shocks		variable 4			variable 8	
1	-0.0007	-4.1e-005	0.0013	-0.0606	-0.0382	-0.0087
2	-0.0028	-0.0019	0.0003	-0.0315	-0.0141	0.0154
3	-0.0015	-0.0011	0.0007	-0.0454	-0.0166	0.0169
4	0.0024	0.0051	0.0060	-0.0222	-0.0039	0.0220
5	-0.0002	0.0015	0.0027	-0.0186	-0.0023	0.0111
6	-0.0026	-0.0030	-0.0007	-0.0274	-0.02102	0.0079
7	0.0001	0.0016	0.0019	-0.0558	-0.0433	-0.0115
8	-0.0010	0.0003	0.0014	-0.0369	-0.0134	0.0165

Table 27: Differences between the cumulative impulse-response functions over the first 8 quarters (USA-Canada)

	.16 quantile	value	.84 quantile	.16 quantile	value	.84 quantile
shocks		variable 1			variable 5	
1	-0.0164	-0.0070	0.0053	-0.0010	0.0037	0.0066
2	-0.0107	-0.0016	0.0085	-0.0080	-0.0078	-0.0010
3	-0.0062	0.0008	0.0063	-0.0049	-0.0025	0.0023
4	-0.0001	0.0065	0.0105	0.0030	0.0098	0.0116
5	-0.0058	0.0026	0.0071	0.0049	0.0129	0.01301
6	-0.0156	-0.0154	-0.0010	-0.0021	0.0009	0.0031
7	-0.0029	0.0082	0.0125	-0.0011	0.0012	0.004
8	-0.0066	-0.0017	0.0063	-0.0014	0.0028	0.0055
shocks		variable 2			variable 6	
1	-0.0433	0.0354	0.0529	-0.5569	-0.4546	-0.0307
2	-0.1240	-0.0528	0.0616	-0.1766	0.2204	0.4719
3	-0.0369	0.0468	0.0577	-0.2432	-0.0436	0.4118
4	-0.0480	-0.0021	0.0422	-0.0415	0.2862	0.3409
5	-0.0328	0.0392	0.0860	-0.2293	-0.0542	0.1386
6	-0.0547	-0.0112	0.0399	-0.5307	-0.345	0.0675
7	-0.0085	0.0697	0.0782	-0.0668	0.1911	0.3068
8	-0.0350	0.0026	0.0419	-0.1171	0.2634	0.3393
shocks		variable 3			variable 7	
1	-0.0301	-0.02029	-0.0032	-1.136	-0.4066	0.6126
2	-0.0183	-0.0112	0.0026	-1.743	-1.693	-0.2629
3	-0.0120	0.0029	0.0177	-0.897	0.0758	0.9274
4	-0.0009	0.0121	0.01463	0.1665	1.316	1.639
5	-0.0086	0.0002	0.0062	-0.3487	0.0559	0.7435
6	-0.0118	-0.0042	0.0057	0.1442	1.068	1.319
7	-0.0140	-0.0085	0.0035	0.3577	1.809	2.084
8	-0.0076	-0.0018	0.0062	0.2478	1.442	1.649
shocks		variable 4			variable 8	
1	-0.0038	-0.0025	0.0020	-0.1099	-0.0760	-0.0087
2	-0.0073	-0.0040	0.0025	-0.0515	-0.0003	0.0357
3	-0.0022	0.0003	0.0049	-0.1156	-0.0393	0.0385
4	0.0038	0.01069	0.0132	-0.0106	0.0448	0.07167
5	-0.0010	0.0041	0.0081	-0.0471	-0.0023	0.0273
6	-0.0095	-0.0098	-0.0030	-0.0995	-0.0767	0.0021
7	-0.0006	0.0026	0.0043	-0.1194	-0.0935	-0.0168
8	-0.0030	0.0012	0.0052	-0.0703	-0.0478	0.0161

Table 28: Differences between the cumulative impulse-response functions over the first 12 quarters (USA-Canada)

	.16 quantile	value	.84 quantile	.16 quantile	value	.84 quantile
shocks		variable 1			variable 5	
1	-0.0267	-0.0111	0.0079	-0.0005	0.0072	0.0112
2	-0.0317	-0.0144	0.0041	-0.0131	-0.0114	0.0002
3	-0.0076	0.0157	0.0159	-0.0043	-0.0015	0.0047
4	-0.0012	0.0088	0.0165	0.0028	0.0134	0.0152
5	-0.0102	0.0004	0.0100	0.0050	0.0187	0.0202
6	-0.0213	-0.0212	-0.0010	-0.0071	-0.0017	0.0032
7	-0.0060	0.0120	0.0174	-0.0011	0.0022	0.0063
8	-0.0149	-0.0057	0.0090	-0.0014	0.0046	0.0101
shocks		variable 2			variable 6	
1	-0.0587	0.0654	0.1025	-0.5744	-0.3387	0.1191
2	-0.2014	-0.0553	0.1212	-0.2955	0.3829	0.6534
3	-0.0746	0.0776	0.1114	-0.3542	0.0912	0.6915
4	-0.0874	-0.0241	0.0628	-0.09162	0.5044	0.5873
5	-0.0597	0.0661	0.1505	-0.3419	-0.1103	0.2947
6	-0.0835	-0.0091	0.0676	-0.6656	-0.4422	0.1516
7	-0.0183	0.0894	0.1274	-0.0774	0.5025	0.6139
8	-0.0451	0.0364	0.0735	-0.2307	0.3447	0.4873
shocks		variable 3			variable 7	
1	-0.0400	-0.0241	0.0031	-1.661	-0.4741	1.167
2	-0.0416	-0.0299	0.0002	-3.328	-3.111	-0.4264
3	-0.0285	-0.0009	0.0234	-1.627	-0.4349	1.427
4	-0.0088	0.00219	0.0147	-0.1660	0.9964	1.908
5	-0.0129	0.0078	0.01453	-0.5584	0.6695	1.463
6	-0.0155	-0.0034	0.0081	-0.1378	1.313	1.619
7	-0.0202	-0.0119	0.0082	0.3288	2.742	3.104
8	-0.0150	-0.0075	0.0077	0.0996	2.166	2.495
shocks		variable 4			variable 8	
1	-0.0062	-0.0028	0.0046	-0.1503	-0.0969	0.0007
2	-0.0106	-0.0033	0.0070	-0.0957	0.0158	0.0536
3	-0.0036	0.0028	0.0111	-0.2250	-0.0897	0.0636
4	0.00236	0.0138	0.0186	-0.0398	0.0583	0.1070
5	-0.0021	0.0089	0.0153	-0.0699	-0.0212	0.0579
6	-0.0190	-0.020	-0.0057	-0.1462	-0.0854	0.0197
7	-0.0019	0.0022	0.0062	-0.1646	-0.1195	-0.0086
8	-0.0042	0.0032	0.0091	-0.0976	-0.0550	0.0229

Table 29: Differences between the cumulative impulse-response functions over the first 20 quarters (USA-Canada)

	.16 quantile	value	.84 quantile	.16 quantile	value	.84 quantile
shocks		variable 1			variable 5	
1	-0.0506	-0.0324	0.0071	-0.0009	0.0136	0.0185
2	-0.0883	-0.0672	-0.0088	-0.0184	-0.0164	0.0049
3	-0.0172	0.0478	0.0371	-0.0047	0.0099	0.0147
4	-0.0075	0.0278	0.0429	0.0033	0.0173	0.0203
5	-0.0130	0.0149	0.0260	0.0058	0.0275	0.0304
6	-0.0313	-0.0066	0.0048	-0.0143	-0.0107	0.0035
7	-0.0116	0.0192	0.0252	-0.0015	0.0041	0.0119
8	-0.0313	-0.0227	0.0124	-0.0029	0.0067	0.0145
shocks		variable 2			variable 6	
1	-0.0918	0.1708	0.1981	-0.6157	0.0340	0.4994
2	-0.2700	-0.0343	0.2317	-1.097	-0.3131	0.5008
3	-0.1223	0.1729	0.2363	-0.4700	0.2654	1.026
4	-0.1649	-0.0999	0.1313	-0.1480	0.6728	0.8967
5	-0.1587	0.0511	0.2324	-0.6218	-0.3443	0.5499
6	-0.1445	-0.0394	0.0991	-1.257	-1.041	0.1006
7	-0.0339	0.1435	0.2491	-0.0401	1.102	1.173
8	-0.1106	0.06774	0.1496	-0.5963	0.3514	0.7687
shocks		variable 3			variable 7	
1	-0.0793	-0.0535	-0.0040	-3.669	-1.758	1.154
2	-0.1010	-0.0825	-0.0096	-6.583	-6.353	-0.7404
3	-0.0643	-0.0171	0.0275	-3.482	-1.843	1.707
4	-0.0388	-0.0199	0.0220	-1.952	-0.3742	2.080
5	-0.0123	0.0336	0.0410	-0.5994	2.261	3.588
6	-0.0325	-0.0092	0.0113	-0.9408	2.079	2.265
7	-0.0379	-0.0213	0.0147	-0.1509	4.245	4.909
8	-0.0277	-0.0040	0.0124	-0.6224	2.945	3.142
shocks		variable 4			variable 8	
1	-0.0093	0.0010	0.0103	-0.3044	-0.1775	-0.0093
2	-0.0139	0.0048	0.0187	-0.2850	-0.0404	0.0557
3	-0.0028	0.0155	0.0313	-0.4824	-0.2751	0.0669
4	0.0015	0.0150	0.0224	-0.1815	-0.0468	0.1258
5	-0.0004	0.0210	0.0327	-0.1168	-0.0898	0.1016
6	-0.0314	-0.0364	-0.0048	-0.2256	-0.082	0.0623
7	-0.0031	0.00154	0.0147	-0.2331	-0.1620	0.0208
8	-0.0057	0.0093	0.0164	-0.1704	-0.0155	0.0503

Annexe

Figure 7: Bias-corrected impulse-response functions in the US with separated trends (1/4)

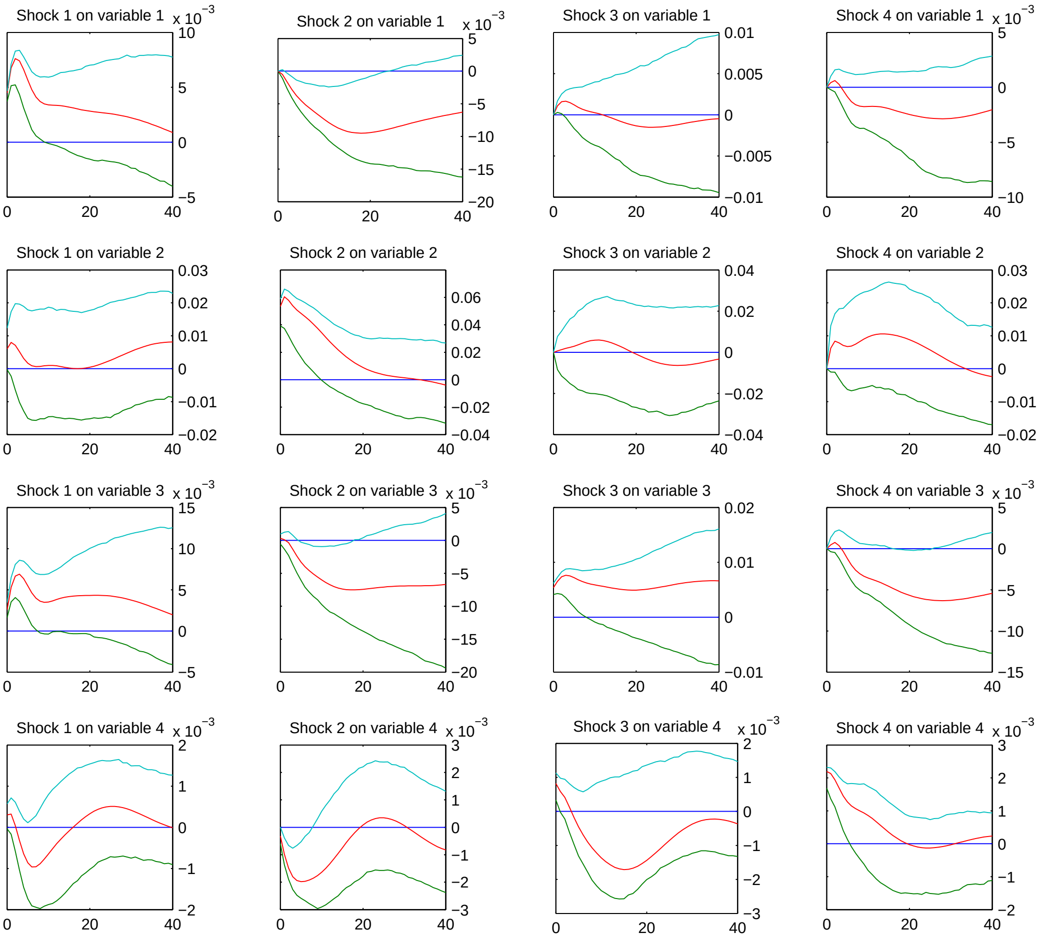

Figure 8: Bias-corrected impulse-response functions in the US with separated trends (2/4)

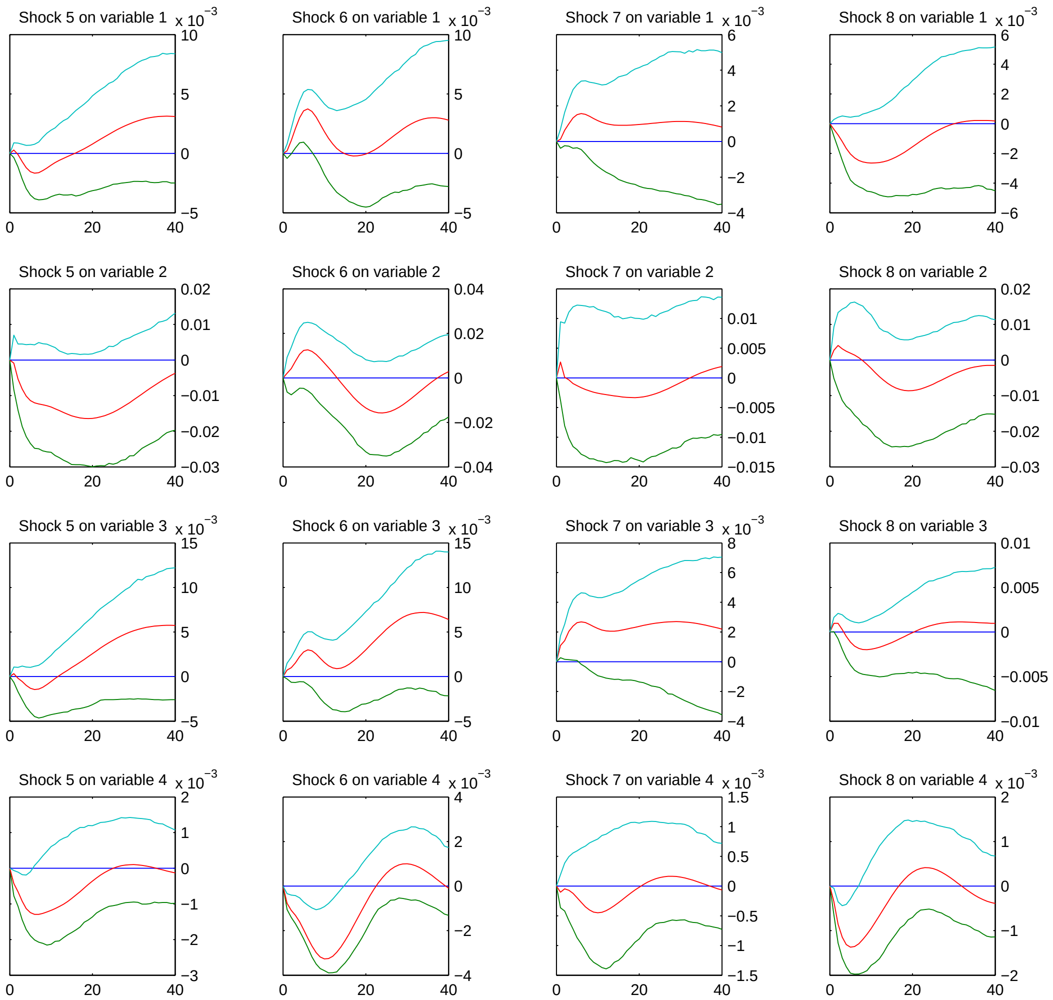

Figure 9: Bias-corrected impulse-response functions in the US with separated trends (3/4)

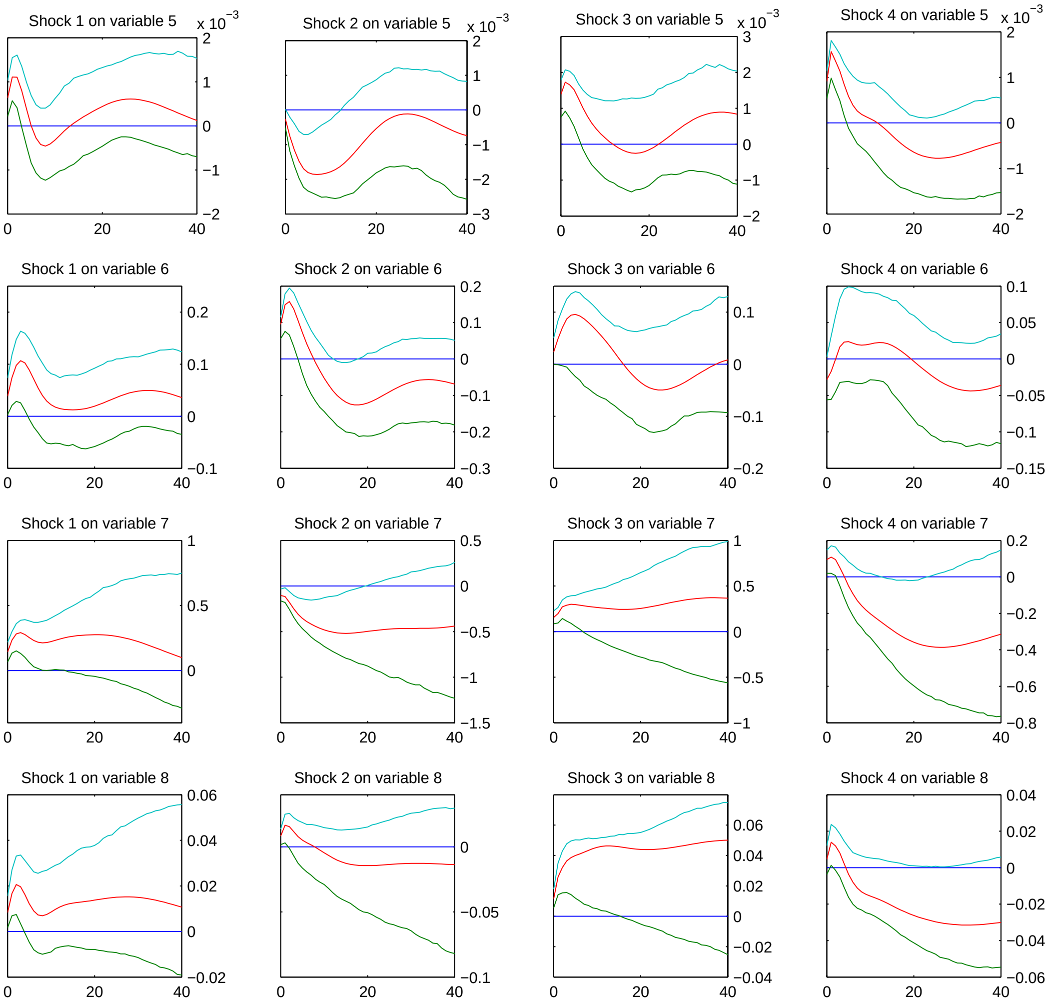

Figure 10: Bias-corrected impulse-response functions in the US with separated trends (4/4)

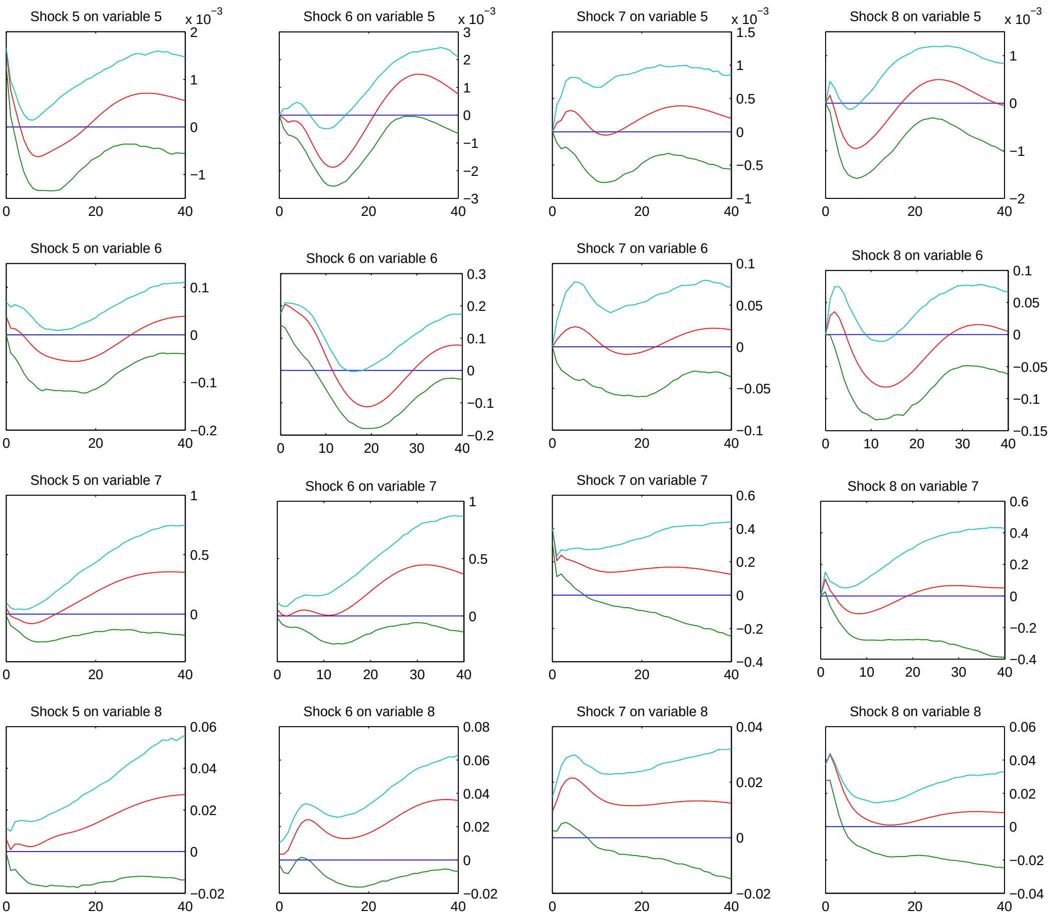

Figure 11: Bias-corrected impulse-response functions in Germany with separated trends (1/4)

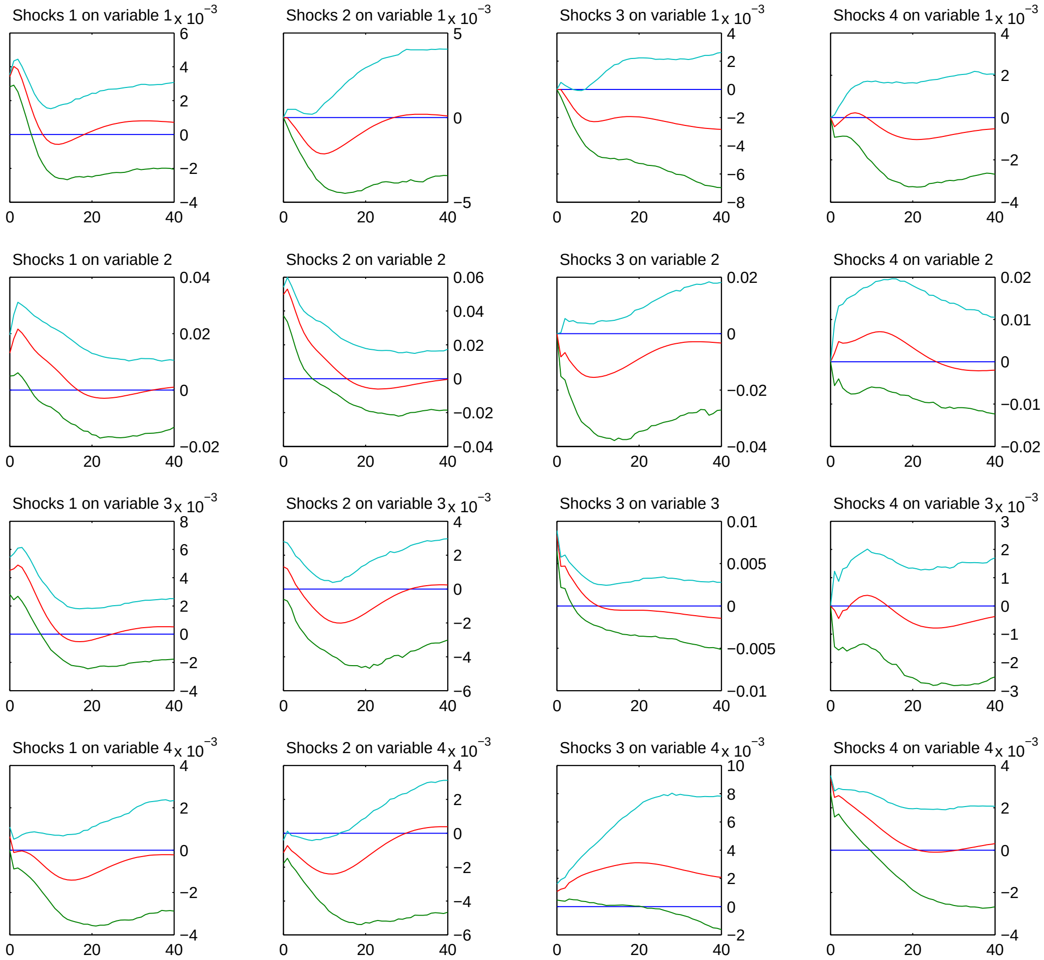

Figure 12: Bias-corrected impulse-response functions in Germany with separated trends (2/4)

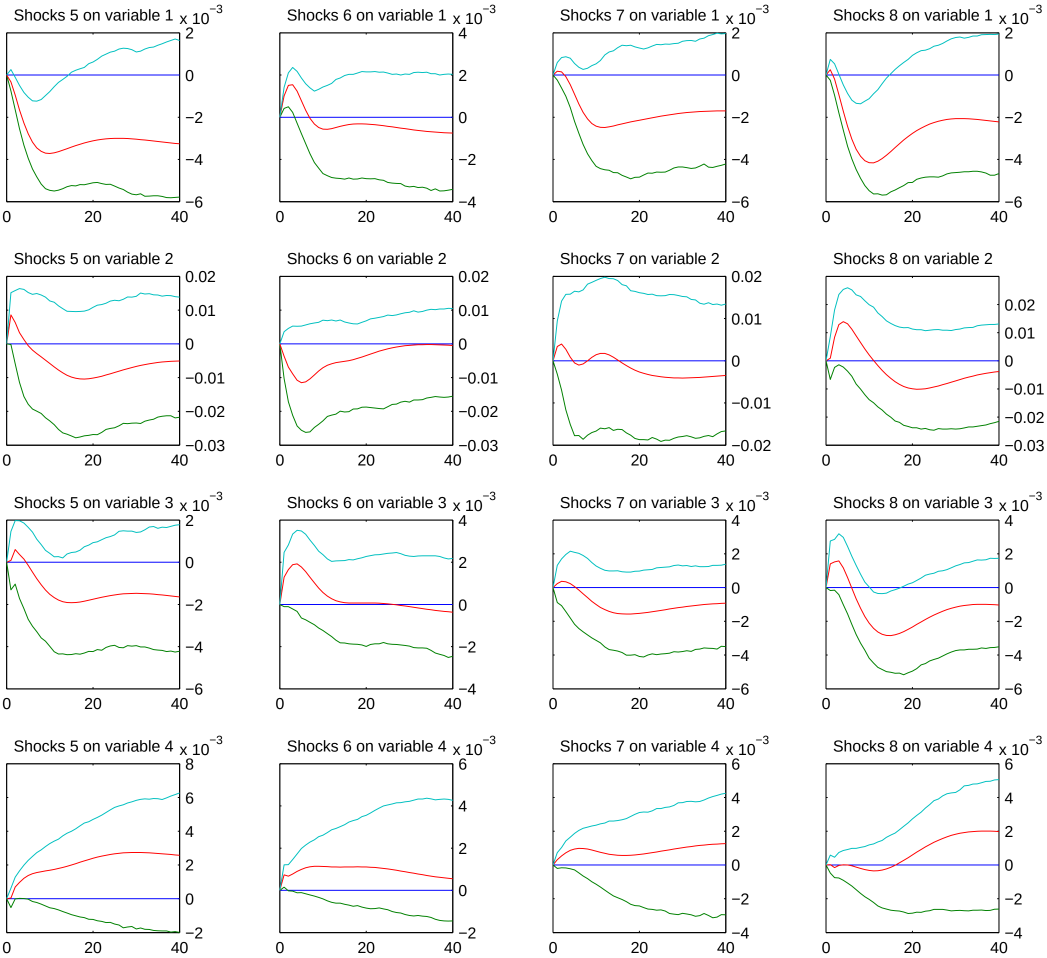

Figure 13: Bias-corrected impulse-response functions in Germany with separated trends (3/4)

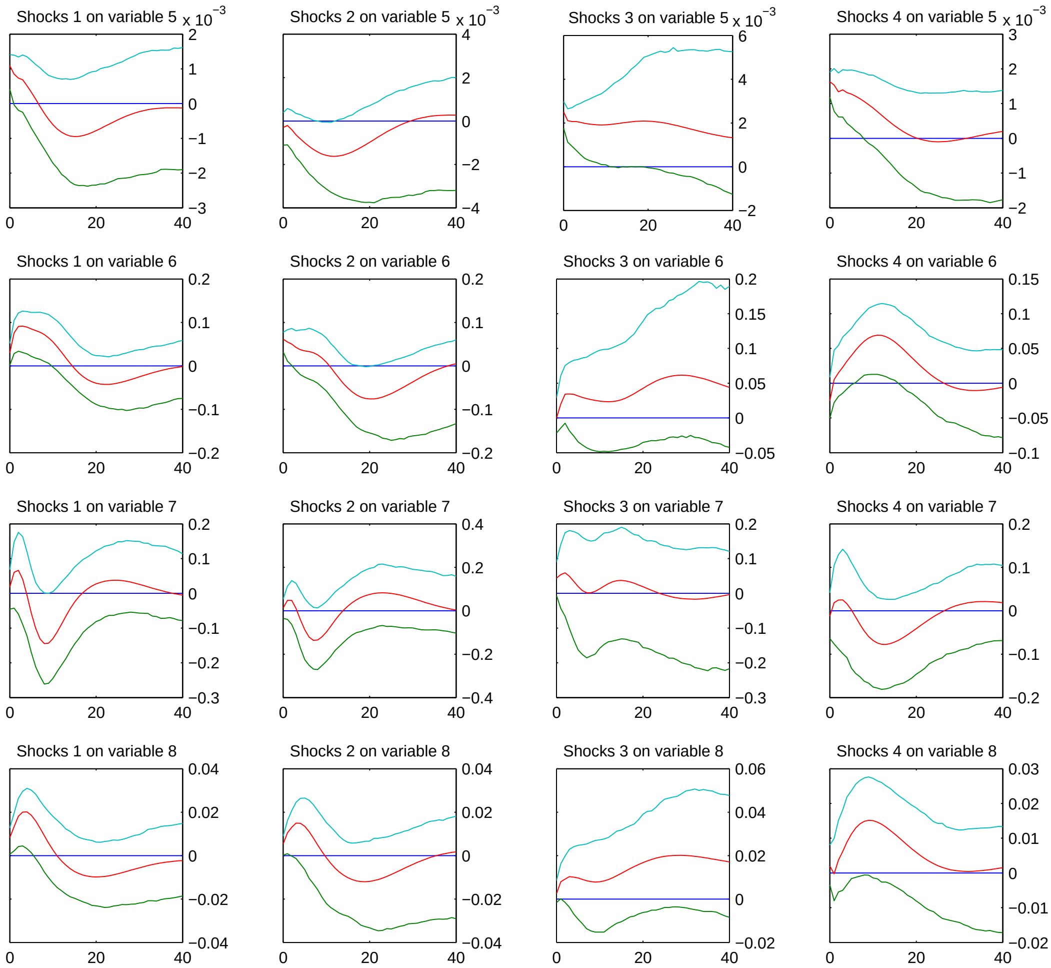

Figure 14: Bias-corrected impulse-response functions in Germany with separated trends (4/4)

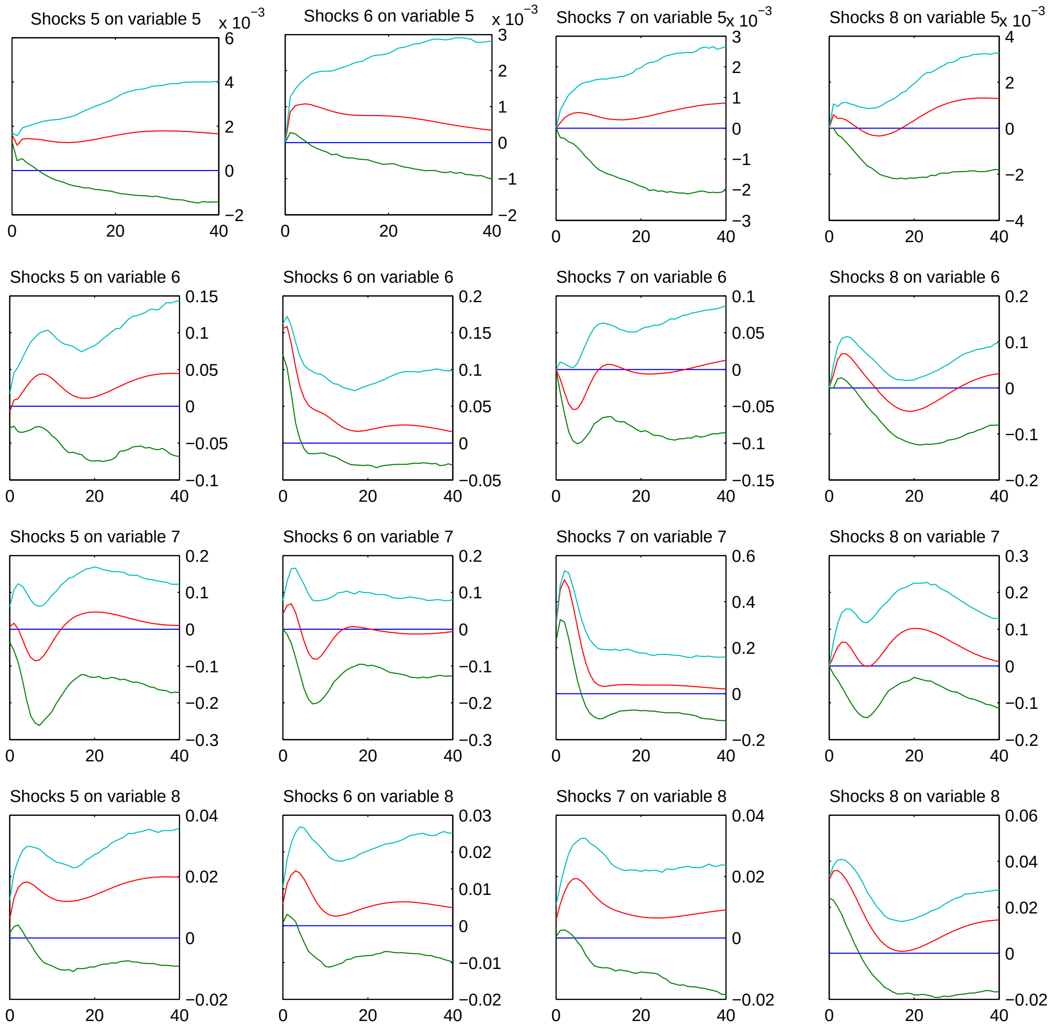

Figure 15: Bias-corrected impulse-response functions in France with separated trends (1/4)

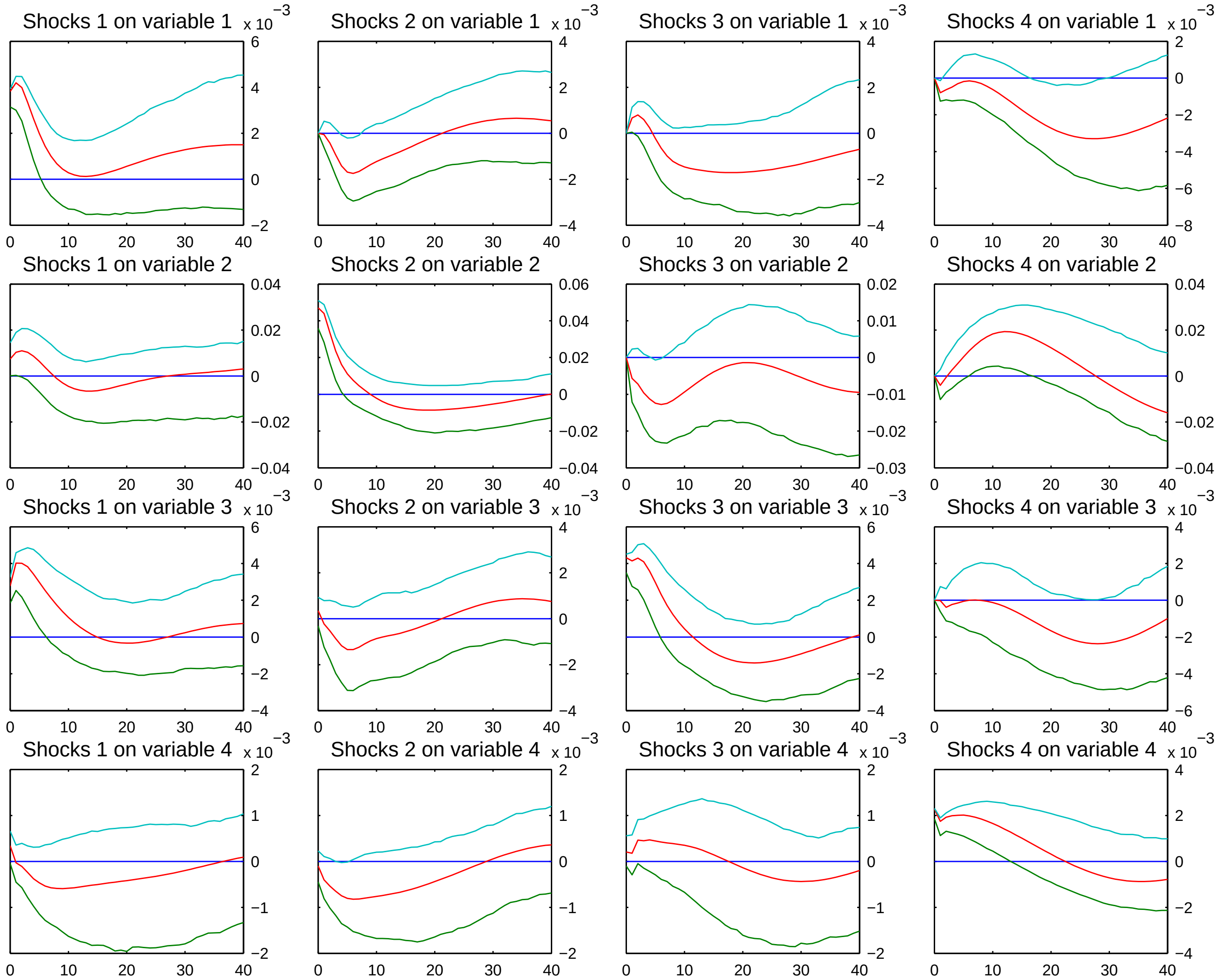

Figure 16: Bias-corrected impulse-response functions in France with separated trends (2/4)

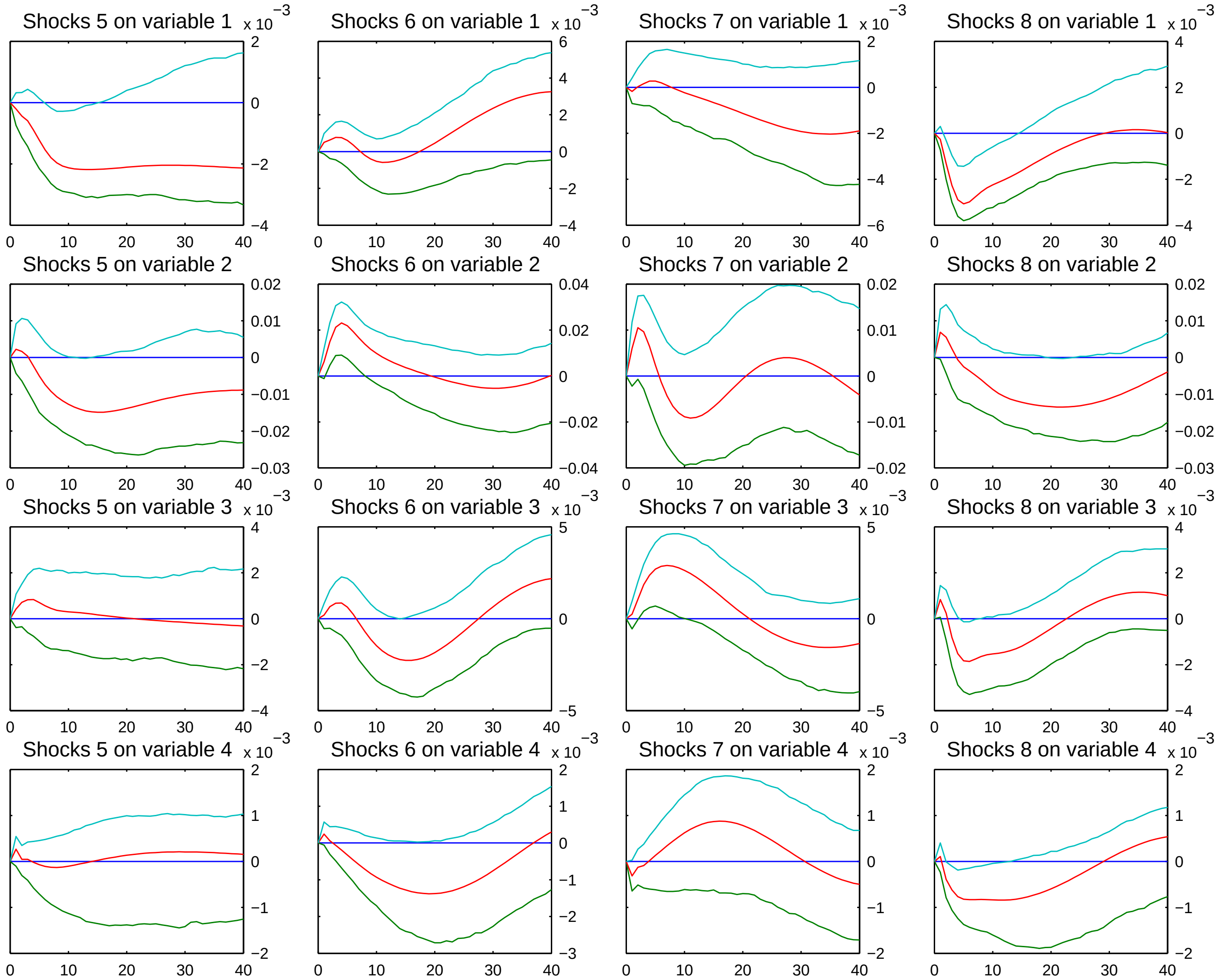

Figure 17: Bias-corrected impulse-response functions in France with separated trends (3/4)

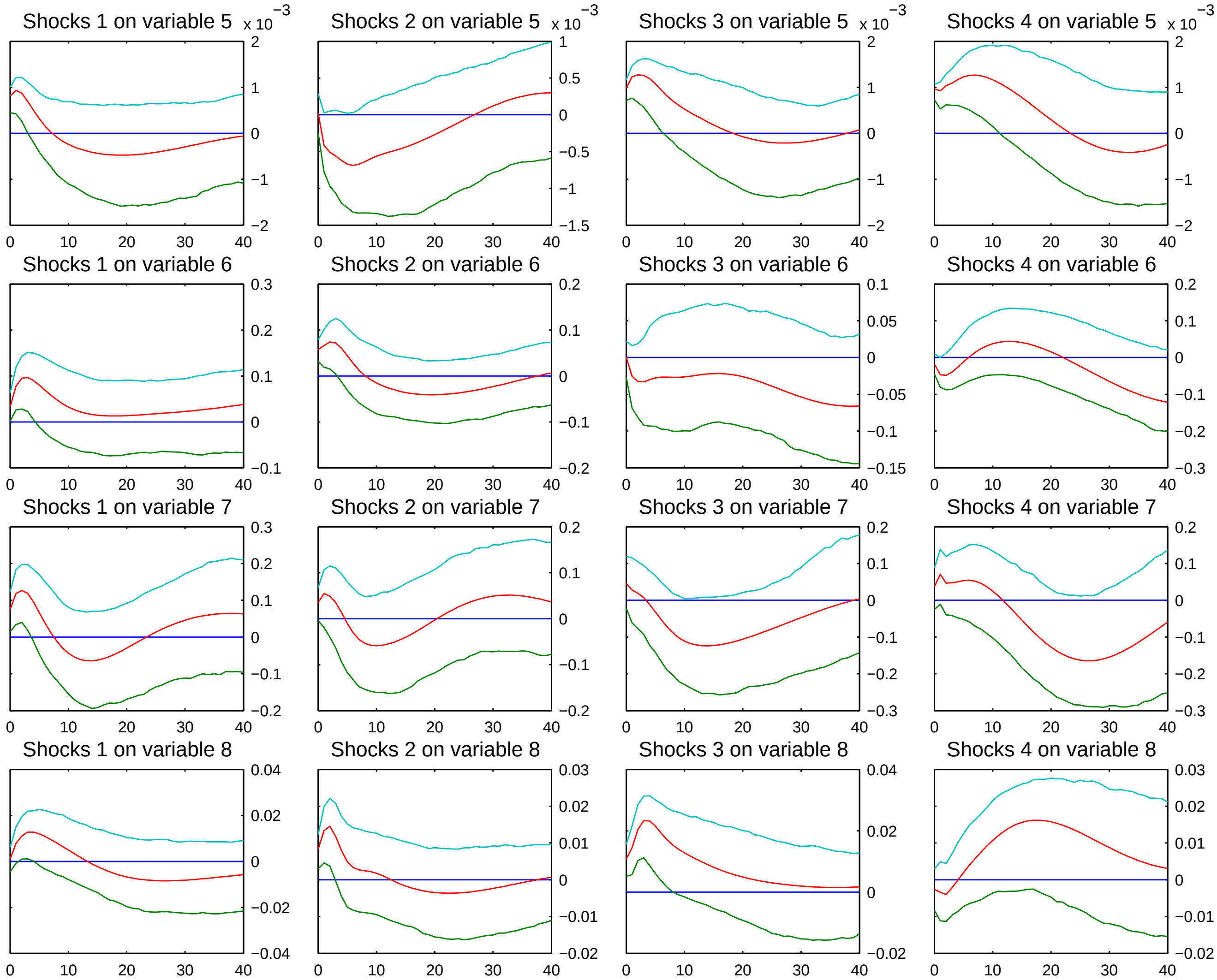

Figure 18: Bias-corrected impulse-response functions in France with separated trends (4/4)

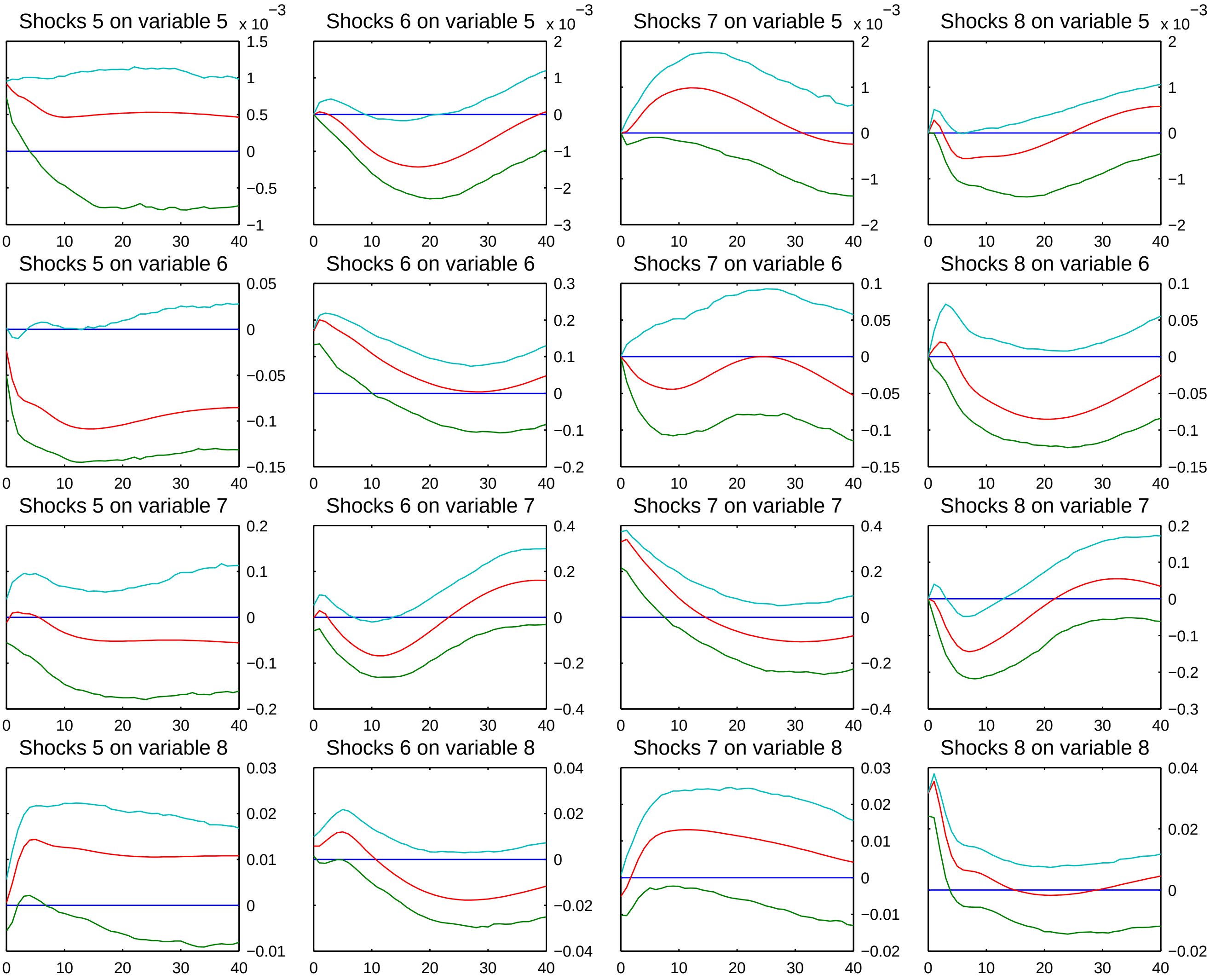

Figure 19: Bias-corrected impulse-response functions in Canada with separated trends (1/4)

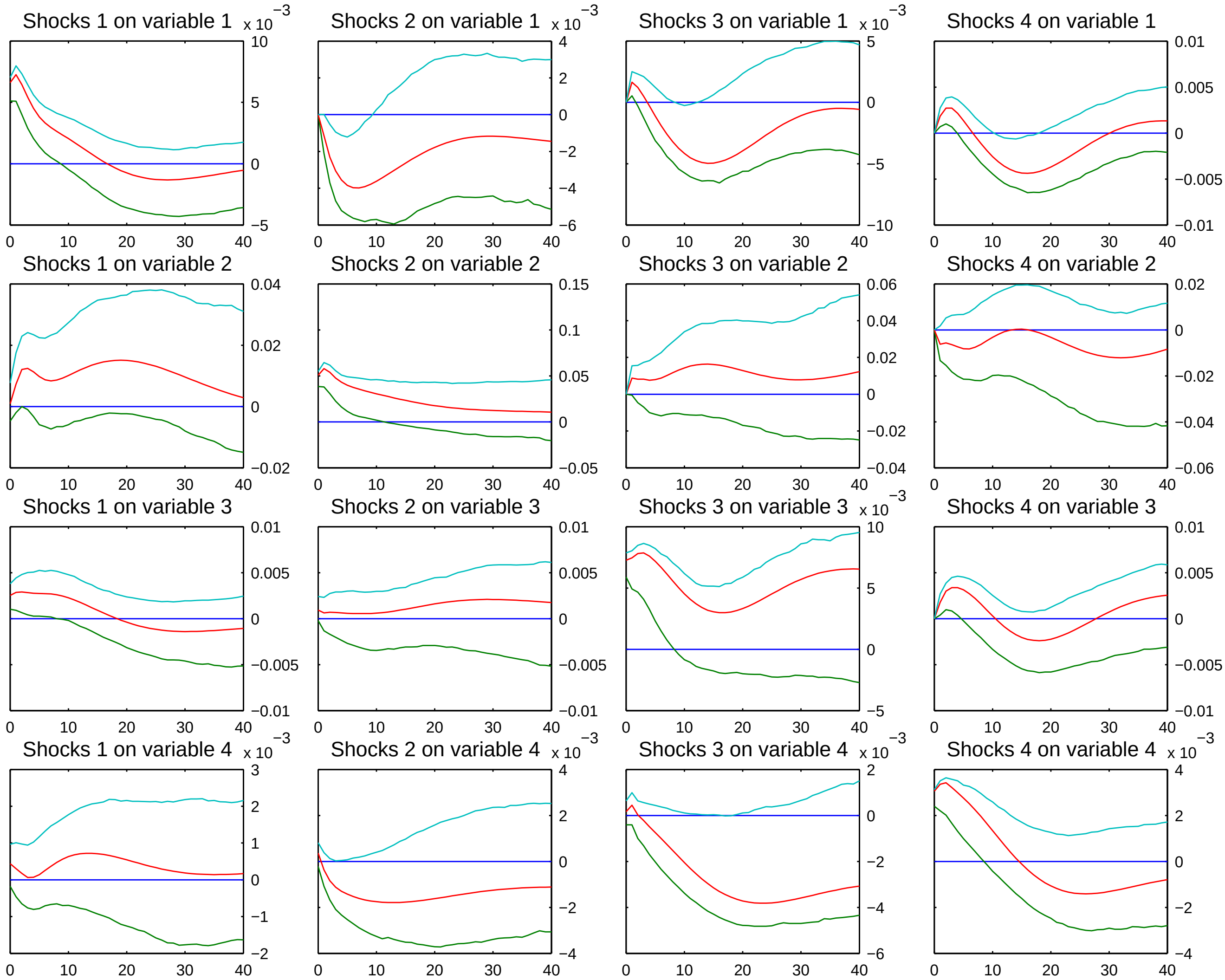

Figure 20: Bias-corrected impulse-response functions in Canada with separated trends (2/4)

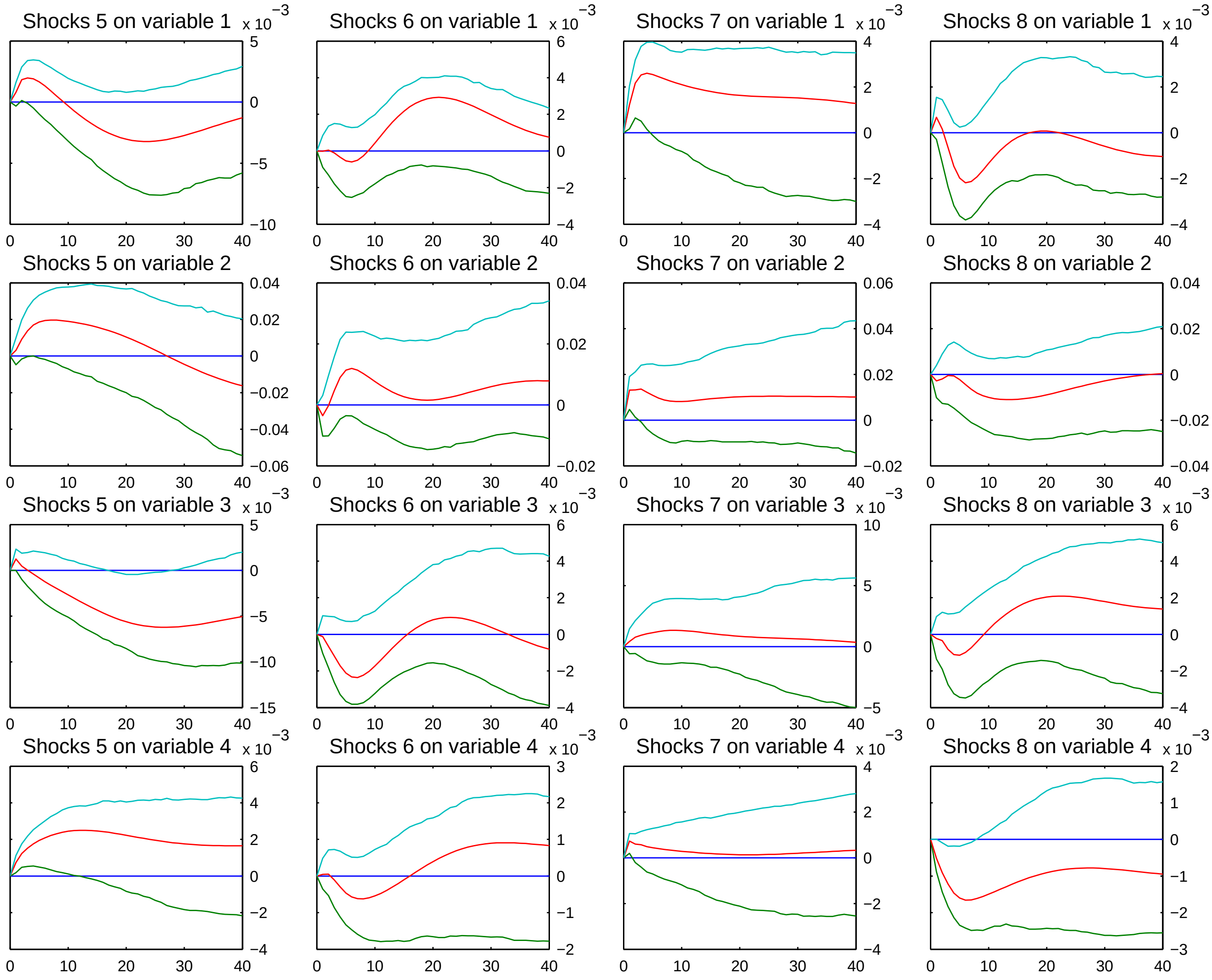

Figure 21: Bias-corrected impulse-response functions in Canada with separated trends (3/4)

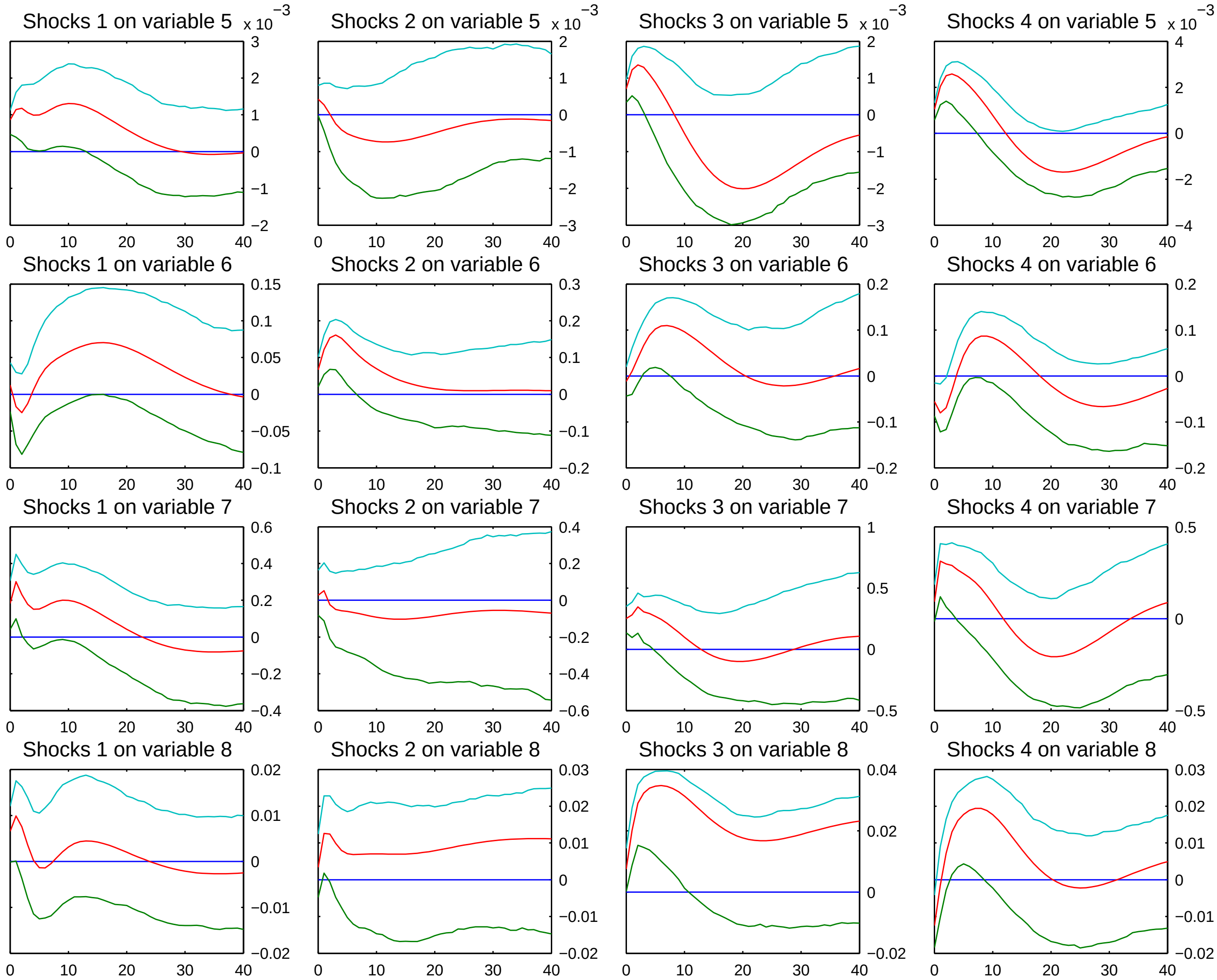

Figure 22: Bias-corrected impulse-response functions in Canada with separated trends (4/4)