BANCA D'ITALIA
EUROSISTEMA

Temi di Discussione

(Working Papers)

Housing and credit markets in Italy in times of crisis

by Michele Loberto and Francesco Zollino

Number 1087

October 2016

BANCA D'ITALIA
EUROSISTEMA

Temi di discussione

(Working papers)

Housing and credit markets in Italy in times of crisis

by Michele Loberto and Francesco Zollino

Number 1087 - October 2016

ISSN 1594-7939 (print)
ISSN 2281-3950 (online)

Printed by the Printing and Publishing Division of the Bank of Italy

HOUSING AND CREDIT MARKETS IN ITALY IN TIMES OF CRISIS

by Michele Loberto* and Francesco Zollino*

Abstract

We investigate the determinants of Italian house prices and residential investments in a structural model with possible disequilibria in the market for lending to both households and firms in the building sector. Based on a structural approach that takes into account the multifold relationships between demand and supply within the housing and the credit markets, we find that, while house prices react mostly to disposable income and demographic pressures, lending conditions also exert a significant impact. During the recent crises the contribution of declining bank rates to household lending was limited, due to the greater deleveraging needs of Italian banks. Conventional monetary policy has supported house prices, albeit with declining intensity as policy rates have gradually approached the lower bound. At the same time, unconventional monetary policy measures have sustained house prices via their effect on Italian sovereign spreads, which have shrunk by a sizeable amount since they peaked in the period between late 2011 and early 2013. Finally, we find that house price developments stayed in line with the fundamentals, during both the global financial and sovereign debt crisis, with only minor and occasional discrepancies.

JEL Classification: E52, G21, R20, R30.
Keywords: house prices, credit, system of simultaneous equations.

Contents

* Bank of Italy, Economic Outlook and Monetary Policy Department.

1. Introduction

Since the inception of the global financial crisis, an increasing body of literature has been addressing the multifold channels by which credit and house market developments dynamically interact, thus significantly affecting both business cycle and conditions for financial stability (for a review, see Hartmann, 2015 and Nobili and Zollino 2012). An in-depth assessment of the links between housing and credit markets is key to understand the transmission mechanism of the monetary impulses and to identify the sources of vulnerabilities that are related to real estate developments; besides, it is a crucial ingredient in evaluating the adequacy of macro-prudential policies. The latter issue is particularly pressing in many advanced economies as the stance of monetary policy has become exceptionally expansionary and non-conventional measures have been extensively adopted in order to counteract the deflation risks (IMF, 2014; Burlon et al, 2016).

In this paper we address these policy issues starting from the fully-fledged structural approach put forward in Nobili and Zollino (2012; NZ henceforth), where the multiple interactions between housing and banking in Italy are explored in a system of simultaneous equations modelling the demand and supply schedules on the following: the housing market, the mortgage market and the market for loans to developers. Looking at structural parameters helps understanding the several channels through which shocks on exogenous drivers can transmit to house prices, credit flows and residential investment. The last of these three variables is generally ignored in the literature, where a fixed house supply is assumed; however, its inclusion in the analysis is particularly important for Italy, where construction firms show a relatively high leverage ratio - compared with international standards and the Italian household sector – and largely contribute to the total stock of non-performing loans (Gobbi and Zollino, 2013; Ciocchetta et al., 2016).

With respect to the reference model, we consider two further ingredients that arguably characterized the Italian housing and credit markets in recent years: a) credit supply restrictions, especially as the sovereign debt crisis deepened since mid-2011; b) significant and frequent changes in property taxation, especially since 2012.

While the basic structure of the model in NZ remains on the whole appropriate, its gradual loss of accuracy suggests that it needs revamping and extending. The simulation errors are particularly large for credit flows; this leads to questioning the appropriateness of the assumption of market clearing, period by period. In this paper, the credit block of the original model is thoroughly revised, in order to take into account the effects of credit restrictions found in Del Giovane, Nobili and Signoretti (2013). In particular, we follow the seminal approach by Fair and Jaffee (1972) assuming possible demand or supply excess for any given cost of credit depending on contingent states, that we link to the developments of the bank capital position. Empirically, we test the asymmetric effects on credit demand and supply by increasing and decreasing total credit-to-asset ratio of Italian banks.

An additional factor that was not included in the original NZ specification is property taxation, which has recently undergone major changes in Italy, especially since 2012. Ignoring this variable may result in omitted variable bias, thus contributing to reducing the overall accuracy of our estimates. Taking into account the effects of property tax is not a simple task, due to the complexity of the fiscal system, which weighs either on the main and second house or on rental incomes and house transactions. In Italy, recent evidence shows that property taxation on owner-occupied dwellings has a negative effect on house prices and rents, whereas taxes on second dwellings seem to exert the opposite impact (Liberati and Loberto, 2016). Moreover, changes in property taxation may affect house demand both through the income channel – as taxes on capital account enter the disposable income measured in the national accounts – and the portfolio adjustment considered since the contribution by Poterba (1984). In our model we investigate both effects, by adding to the house demand a measure of effective tax rate on real property, on top of the usual control for taxes paid out of labour and capital income.

Starting from the model of NZ, we update the estimate of the structural equations for periods from 1986Q1 to 2015Q4 and replicate most simulations in order to provide fresh evidence on the transmission channels of impulses coming from monetary policy, disposable income, demographic pressures and "pure supply" bank factors. We also take into account the possible effects exerted by the sovereign debt spreads, affected by the unconventional monetary policy measures adopted by the Eurosystem during the recent crises. We also evaluate the relative contribution of each driver to house price developments as well as on residential investment, focusing on the period starting with the financial crisis. Furthermore, we explore the possible misalignment of house prices with fundamentals, based on both model's residuals and dynamic simulations.

Our findings confirm previous evidence that in Italy house price trends since the mid-Eighties have largely reflected the dynamics of demand factors, such as the households' disposable income and the demographic pressures. Bank lending has also played a crucial role, affecting both house demand and supply; the impact of the decline in bank rates was limited, due to the shrinking credit volumes induced by the increasing deleveraging needs of Italian banks. As for the policy rate, it has provided a remarkable positive contribution to house prices in Italy, although constantly decreasing, as it gradually approached the effective zero lower bound. The monetary policy has been supporting house prices also through other channels, for example by contributing to mitigating the factors behind the spike of the Italian sovereign spread between the summer 2011 and early 2013. Overall, the positive effects prove more significant for residential investments, thus gradually offsetting the important drag coming from credit restrictions to construction firms. Based on the residuals of the estimated system, we find that house price developments kept in line with fundamentals since the mid-Eighties, including the period of the global financial and the sovereign debt crises, and showing only occasionally minor discrepancies. This result is largely confirmed by dynamic simulations, although these point to a steady house undervaluation during the most critical stage of the sovereign debt crisis. However, following the gradual enhancement of unconventional monetary policies, our evidence shows that since early 2015 the last quarters the negative gap in house prices first reduced, followed by a moderate overvaluation since the middle of the year.

Important caveats are in place. First, we do not consider the potential link between property prices and credit stemming from wealth effects on households' consumption (for Italy, see Guiso, Paiella and Visco, 2005; Bassanetti and Zollino, 2010).[1] Second, since several main drivers are assumed to be exogenous, in our model we may miss additional feedbacks in the transmission mechanism of the monetary policy. For example, we consider only the direct effect of interest rate changes on mortgage credit and, therefore, on house prices, but we do not account for indirect effects coming from other variables, exogenous in our model, such as the households' disposable income or the banks' capital position.

The rest of the paper is organized as follows: Section 2 sketches the modelling strategy; section 3 briefly outlines the data set and developments of key variables; section 4 discusses the main blocks of the system of equations, with reference to the underlying economic theory and the estimation strategy. In section 5 we summarize the estimated coefficients of the model, while in Section 6 we assess the response of house prices to changes in the main exogenous drivers, with a special focus on the consequences of monetary policy. In Section 7 we assess the contributions of each driver on house prices and credit developments, as occurred in the past; this section is followed by an investigation of possible house price misalignments, carried out in Section 8. The final section summarizes the main findings.

[1] As for the intensity of housing wealth effects, the empirical literature is very large and not conclusive, as country evidence may depend on the prevailing design of the mortgage contracts, the accuracy in the measurement of housing wealth, the age structure of population, the ownership rate and the alike (cfr. De Bandt et al., 20l0 for a full discussion).

2. The modelling strategy

Following the same specification as in NZ, in the inverse housing demand, schedule prices are driven by standard variables, such as demographic developments, housing stock, household disposable income and availability of mortgage credit. We have also included the risk-free short-term interest rate and the expected general inflation as collected by qualitative surveys across Italian households (current house prices may positively respond on future expected prices), but these possible drivers did not prove statistically significant.

As a first innovation, we enrich the equation of (inverse) house demand by introducing a control for property taxation that ideally affects the user cost as a key determinant of the propensity to invest on dwellings (Poterba, 1984). In particular, we proxy a measure of effective tax rate by the ratio of total tax revenues on real property over the value of housing wealth.

A second innovation refers to the two pairs of equations modelling two distinct segments of the credit market, namely mortgages to households and loans to construction firms. On the one side we add the spread between the yields on the benchmark 10-year Italian and German sovereign bonds to the candidate drivers of the cost of credit in both supply schedules. On the other side, we make our first attempt to test the effects of possible disequilibria in the credit market on the housing market developments. In this respect, Del Giovane, Nobili and Signoretti (2013) show that in normal times the Italian credit market seems to follow a standard imperfect-competition model, whereas in phases of high tensions supply-side factors exert an important impact on lending, so that credit rationing may occur. According to their evidence, supply restrictions in Italy were more intense during the sovereign debt crisis than during the global financial crisis.

For a full description of the model we refer to Appendix A and here we focus on our modelling innovation related to the credit markets. The empirical strategy we adopt to model excess demand and supply is based on the "quantitative approach" developed by Fair and Jaffee (1972). Broadly speaking, the observed quantity traded in a given market over each period T is assumed to be the minimum amount between supply and demand, with the excess demand (or supply) being a function of some exogenous variables. As in Del Giovane, Nobili and Signoretti (2013), the credit market can be described with the following system of equations:

$$\Delta r_t^m = c^{rm} + \beta_1^{rm}\Delta\mathrm{log}(Q_t^{mS}) + \gamma^{rm}(\mathrm{L})\Delta log(X_t^{rm}) + \varepsilon_t^{rm} \tag{1}$$

$$\Delta\mathrm{log}(Q_t^{mD}) = c^{Qm} + \beta_1^{Qm}\Delta r_t^m + \gamma^{Qm}(\mathrm{L})\Delta log\left(X_t^{Qm}\right) + \varepsilon_t^{Qm} \tag{2}$$

$$\Delta\mathrm{log}(Q_t^m) = min[\Delta\mathrm{log}(Q_t^{mD}), \Delta\mathrm{log}(Q_t^{mS})] \tag{3}$$

$$\Delta\mathrm{log}(Q_t^{mD}) - \Delta\mathrm{log}(Q_t^{mS}) = \delta_+^m(L)\,\kappa_t^+ \tag{4}$$

$$\Delta\mathrm{log}(Q_t^{mS}) - \Delta\mathrm{log}(Q_t^{mD}) = \delta_-^m(L)\,\kappa_t^- \tag{5}$$

Equations (1) and (2) are the supply and the demand schedules, where $\Delta\mathrm{log}(Q_t^{mS})$ and $\Delta\mathrm{log}(Q_t^{mD})$ represent the non-observable quantities supplied and demanded, while $\Delta log(X_t^{rm})$ and $\Delta log\left(X_t^{Qm}\right)$ are the remaining drivers of supply and demand, respectively. Differently from the equilibrium assumption maintained in NZ, according to which credit supply equals demand at the market clearing bank rate, here the traded quantity is determined by equation (3) as the minimum amount between the supply and demand of credit. Following Fair and Jaffee, the excess demand (or supply) that characterizes the rationing equilibrium is a linear function of some exogenous variables, which in our case are identified by κ_t^+ and κ_t^- as shown in equation (4) and (5). These variables assume a positive (negative) or zero value depending on excess demand (supply) being active or negligible.

After properly rearranging, the system (1)-(5) can be simply reduced to a pair of equations modelling a single supply and demand schedule as follows:

$$\Delta r_t^m = c^{rm} + \beta_1^{rm} \Delta\log(Q_t^m) - \delta^{*m}(L)\,\kappa_t^- + \gamma^{rm}(\mathrm{L})\Delta log(X_{t-k}^{rm}) + \varepsilon_t^{rm} \tag{6}$$

$$\Delta\log(Q_t^m) = c^{Qm} + \beta_1^{Qm} \Delta r_t^m - \ {}_{+}^{m}(L)\,\kappa_t^+ + \gamma^{Qm}(\mathrm{L})\Delta log\left(X_{t-k}^{Qm}\right) + \varepsilon_t^{Qm} \tag{7}$$

In this specification if the coefficients $\delta^{*m} = -\beta_1^{rm}\delta_-^m$ and δ_+^m are statistically significant then the associated variables are correlated with excess credit demand or supply, respectively. As expected, the crucial aspect is the choice of the variable correlated with excess demand or supply. Del Giovane, Nobili and Signoretti (2013) resort to the individual responses of the Italian banks participating in the Bank Lending Survey (BLS), the quarterly survey on credit conditions carried out in all euro area countries since 2002. However, as our estimation strategy requires a much wider sample, we have to adopt a different measure.

According to Del Giovane, Eramo and Nobili (2011), the Italian banks participating in the Bank Lending Survey tend to report that the difficulties in their capital position significantly lead to a tightening in the credit standards. Based on these findings, we explore the possibility to use the capital-to-asset ratio as a variable affecting excess supply (demand) for credit. Intuitively, a single bank may have an incentive to strengthen its capital position not only by issuing new equities, but also by reducing lending. As noted in Panetta (2015), "*if all banks seek to deleverage at the same time, this could trigger a credit crunch, with adverse repercussions on the economy and ultimately on the banking system itself*". The fact that tighter capital requirements have a negative, although limited, effect on credit dynamics is well known in the empirical literature on Italian banking (among others see Gambacorta, 2010 and Locarno, 2011). Therefore, we consider the aggregate capital-to-asset ratio as our indicator for credit excess supply/demand and, as explained in the following section, κ_t^+ is meant to represent an increase of the ratio and κ_t^- a decrease.

3. The dataset

For the purposes of our analysis, we update and extend the dataset initially developed in NZ with the effort to cover the full horizon between 1986Q1 and 2015Q4, thus including the time of the prolonged crisis that hit the Italian economy starting in early 2008 and still showing some effects, although gradually phasing out against the moderate recovery of GDP since late 2014. While referring the reader to the above mentioned paper for a full description of the dataset, sources and methodologies, in this section we focus on the m in extensions we introduced.[2]

To begin with, in order to account for the possible effects on the Italian housing market of the major changes intervened in the fiscal framework over the last five years, we computed the effective tax rate on dwellings as the ratio between property tax revenues provided by Istat (*taxes*) and the value of the housing wealth (*wealth_housing*) of the Italian households as estimated by the Bank of Italy.[3] As official data on property tax revenues do not allow to disentangle the sole residential component, we are aware that we somewhat overestimate the *level* of the effective tax rate on dwellings although the bias regarding the dynamics could be lower as main changes on

[2] Regarding loan quantities to construction firms (loan) and mortgage loans to households for dwelling purchases (mortgage), we adopt data on stocks adjusted for the accounting effects of securitizations.
[3] Compared with the official data on Italian wealth recently started by Istat, we adopt an internal update of estimates published by the Bank of Italy until 2014 as they cover a longer time span.

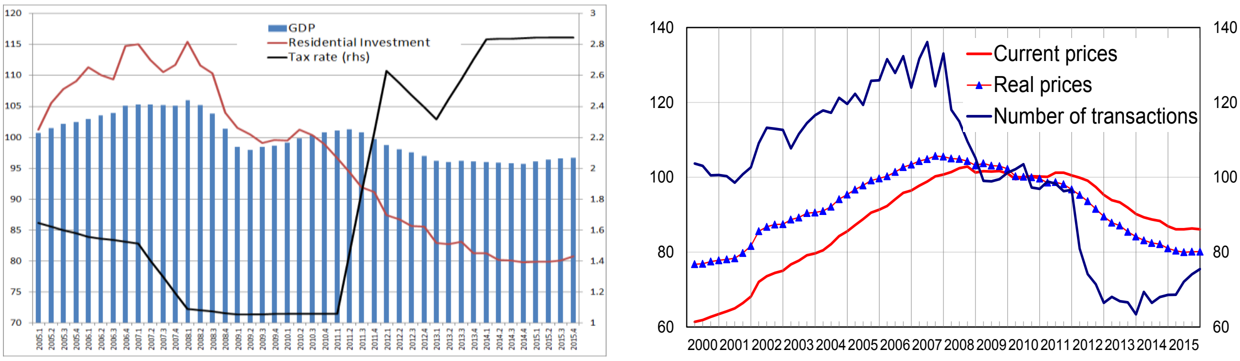
commercial property taxation are usually coincident with those on dwellings.[4] In panel A we show the effective tax rate on total real property, thus including the residential and non-residential component, in order to document the overall picture following the recent reforms in taxation. Yearly data are made quarterly using simple linear interpolation, in order to smooth among different years.

Figure 1

HOUSING MARKET DEVELOPMENTS

(indices 2010=100; for effective taxation, rates per 1000)

A) Residential investment, GDP and property taxation B) House prices and transactions



Source: elaborations based on data from Bank of Italy, Istat and *Agenzia del Territorio*.

Secondly, we added more controls affecting credit supply restrictions: i) the spread between the yield on the benchmark 10-year Italian and German sovereign bonds (*sov_spread*); ii) capital-asset ratio split in two different variables, namely *kap_plus* and *kap_minus*. The first one is equal to the difference between the capital-asset ratio at time t and t-1 whenever the difference is positive, otherwise it is equal to 0; the second variable is equal to the absolute value of difference between the capital-asset ratio at time t and t-1 whenever the difference is negative, otherwise it is equal to 0.

We cast our analysis on the background of the deep recession of the Italian economy, that resumed in summer 2011 following the temporary recovery in the aftermath of the global financial crisis and prompted by the dramatic tensions on the sovereign debt sustainability. All in all, between 2008Q1 and 2014Q4 the huge fall in GDP (-9.7%) was more than doubled by the contraction in residential investments, that started to show a cyclical weakening also prior to the global financial crisis (Fig. 1, panel A). On the one side, construction activity was curbed by the brisk reduction in the number of house transactions, that in five years since 2008 fell by 53% despite the virtual stabilization between mid-2009 and mid-2011 (Fig. 1, panel B); the first signs of recovery in transactions began to show in early 2014, transmitting to house prices in the usual lag approximately over two years. Indeed, houses deflated by 12.3% since 2008 before stabilizing over 2015; net of consumer inflation, real prices cumulated a decline by 22.2%.

On the other side, interactions with credit developments weigh significantly on the housing market. After the gradual acceleration between late 1997 and 2006, mortgages first registered a marked slowdown with the blow up of the financial crisis, followed by a temporary improvement on the eve of the sovereign debt crisis; the deterioration in yearly growth of household credit resumed with renewed strength since summer 2011, stepping into negative territory between late 2012 and mid 2015 with a moderate positive credit dynamics in the latest quarters (Fig. 2, panel A). The disappointing developments in flows went together with a reduction in the cost of households' credit, from 6% on the eve of the global crisis down to around 4.5% in summer 2011 and, as the stance of monetary policy became unprecedentedly expansionary, to 2.5% in late 2015.

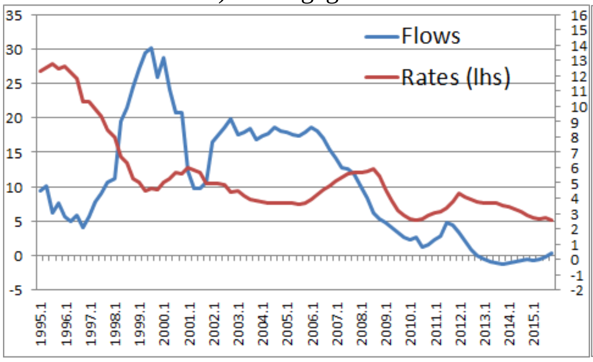
[4] As the last period included in the analysis is 2015Q4, we do not consider the important change introduced since the start of 2016, namely the removal of the property tax on the main dwelling, that mostly affect only the residential market.

Figure 2

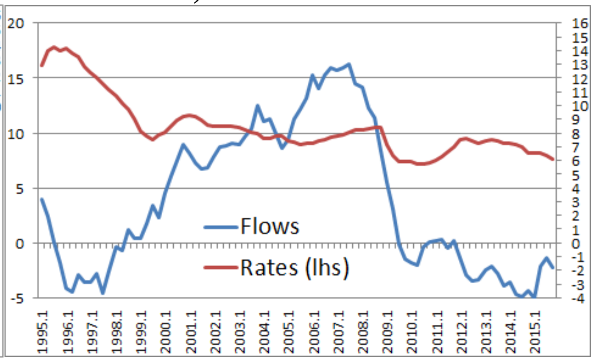
CREDIT MARKET DEVELOPMENTS

(percentage changes on the corresponding period for flows; percentage points for rates)

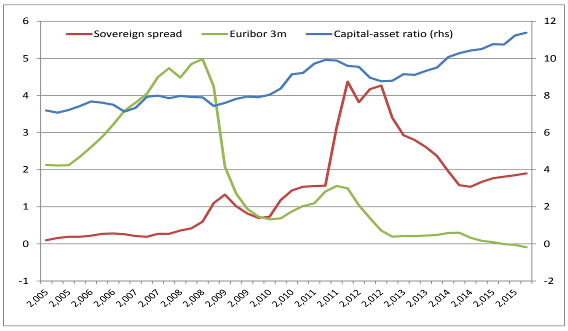
A) Mortgages



B) Loans



C) Bank funding conditions



Source: Bank of Italy.

The picture for loans to developers looks even gloomier, especially due to a dramatic deterioration in the quality of credit following the particularly deep recession in the construction sector and the associated increase in the stock of unsold dwellings. The yearly growth rate of loans to construction firms went steadily down from the peak of around 16% in mid-2007 to a slightly negative territory two year later (Fig. 2, panel B); following a virtual stabilization between late 2010 and 2011, credit flows resumed falling with a gradually increasing intensity until early 2015 (-5.0% in 2015Q1 compared with the same period in 2014), with a mitigation in later quarters. In the same period the cost of credit to developers reduced, but more moderately compared with the mortgage markets, due to the larger stock on non-performing loans (Bank of Italy, 2016). Focusing on trends since the start of the sovereign debt crisis, it is worth noting that the bank rates followed quite closely the reduction in policy rates as well as the progressive mitigation of risks signalled by the lowering sovereign spreads (Fig. 2, panel C); at the same time, the volume of credit has been restrained by the need for deleveraging of the banks, in compliance with the tightened regulatory framework (Bank of Italy, 2015).

4 The estimation strategy and the estimated coefficients of the structural model

As in NZ, our estimation strategy follows the standard "general-to-specific" approach to macroeconometrics (Hendry, 1993). In particular, we started from including all potential regressors in the quarterly frequency in the following structural model:

$$B_0 \Delta log(Y_t) = c + B(L)\Delta log(Y_t) + \Gamma(\mathrm{L})\Delta log(X_t) + \varepsilon_t$$

where Y is the vector of the endogenous variables, namely house prices, residential investments, flows and costs of mortgages to households, flows and costs of loans to construction firms. X is the vector of the exogenous variables. The complete description of the full model is in Appendix A. All variables initially enter with up to four lags in order to control for dynamic relationships.

The estimation period is 1986Q1-2015Q4. The identification conditions required in a system of structural equations are satisfied; because of the possible simultaneity bias, a three-stage least squared estimation approach was adopted.

All variables are transformed in logs, apart from the interest rates and the capital-to-asset ratio, and are considered in nominal terms, mostly because the credit eligibility of candidate borrowers are assessed based on criteria in current values (wealth, disposable income, collateral). The results of our estimation (Table 1) are largely in line with NZ, although with some revisions in the size and statistical significance of coefficients.

The main driver of house demand is represented by the households' disposable income, while sizeable pressures derive also by the ratio of available dwelling surface to total population.[5] As in NZ, house prices are positively affected by growth in mortgage loans, while changes in interest rate confirms not significant. The main innovation in our specification of the housing block is the control for property taxation. Indeed, our proxy for the effective property tax rate on dwellings has a significant and negative impact on the dynamics of house prices, as initially expected. We have also tested for significance of house price expectations as measured, for periods since 2010Q1, by the balance between answers of increasing or decreasing house prices expected by real estate agencies pooled in the Bank of Italy survey on housing market and, for earlier periods, by the balance regarding consumer prices expected by households as it comes from the ISTAT consumer surveys. With some surprise, we find that the effects of this variable do not prove statistically significant, thus confirming the well-known difficulties in measuring price expectations.

Concerning housing supply, that we model according to the standard approach of stock-flow adjustment as in NZ, the investment rate – or the ratio of residential investments to dwelling surface - is strongly and positively affected by a rise in the profitability of construction firms, as captured by the margins of house prices on building costs. Moreover, the investment rate is soundly related to the availability of bank credit; this represents an additional channel through which shocks to the credit market can be transmitted to the housing market, on top of the standard one represented by the mortgage loans to households.

As expected, looking at the mortgage demand we observe a negative effect of the interest rate on mortgages and a positive effect of house prices, confirming the strong interactions between the housing and the mortgage markets. In an initial specification we had also included households' disposable income, but this variable has proved not significant. The main innovation we focus on refers to the coefficient of increases in the capital-to-asset ratio, that turns negative and significant, as expected according to the Fair and Jaffe (1972) methodology. This result should be interpreted as a negative impact on mortgage flows coming from higher capital-to-asset ratio. Interestingly, the

[5] As households' disposable income is significant up to the third lag, in the final specification we directly considered a moving average of four terms, which can be interpreted as a measure of permanent income.

coefficient for disequilibrium in the credit market is significant and negative also in the mortgage supply schedule, although at lag four, meaning that a decrease in the capital-to-asset ratio somewhat eases credit conditions as it implies a lower bank rate. Moreover, the cost of mortgages is positively affected by the evolution of the money market rate (3-months Euribor), while the house affordability, proxied by the ratio of house prices to households disposable income, exerts the expected positive effects. Finally, the sovereign spread has a positive impact on the mortgage interest rate, with no surprise either.

Table 1

THE ESTIMATED COEFFICIENTS FOR THE SYSTEM IN STRUCTURAL FORM

Variable	Estimated coefficient	Standard Error	Variable	Estimated coefficient	Standard Error
A.1 House Demand			**A.2 House Supply**		
*Endogenous variable: Dlog(**hp**(t))*			*Endogenous variable: Dlog(**invest**(t)/**surf**(t-1))*		
Constant	-0.002	0.00	Constant	-0.003	0.00
Dlog(**mortgage**(t-1))	0.121***	0.04	Dlog(**loan**(t))	0.518***	0.15
Dlog(**hp**(t-1))	0.201***	0.07	D(cs_cycle(t))	0.001***	0.00
Dlog(**hp**(t-3))	0.414***	0.06	Dlog(**hp**(t-2)/cost(t-2))	0.330**	0.15
Dlog(income Ma(t))	0.514***	0.14			
Dlog(**surf**(t-3)/popol(t-3))	-0.335**	0.16	Adjusted R^2 = 0.34; S.E. of regression = 0.02; DW stat = 1.99		
Dlog(taxes(t-3)/h_wealth(t-3))	-0.002**	0.00			
			Endogenous variable: log(**surf**(t))		
Adjusted R^2 = 0.71; S.E. of regression = 0.01; DW stat = 1.80			Constant	-0.057	0.03
			log(**surf**(t-1))	0.99***	0.01
			log(**invest**(t))	0.010***	0.00
			Adjusted R^2 = 0.99; S.E. of regression = 0.005; DW stat = 0.45		
B.1 Mortgage Demand			**B.2 Mortgage Supply**		
*Endogenous variable: Dlog(**mortgage**(t))*			*Endogenous variable: D(**r_mortgage**(t))*		
Constant	0.010***	0.00	Constant	0.034	0.02
Dlog(**mortgage**(t-1))	0.163*	0.10	D(**r_mortgage**(t-2))	0.202*	0.05
Dlog(**mortgage**(t-3))	0.299***	0.08	D(r_3m(t))	0.311***	0.03
Dlog(**hp**(t))	0.582***	0.21	D(r_3m(t-1))	0.229***	0.03
D(**r_mortgage**(t))	-0.017**	0.01	D(r_3m(t-2))	0.088**	0.04
D(**r_mortgage**(t-4))	-0.011***	0.00	D(sov_spread(t-1))	0.167**	0.08
kap_plus(t-1)	-0.039***	0.01	Dlog(**hp**(t)/income(t))	2.749*	1.67
			kap_minus(t-4)	-0.491***	0.18
Adjusted R^2 = 0.41; S.E. of regression = 0.02; DW stat = 2.10			Adjusted R^2 = 0.78; S.E. of regression = 0.24; DW stat = 1.70		
C1. Demand for loans to firms			**C2. Supply for loans to firms**		
*Endogenous variable: Dlog(**loan**(t))*			*Endogenous variable: D(**r_loan**(t))*		
Constant	0.007***	0.00	Constant	-0.009	0.02
Dlog(**loan**(t-1))	0.200**	0.10	D(r_3m(t))	0.478***	0.03
Dlog(**invest**(t))	0.486**	0.24	D(r_3m(t-1))	0.357***	0.03
Dlog(**invest**(t-1))	0.264***	0.08	D(sov_spread(t-2))	0.254***	0.07
Dlog(**invest**(t-2))	0.156**	0.08	D(cs_cycle(t))	-0.001***	0.00
D(**r_loan**(t)-r_10y(t))	-0.006**	0.00			
kap_plus(t)	-0.016*	0.01			
Adjusted R^2 = 0.36; S.E. of regression = 0.017; DW stat = 2.09			Adjusted R^2 = 0.82; S.E. of regression = 0.21; DW stat = 1.60		

As for loans to firms, in the credit demand equation the growth rate of the stock of loans is strongly and positively affected by the evolution of residential investment, and proves significantly related to the spread between the bank rate and the long-term interest rate, in line with the previous evidence that the opportunity cost drags the propensity of firms to pay for loans. The coefficient on the capital-to-asset ratio increases is negative and significant also for loan demand, confirming the significant role of bank capital on the quantity of credit. Instead, the related coefficient in the supply equation results not significant, consistently with previous findings (Del Giovane, Nobili and Signoretti, 2013). The cost of loans to construction firms is related to the evolution of the money market rate and it is positively affected by the sovereign spread.

5. Assessing house price and residential investment responses to the main exogenous drivers

By solving the structural model described in the previous section, we retrieve the specification in reduced form, in which each endogenous variable may depend on the predetermined values of itself and the other endogenous variables in addition to the current and lagged values of the exogenous. The reduced form model is the standard tool to perform dynamic simulations by which we can track the responses of endogenous variables to shocks given to key exogenous drivers, mostly related to policies. Based on the underlying structural model we can at the same time comment on the main channels of transmission.

In this section we focus on the dynamic responses of house prices and residential investments, over a forecast horizon of five years, to permanent changes applied to: i) disposable income; ii) taxation; iii) 3-months Euribor; iv) sovereign spread; v) capital asset ratio. The inclusion of elastic house supply, mostly modelled as rigid in the literature, enrich a lot our understanding of the macro-impact of the single shock considered, especially regarding credit relationship with both households and developers. The estimated effects of every single exogenous driver are computed as percentage deviations of the relevant endogenous from the baseline scenario, namely the scenario obtained under all exogenous variables unchanged over the whole forecast horizon.[6]

5.1 Changing disposable income. We first simulate the effects of a permanent increase by 0.5% in nominal disposable income of Italian households (Figure 3, top panels). Due to the high coefficient estimated for the 4 term moving average income in the structural model, we find a significant and long lived positive effects on house prices, gradually gaining momentum in the first 10 quarters, then slowly approaching a peak of almost 1% in four year time and stabilizing afterwards. Interestingly, the house demand effects are somewhat reinforced as higher house prices feed into more mortgage flows, even if partially offset by the higher cost of credit due to the worsened affordability. On the contrary, increasing margins for developers would stimulate residential investment, which would also be supported by larger loans; the effect on firm spending would be lagged, but substantial and persistent, cumulating a 1% increase at the end of the forecast horizon. Accordingly, also the house stock would slowly start to increase, gradually contrasting the demand impulse on house prices, which would be virtually offset over the fifth year. The simulation confirms the important role of disposable income to explain house price dynamics in the short-medium term, as well as the role of residential investment to gradually drive a phasing out in a longer horizon. An important caveat is that, in the current specification, we rule out a dynamic feedback from residential investment to disposable income, that could operate through higher labour demand and wage bill; leaving this point for future research, we can reasonably expect that adding this input could imply more durable positive effects of the income shock on house prices.

5.2 Changing property taxation. We model the effects of changes in property taxation as an additional impact with respect to those coming from disposable income, which actually includes

[6] For each stochastic simulation, 10% confidence bands are generated by using a Monte Carlo approach based on 5,000 independent draws from the standard normal distribution.

direct taxation on both income and property under the standards of national accounts.[7] In this respect, extending the driver set to the property taxation fixes a potential missing variable distortion in the empirical model as it allows to control for the motivation to purchase a dwelling related to its investment content in addition to the housing service consumption. Accordingly, the property taxation would impact on the household portfolio choice by affecting the user costs, hence the propensity to purchase an additional unit in the housing stock. By simulating a permanent 5% increase in the total fiscal revenues on dwellings, equivalent to a 0.02 percentage point increase in the effective taxation rate, we find that house prices would react with one year lag and relatively slowly, cumulating only a 0.06% decline by the end of the forecast horizon (Figure 3, second row panels). The pattern seems somewhat different for residential investments: they do not decline until a reduction in margins on construction costs shows up with a three-quarter delay since the original shock, and then they decrease more rapidly and for longer than house prices, with the result that, in five years, the reduction would have about the same magnitude for the entire period considered, but would remain in place even longer. The main reason traces back to credit flows, that would start declining later for developers than for households but by the same lag between the first reaction to shock by house prices and by investments; in addition, the investments decline would gradually activate upward pressures on house prices.

5.3 Changing interest rates. As a first ingredient of a monetary experiment, we simulate that the 3-month money market rate increases by 50 basis points in the first quarter and remains at the new level for the remaining forecast horizon. We find that after promptly declining in the first three years, house price keep reducing at progressively lower rate, with a stabilization in the final quarters (Figure 3, third row panels); the decline of residential investments would proceed over all the simulation horizon, although moderating in the final period, thus partially offset the deflationary effect stemming from the decrease in housing demand. On the one side, the higher cost of credit would transmit to house prices directly due to a long lasting decline in loans for house purchases. On the other side, loans to construction firms also react negatively to changes in the cost of loans (through a higher spread between the bank rate and the long-term interest rate), even if by a magnitude reduced by almost half compared to the mortgage loans in the overall horizon. As the negative response in loans to construction firms leads to a drop in residential investments and slowly transmits to a declining housing stock, the overall negative effect coming from a 50 basis point increase in Euribor would prove as modest as 0.6% on house prices and almost double for residential investments.

5.4 Changing the sovereign spread. As an additional ingredient of a policy experiment, that has gained interest during the crisis as signalling the mix effects of monetary, fiscal and structural action, we simulate a permanent increase of the 10y sovereign spread on the Italian government bonds by 50 basis points. The pattern of the reaction of both house prices and residential investment is reasonably similar to the one we would have under a 3 months Euribor shock, with the important qualifications that the impact is more limited in size, especially for residential investment, as the spread shock transmits once for all to both mortgage and loan bank rates (with a higher coefficient for the latter).

Accordingly, a 50 basis point increase in the sovereign spread would lead to a modest negative impact on house prices (-0.01%), marginally more pronounced for residential investment (-0.3% ; Figure 3, fourth row panels).

5.5 Changing the bank capital asset ratio. In order to assess the effects of a credit supply shock, we experimented a permanent increase in the total capital-to-asset ratio by 0.5 percentage points in one quarter. Differently from the specification in NZ, in our model this driver enters the

[7] The lift of the property tax on the first house introduced by the Stability Law for 2016 amounts to a saving of 3.2 billion euros for Italian households, or to a 0.3 percentage point increase in their disposable income registered in the national accounts.

supply schedule for mortgages only for easing conditions (with 4 quarter lags), but fails to prove significant for loans.

Figure 3

ESTIMATED EFFECTS OF SELECTED DRIVERS ON HOUSE PRICES AND INVESTMENT

(quarterly data; deviations from baseline scenario)

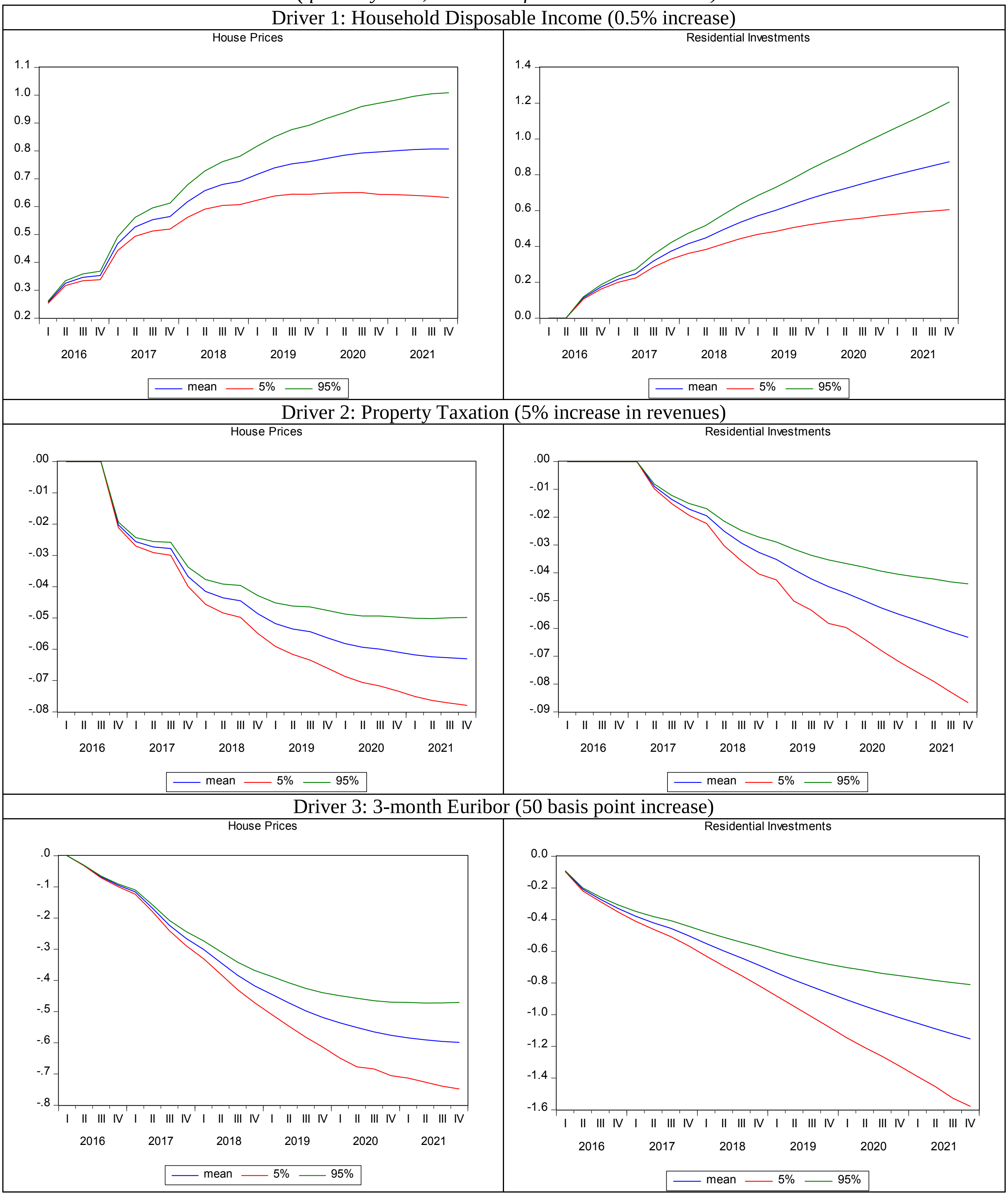
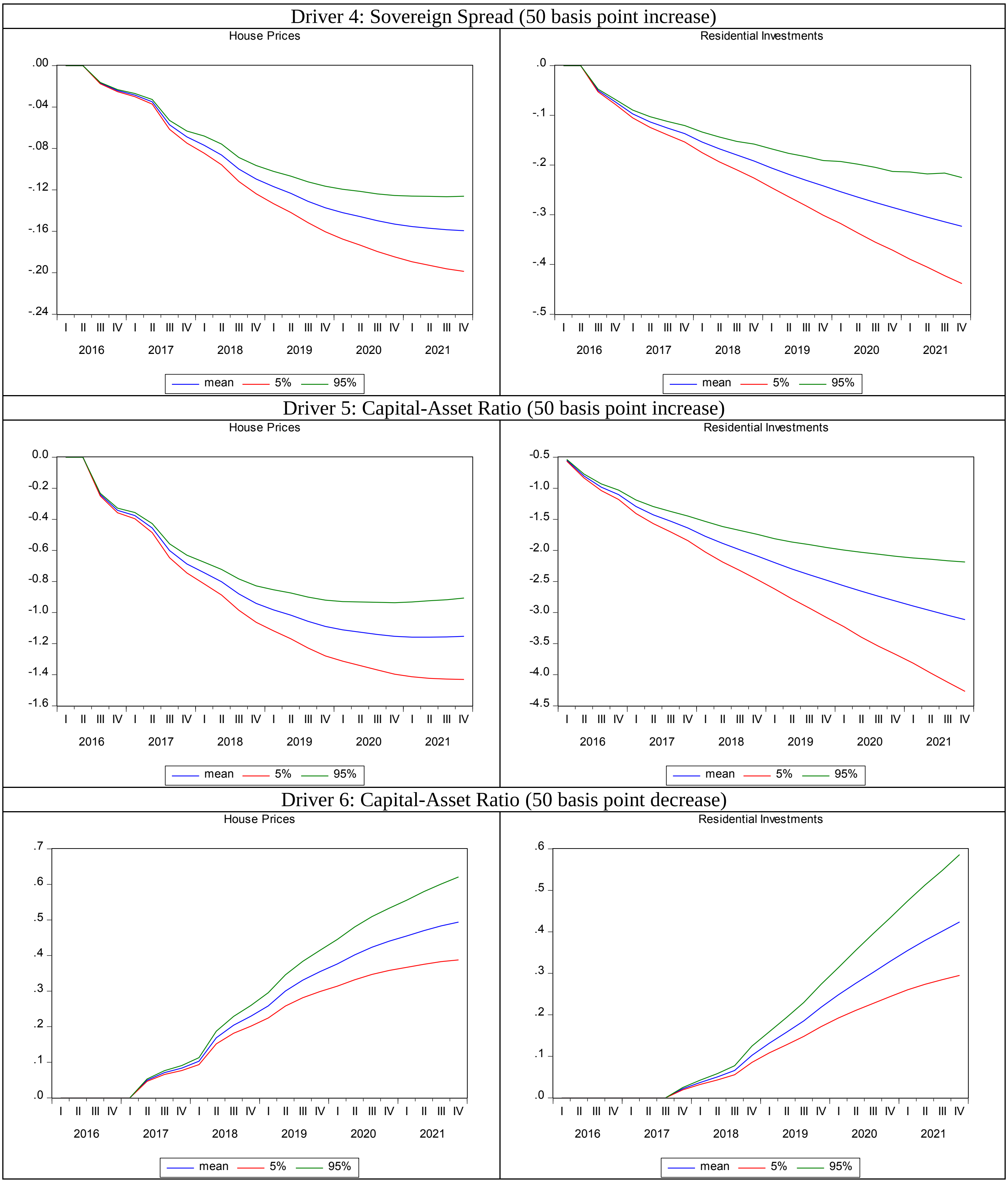


Figure 3
continued



Notes: each figure reports the estimated effect on the house price and residential investment levels of the shock to the indicated exogenous driver by the indicated size. The baseline scenario is founded on the assumption that all exogenous variables do not change over the entire forecast horizon. Confidence bands represent the 16th and 84th percentiles of the empirical distribution of the forecasts obtained from Monte Carlo simulations.

As a specific innovation implied by the strategy we follow to control for credit restrictions, in our specification banks' deleveraging affects negatively only the demand schedules, for both mortgages and loans; in particular, we find that for the former the effects are one-quarter lagged and marginally higher than for the latter. As bank loans enter contemporaneously in the investment equation and the mortgages affect house demand with one quarter lag, we expect that the decline promptly starts for investment activity whereas for house prices it takes two quarters after the economy is hit by the simulated 50 basis point increase in the bank capital ratio (Figure 3, bottom panels). Accordingly, the timing is now shorter than the one-year delay found in NZ under the assumption of credit market clearing, and the transmission channels operate through demand rather than supply.

Interestingly, it turns out that the negative effects on house prices come to an halt one year earlier than a monetary policy shock but prove significantly larger in magnitude, as the cumulated decline peaks 1.1% after four years (almost double than under 3M Euribor shock).

As for the residential investments, they show a similarly lasting decline as under a monetary policy shock, but by a stronger intensity as the hit an overall loss of 2.7% at the end of the simulation horizon. The stronger contraction in investments would transmit more rapidly to a reduction in the housing stock, thus feeding more robust upward pressures on house prices. This explains why house prices stabilize earlier.

As a specific innovation implied by the strategy we follow to control for credit tightening; in our specification banks' deleveraging affects negatively only the demand schedules, for both mortgages and loans; in particular, we find that for the former the effects are one-quarter lagged and marginally higher than for the latter. The effects of capital ratio changes on credit flows confirm asymmetric, somewhat in line with previous contributions (for Italy see Locarno 2011, Del Giovane, Eramo and Nobili 2011, NZ). In particular we find that the result holds true especially for loans to construction firms, that do not show a significant reaction to a lower capital. With regards to mortgages to households, our evidence shows that a lower capital-to-asset ratio leads banks to reduce the cost of credit with a four quarter lags, thus supporting household demand for credit; the latter however would benefit from lower cost less than it is curbed by banks' capital reduction, that in our empirical specification enters credit demand with a higher coefficient compared to the banks' interest rate. Overall the impact of easier capital ratio turns out to be significantly positive both on house prices and, with the longer delay by which firms profitability increases, on residential investment. Once started 5 quarters after the shock, the increase in house prices would be equal to 0.50% at the end of the simulation horizon; the pattern is similar for residential investments, that cumulate a 0.4% increase. These figures must be compared with a overall declines, respectively by 1.1% and 2.7, under a 0.50 basis points in banks' capital-asset ratio.

6. What were the main drivers of house prices over the last decade?

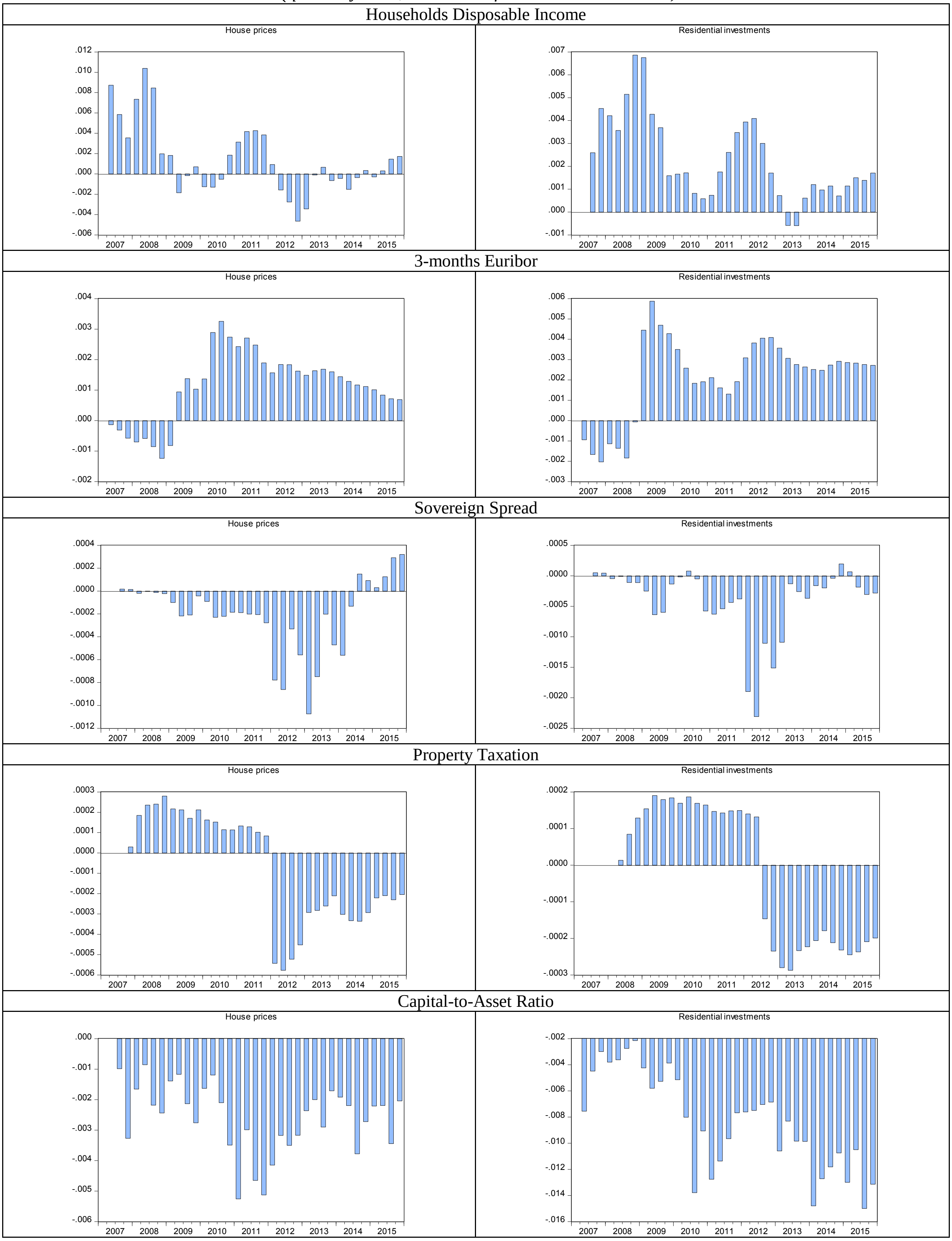
In this section we assess the contribution of the main exogenous drivers to the changes of house prices and investments in dwellings in Italy during the period 2007Q1-2015Q4, covering first the global financial crisis and then the sovereign crisis (Figure 4). We compute the impact of a single driver through a counterfactual exercise in which the fitted growth rates of the model are compared with those obtained by a simulation in which the same driver has been kept fixed over the entire horizon of the simulation. The impact on the growth rates of house prices and investments is computed as the difference between logs of the two series at time T, minus the same difference at time T-1.

Regarding house prices, the main driver of their disappointing evolution during the last eight years has been the weakness of households' disposable income, that between 2007 and 2015 decreased by about 10 percent in real terms, with a heightening fall in the 2011-2013 period. The second main drag came from the evolution of the credit market, especially by the tightening of credit conditions plausibly connected with the banks' need to deleverage induced by the raise of capital-to-asset ratio.

Figure 4

HISTORICAL DECOMPOSITION OF HOUSE PRICES AND RESIDENTIAL INVESTMENTS

(quarterly data; deviations from baseline scenario)



Notes: each panel reports the effects on house price levels provided by a single driver at each point in time. The effects are measured as the deviation in logs of the house prices fitted under the assumption of no change of the considered driver and those obtained from the benchmark model.

Indeed, the dynamic of mortgage loans to households turned progressively weak during the peak of the sovereign crisis, although the cost of mortgage credit decreased because of the accommodative monetary conditions.

Looking the money market rate, during the crisis it provided a marked positive contribution to house prices in Italy, although it gradually decreased as the policy rate went down to the zero lower bound. In any case, monetary policy has proved still effective, as it plausibly affected the sovereign spread: while its contribution was negative during the period 2011-2013, as it started decreasing it provided a positive push to house price dynamics. Overall, since 2013 these two channels sustained house prices by 0.9 percentage points.

Finally, an important driver was represented by housing property taxation. While in the period 2007-2011 taxation had a positive effect, driven by the repeal of taxation on owner-occupied dwellings in 2008, in 2012 the contribution becomes suddenly negative, due to the housing property reform approved at the end of 2011. Since 2016 the property tax has been lifted for the main dwellings, and we can expect that some support to house prices could soon materialize.

Regarding the dynamics of investment in dwellings, closely related to the construction value added in the national accounts, the main driver of the negative performance appears to have been our measure of excess supply/demand in the credit market. A negative contribution was provided also by the sovereign debt spread. In both cases the impact on investments has been stronger than the one on house prices. This is related to the fact that construction firms suffer from financial shocks both directly, as the availability and the cost of financing worsen, and indirectly, because the same shock has a negative effect on house prices, thus reducing the profitability of the construction sector. Since 2012, for example, property taxation has also affected the construction sector, although the magnitude of its contribution has been lower than the impact on house prices. In this context, monetary policy has definitively supported the activity of the construction sector, both through a strong contribution of the money market rate and through the fall of the sovereign debt spread.

7. Implications for house price misalignments

In this section we analyse the residuals of the econometric estimation of the house price equation in order to detect the size and sources of possible misalignments with respect to main fundamentals. This practice, that is common in the empirical literature (Tsatsaronis and Zhu 2004; IMF 2007; OECD, 2009; ECB, 2016), may gain robustness in our approach as we control for a large set of candidate drivers of house prices, including property taxation and possible credit restrictions. The remaining missing variables are mostly related to regulations regarding the rental market and the land use, for which data gap are still prohibitive.

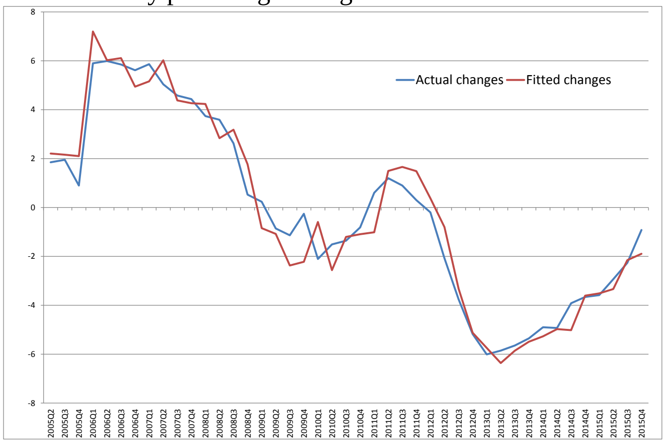
Our results point to negligible misalignments of Italian house prices over both the expansionary and receding stages in all previous cycles since the mid-Eighties. Focusing on developments since the global financial crisis, we see that observed yearly changes in house prices are largely in line with fitted values (Figure 5.A). In terms of percentage deviation between actual and fitted levels of the house price index, we do not detect any signal of sizeable and persistent misalignment as the range of the gaps since the inception of the financial crisis is between the largest undervaluation of 1.6% (in the middle of 2008) and the largest overvaluation of 1.2% (middle 2010). Interestingly, as the stance of the monetary policy has gradually become unprecedentedly expansionary over the last two years we find that the yearly changes in house prices have significantly increased, from -6.0% in 2013Q1 to -0.9% in 2014Q4. Compared to fundamentals, on the average of 2015 the levels of the quarterly index of house prices prove overvalued by as low as 0.6% (0.3% in 2014).

In order to dismiss the risk that the results are partly driven by the large set of exogenous drivers as well as by the relatively long memory included in the empirical specification, we first estimate the structural model over the sample 1986Q1-2010Q4, then perform a dynamic simulation for 16 quarters starting from 2011Q1.

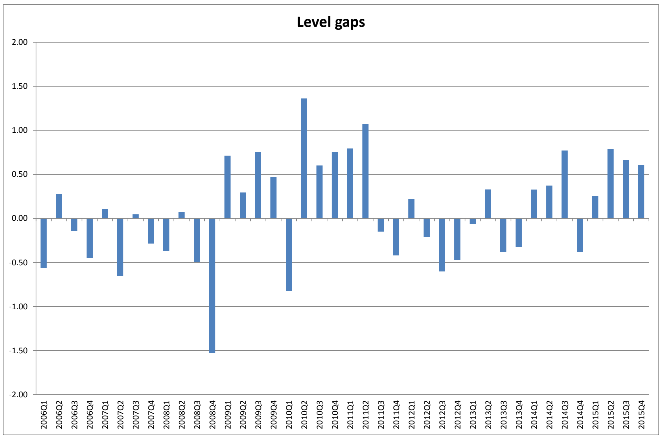
Figure 5

HOUSE PRICES SINCE THE GLOBAL FINANCIAL CRISIS

A. Yearly percentage changes in nominal values



B. Percentage discrepancy of fitted versus actual levels

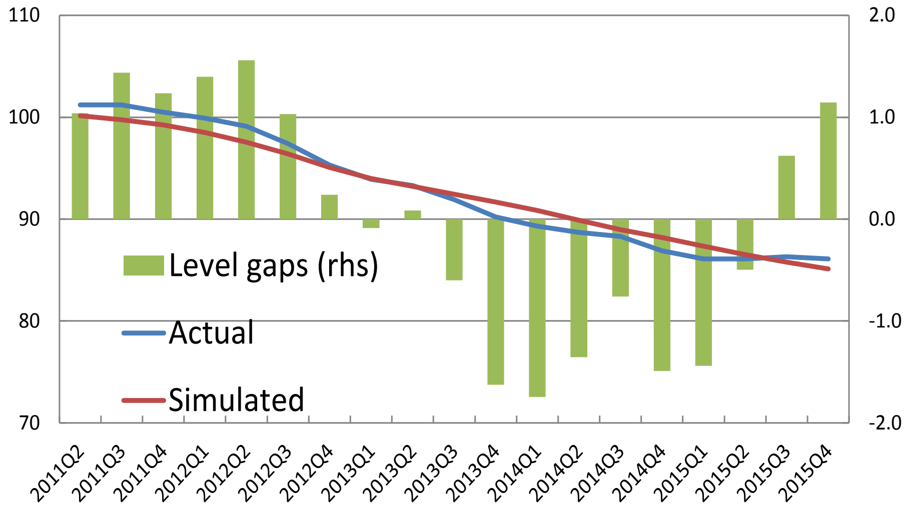


In this way we test the out-of-sample performance of the estimated model over a period of exceptionally weak conditions of the Italian economy, especially with reference to the huge crisis that hit the credit and housing markets. Should the house prices be driven by unsustainable components disconnected from fundamentals, we would observe a progressive divergence between the actual house prices and those estimated by means of simulated predetermined regressors. Indeed we find that the simulated series does not systematically deviate from the actual one, with a percentage gap in terms of levels progressively reducing as the sovereign debt crisis deepened from positive value at early 2012 to significantly negative values three years later (Figure 6). Interestingly, the size of undervaluation is larger than implied by the residual analysis as in our simulations the under-perfomance of the credit markets would have significantly contributed to drive down house prices.

If we focus on more recent periods, in our dynamic simulation the house undervaluation gap first vanished, then turned positive in the following quarters as the ECB has started to implement extended asset purchasing program. In terms of the soundness of our evidence on misalignments, this result is reassuring, since the dynamic simulation confirms overall the signals extracted from the residuals within the in-sample estimation (Figure 5b).

Figure 6

HOUSE PRICES SINCE THE SOVEREIGN DEBT CRISIS

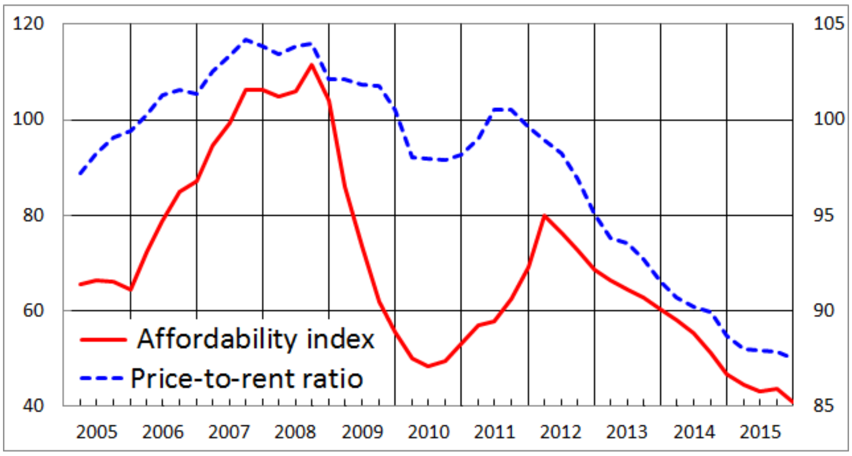


All in all, our results point at a broadly balanced picture in the Italian housing market, in line with developments of the usual statistical indicators of misalignments. On the one side, the price-to-rent ratio, after peaking in the second half of 2007, progressively recovered the long run average around the inception of the sovereign debt crisis in 2011, then kept falling until hitting a historical low by the end of 2015 (Figure 7). On the other side, the affordability index, corrected for the mortgages interest rate, shows that the ability of Italian households to buy a dwelling has been significantly improving since 2008 and it turned historically high by late 2015.

Figure 7

PRICE-TO-RENT RATIO AND AFFORDABILITY INDEX(*)

(Indices 1992-2014=100)



(*) The affordability index takes as numerator the product of house price and the mortgage interest rate. Lower values of both indices signal improved affordability.

8. Concluding remarks

In this paper we investigated the determinants of Italian house prices and residential investments in a structural model that takes into account disequilibria in the market for lending to both households and construction firms, as well as changes in real property tax rates. Focusing on developments during the recent crises, we found that the impact of the decline in bank rates on lending was largely offset by the shrinking credit volumes, following the increasing deleveraging needs of Italian banks. Monetary policy rates have markedly supported house prices, although with a declining intensity in more recent periods, as they gradually approached the effective zero lower bound.

The increasingly expansionary stance of unconventional monetary policy has indirectly sustained house prices by contributing to mitigate the risks underlying the Italian sovereign spread, which has declined markedly from the peaks of late 2011-early 2013. Overall, the positive effects of monetary policy was larger for residential investments, thanks to its ability to offset the drag coming from credit restrictions to construction firms.

Finally, we find that house price developments have kept in line with fundamentals both during the global crisis and the sovereign debt one, occasionally showing minor discrepancies. This result is largely confirmed by dynamic simulations, although houses appeared more regularly undervalued as the sovereign debt crisis deepened; in the same period observed credit flows significantly lagged behind the simulated trends, too. In this context we find that, following the increasingly expansionary stance of monetary policy since early 2015, the gap in house prices starts to reduce and turned positive in the second half of the year in line with mitigating underperformance of credit flows, both to households and construction firms.

We estimate that over the last three years the combined effects of declining bank rates and sovereign spread supported house prices by slightly less than 1 percentage point and boosted residential investments by around 2.0 points. The positive impact would arguably be more sizeable if the model included the dynamic feedback on disposable income, via the possible wealth effects on consumption and the increase in residential investments. It is worth remarking that, absent the sizeable deleveraging by the Italian banks observed in the recent past, the monetary policy stimulus would have been significantly higher, by around 2 and 5 percentage points for house prices and residential investments, respectively.

Appendix A. Stylized specification of the model

1. Housing block

$$\begin{pmatrix}\text{Housing}\\ \text{market}\end{pmatrix}:\begin{cases}\text{Demand}: \textit{House prices} = \text{F (disposable income (+), demographic trends (+), expected inflation (+),}\\ \qquad\qquad \textit{Mortgage loans}\text{ (+), money market rate (-), }\textit{Housing stock}\text{ (-), property tax rate (-))}\\ \text{Supply a)}: \textit{Investments / Housing stock} = \text{F (building cost (}-\text{), }\textit{House prices}\text{ (+), }\textit{Loans}\text{ (+))}\\ \text{Supply b)}: \textit{Housing stock} = \text{F (}\textit{Investments}\text{ (+), depreciation (-))}\end{cases}$$

2. Credit blocks

$$\begin{pmatrix}\text{Mortgage loans}\\ \text{to households}\end{pmatrix}:\begin{cases}\text{Demand}: \textit{Mortgage loans} = \text{F (}\textit{House prices}\text{ (+), disposable income (+/-), financial wealth (+/-),}\\ \qquad\qquad \textit{Mortgage rate}\text{ (-) , bank capital ratio increase (-))}\\ \text{Supply}: \textit{Mortgage rate} = \text{F (money market rate (+), bank capital ratio (+/-), financial wealth (-),}\\ \qquad\qquad \textit{House prices}\text{ (-) , bank capital ratio decrease (-), sovereign spread (+))}\end{cases}$$

$$\begin{pmatrix}\text{Loans to}\\ \text{construction firms}\end{pmatrix}:\begin{cases}\text{Demand}: \textit{Loans} = \text{F (}\textit{Investments}\text{ (+), building cost (-), }\textit{Loan rate}\text{ (-), firms' gross value (-),}\\ \qquad\qquad \text{bank capital ratio increase (-))}\\ \text{Supply}: \textit{Loan rate} = \text{F (money market rate (+), bank capital ratio (+/-), business cycle (-),}\\ \qquad\qquad \textit{House prices}\text{ (-) , bank capital ratio decrease (-), sovereign spread (+))}\end{cases}$$

3. Derivations of disequilibrium model

We start from the demand/supply system in its extensive form:

$$\Delta r_t^m = c^{rm} + \beta_1^{rm}\Delta\log(Q_t^{mS}) + \gamma^{rm}(\mathrm{L})\Delta log(X_t^{rm}) + \varepsilon_t^{rm} \tag{1}$$

$$\Delta\log(Q_t^{mD}) = c^{Qm} + \beta_1^{Qm}\Delta r_t^m + \gamma^{Qm}(\mathrm{L})\Delta log\left(X_t^{Qm}\right) + \varepsilon_t^{Qm} \tag{2}$$

$$\Delta\log(Q_t^m) = min[\Delta\log(Q_t^{mD}), \Delta\log(Q_t^{mS})] \tag{3}$$

$$\Delta\log(Q_t^{mD}) - \Delta\log(Q_t^{mS}) = \delta_+^m(L)\,\kappa_t^+ \tag{4}$$

$$\Delta\log(Q_t^{mS}) - \Delta\log(Q_t^{mD}) = \delta_-^m(L)\,\kappa_t^- \tag{5}$$

We consider firstly the derivation of (7).

If $\kappa_t^+ > 0$, then from (4) we have $\Delta\log(Q_t^{mD}) > \Delta\log(Q_t^{mS})$ and from (3) $\Delta\log(Q_t^m) = \Delta\log(Q_t^{mS})$. Therefore, from (4) we have $\Delta\log(Q_t^{mD}) = \Delta\log(Q_t^{mS}) + \delta_+^m(L)\,\kappa_t^+$ and substituting this expression for $\Delta\log(Q_t^{mD})$ in (2) you can get

$$\Delta\log(Q_t^m) = c^{Qm} + \beta_1^{Qm}\Delta r_t^m - \delta_+^m(L)\,\kappa_t^+ + \gamma^{Qm}(\mathrm{L})\Delta log\left(X_{t-k}^{Qm}\right) + \varepsilon_t^{Qm} \tag{7}$$

Following a similar approach it is possible to derive equation 6.

$$\Delta r_t^m = c^{rm} + \beta_1^{rm}\Delta\log(Q_t^m) + \beta_1^{rm}\delta_-^m(L)\,\kappa_t^- + \gamma^{rm}(\mathrm{L})\Delta log(X_{t-k}^{rm}) + \varepsilon_t^{rm} \tag{6}$$

Appendix B. Diagnostic tests

Sample period: 1986q1-2015q4 HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 5.000

A1. House demand Dependent variable: **Dlog(hp(t))**		A2. House supply Dependent variable: **Dlog(inves(t)**/surf(t-1))	
N. of instruments	10	N. of instruments	8
N. of regressors	7	N. of regressors	4
Test of over-identifying restrictions		*Test of over-identifying restrictions*	
J-statistic	2.36	J-statistic	0.83
Prob(J-statistic)	0.50	Prob(J-statistic)	0.93
Instrument orthogonality test (p-value)		*Instrument orthogonality test (p-value)*	
Ho: Dlog(hp(t-1)) is an instrument	0.55	Ho: Dlog(hp(t-2)/cost(t-2)) is an instrument	0.49
Ho: Dlog(hp(t-2)) is an instrument	0.33	Ho: Dlog(cs_cycle(t)) is an instrument	0.80
Ho: Dlog(hp(t-3)) is an instrument	0.88	Ho: D(r_3m(t)) is an instrument	0.55
Ho: Dlog(hp(t-4)) is an instrument	0.40	Ho: D(r_10y(t)) is an instrument	0.69
Ho: Dlog(income MA(t)) is an instrument	0.23	Ho: Dlog(invest(t-1)) is an instrument	0.53
Ho: Dlog(surf(t-3)/popul(t-3)) is an instrument	0.27	Ho: Dlog(invest(t-2)) is an instrument	0.78
Ho: Dlog(mortgage(t-1)) is an instrument	0.58	Ho: Dlog(invest(t-3)) is an instrument	0.76
Ho: Dlog(taxes(t-3)/h_wealth(t-3)) is an instr.	0.60		
Test of exclusion restrictions on endogenous variables(p-value)		*Test of exclusion restrictions on endogenous variables(p-value)*	
Ho: Dlog(mortgage(t)) is not significant	0.14	Ho: Dlog(hp(t)) is not significant	0.97
Ho: Dlog(invest(t)) is not significant	0.15	Ho: Dlog(mortgage(t)) is not significant	0.69
Ho: D(r_mortgage(t)) is not significant	0.81	Ho: D(r_mortgage(t)) is not significant	0.73
Ho: D(r_loan(t)) is not significant	0.61	Ho: D(r_loan(t)) is not significant	0.66
Ho: Dlog(loan(t)) is not significant	0.60		
Ho: log(surf(t)) is not significant	0.33		

B1. Mortgage demand Dependent variable: **Dlog(mortgage(t))**		B2. Mortgage supply Dependent variable: **D(r_mortgage(t)**)	
N. of instruments	12	N. of instruments	10
N. of regressors	7	N. of regressors	8
Test of over-identifying restrictions		*Test of over-identifying restrictions*	
J-statistic	0.64	J-statistic	0.54
Prob(J-statistic)	0.99	Prob(J-statistic)	0.76
Instrument orthogonality test (p-value)		*Instrument orthogonality test (p-value)*	
Ho: Dlog(income (t-1)) is an instrument	0.51	Ho: D(r_3m(t)) is an instrument	0.46
Ho: D(r_mortgage(t-1)) is an instrument	0.91	Ho: D(r_3m(t-1)) is an instrument	0.79
Ho: D(r_mortgage(t-2)) is an instrument	0.62	Ho: D(r_3m(t-2)) is an instrument	0.52
Ho: D(r_mortgage(t-3)) is an instrument	0.79	Ho: D(r_mortgage(t-2)) is an instrument	0.67
Ho: D(r_mortgage(t-4)) is an instrument	0.82	Ho: Dlog(income(t)) is an instrument	0.74
Ho: Dlog(mortgage(t-1)) is an instrument	0.80	Ho: D(sov_spread(t-1)) is an instrument	0.72
Ho: Dlog(mortgage(t-3)) is an instrument	0.73	Ho: kap_minus(t-4) is an instrument	0.66
Ho: Dlog(income MA(t)) is an instrument	0.93	Ho: Dlog(hp(t-1) is an instrument	0.49
Ho: kap_plus(t-1) is an instrument	0.93	Ho: Dlog(mortgage(t-1)) is an instrument	0.64
Ho: kap_minus is an instrument	0.92		
Ho: D(sov_spread(t-1)) is an instrument	0.48		
Ho: D(sov_spread(t-2)) is an instrument	0.70		
Test of exclusion restrictions		*Test of exclusion restrictions*	
on endogenous variables(p-value)		*on endogenous variables(p-value)*	
Ho: Dlog(invest(t)) is not significant	0.90	Ho: Dlog(mortgage(t)) is not significant	0.99
Ho: D(r_loan(t)) is not significant	0.87	Ho: D(r_loan(t)) is not significant	0.72
Ho: Dlog(loan(t)) is not significant	0.76	Ho: Dlog(loan(t)) is not significant	0.64
Ho: log(surf(t)) is not significant	0.90	Ho: log(surf(t)) is not significant	0.61
		Ho: log(invest(t)) is not significant	0.69

C1. Demand for loans to firms Dependent variable: **Dlog(loan(t))**		C2. Supply for loans to firms Dependent variable: **D(r_loan(t)**)	
N. of instruments	9	N. of instruments	7
N. of regressors	7	N. of regressors	6
Test of over-identifying restrictions		*Test of over-identifying restrictions*	
J-statistic	0.28	J-statistic	1.41
Prob(J-statistic)	0.87	Prob(J-statistic)	0.49
Instrument orthogonality test (p-value)		*Instrument orthogonality test (p-value)*	
Ho: Dlog(invest (t-1)) is an instrument	0.72	Ho: D(r_3m(t)) is an instrument	0.25
Ho: Dlog(invest (t-2)) is an instrument	0.63	Ho: D(r_3m(t-1)) is an instrument	0.66
Ho: D(r_10y(t)) is an instrument	0.72	Ho: kap_minus is an instrument	0.52
Ho: Dlog(loan(t-1)) is an instrument	0.68	Ho: Dlog(loan(t-1)) is an instrument	0.34
Ho: D(r_3m(t)) is an instrument	0.74	Ho: D(cs_cycle(t)) is an instrument	0.24
Ho: D(r_loan(t-2)) is an instrument	0.69	Ho: D(sov_spread(t-1)) is an instrument	0.57
Ho: kap_plus(t) is an instrument	0.78		
Ho: Dlog(hp(t-2)/cost(t-2)) is an instrument	0.73		
Test of exclusion restrictions		*Test of exclusion restrictions*	
on endogenous variables(p-value)		*on endogenous variables(p-value)*	
Ho: D(r_mortgage(t)) is not significant	0.89	Ho: D(r_mortgage(t)) is not significant	0.24
Ho: Dlog(mortgage(t)) is not significant	0.64	Ho: Dlog(mortgage(t)) is not significant	0.33
Ho: Dlog(hp(t)) is not significant	0.69	Ho: Dlog(loan(t)) is not significant	0.42
Ho: log(surf(t)) is not significant	0.97	Ho: log(surf(t)) is not significant	0.41
		Ho: log(hp(t)) is not significant	0.29
		Ho: Dlog(invest(t)) is not significant	0.30

Appendix C. Simulations

Fig. C1 Estimated effects of a 50 b.p. increase in the 3-month money market rate
(deviations from baseline scenario in p.p.)

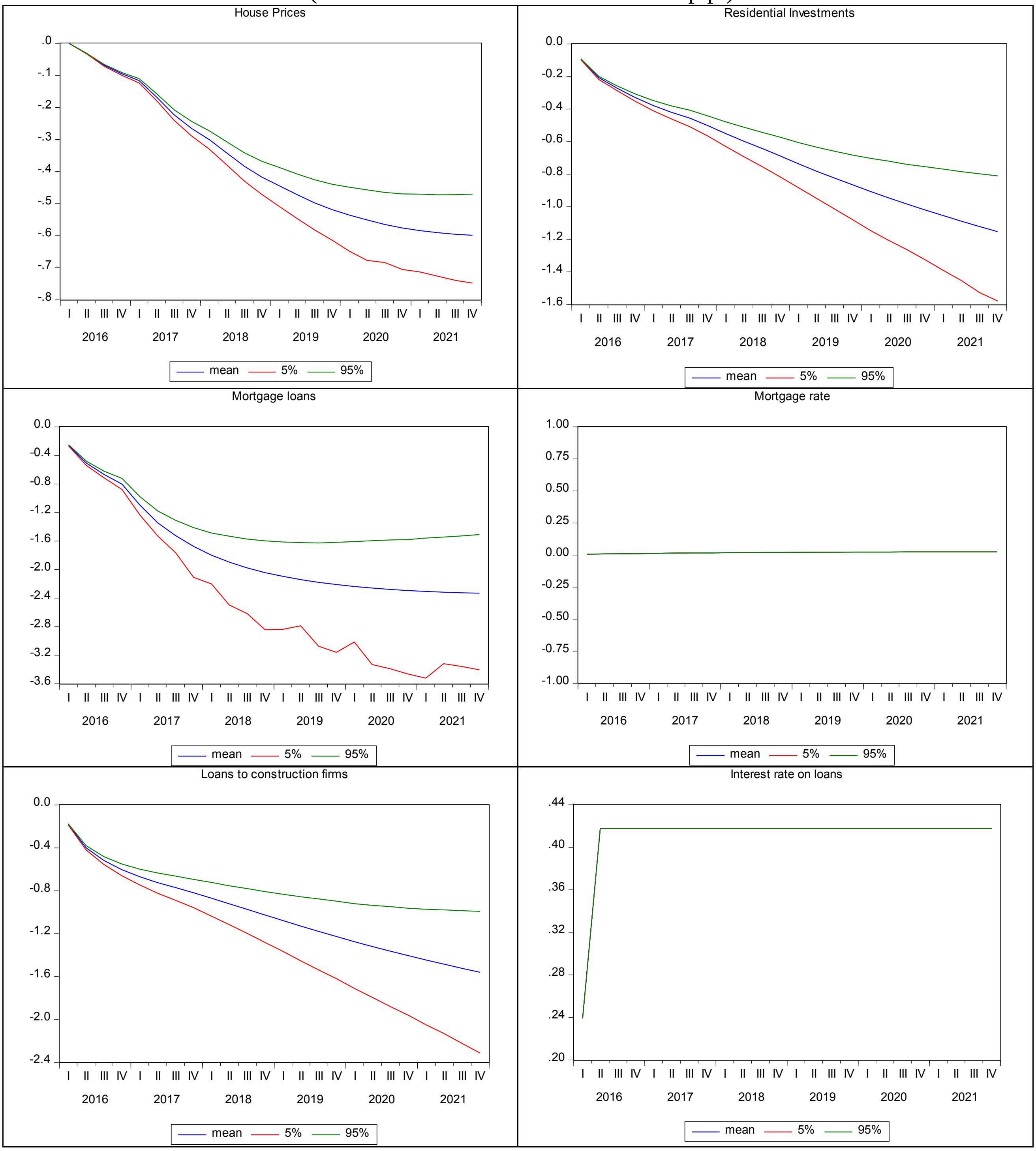


Fig. C2 Estimated effects of a 0.5% increase in household disposable income
(deviations from baseline scenario in p.p.)

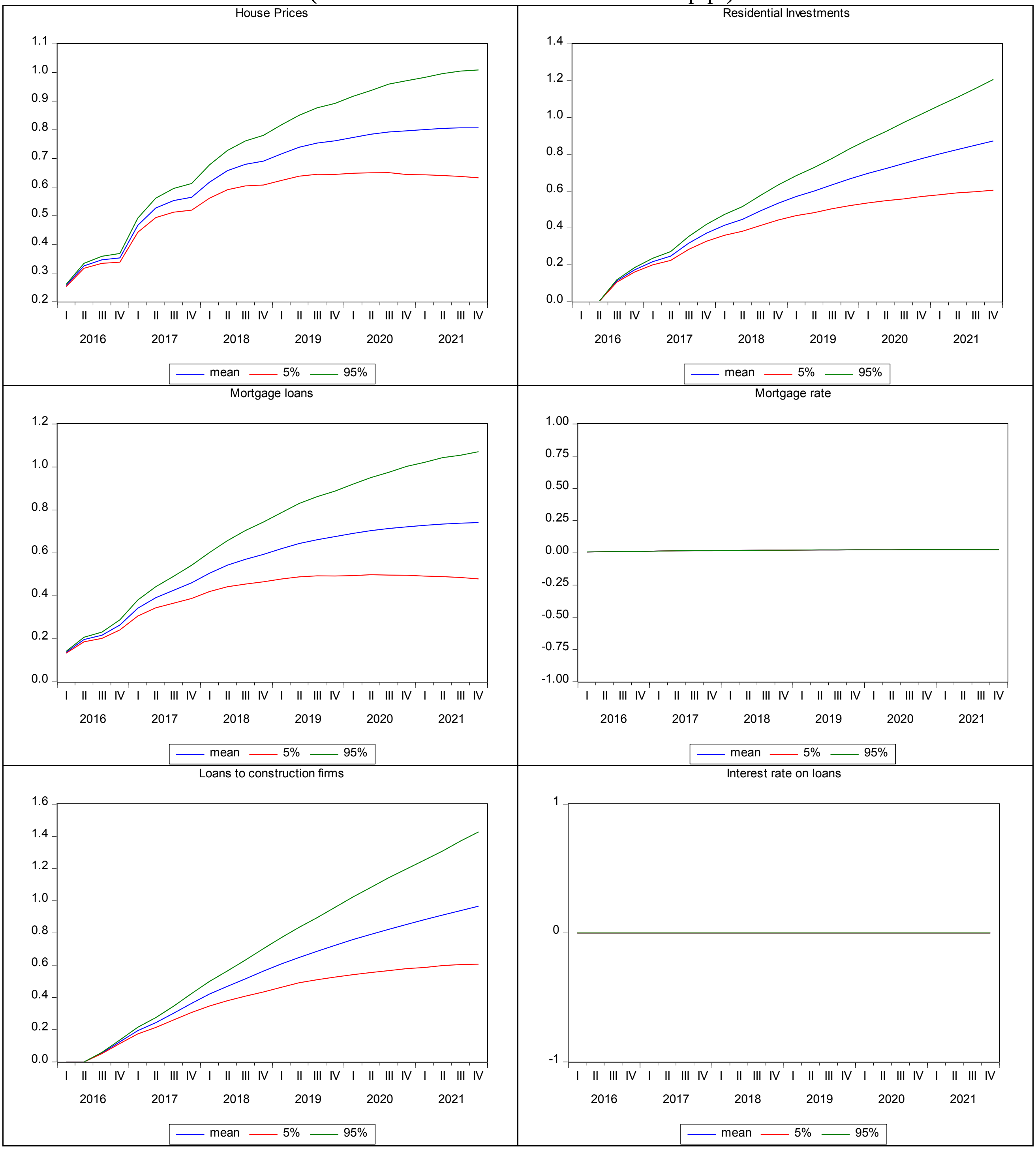


Fig. C3 Estimated effects of a 5% increase in property taxation revenues
(deviations from baseline scenario in p.p.)

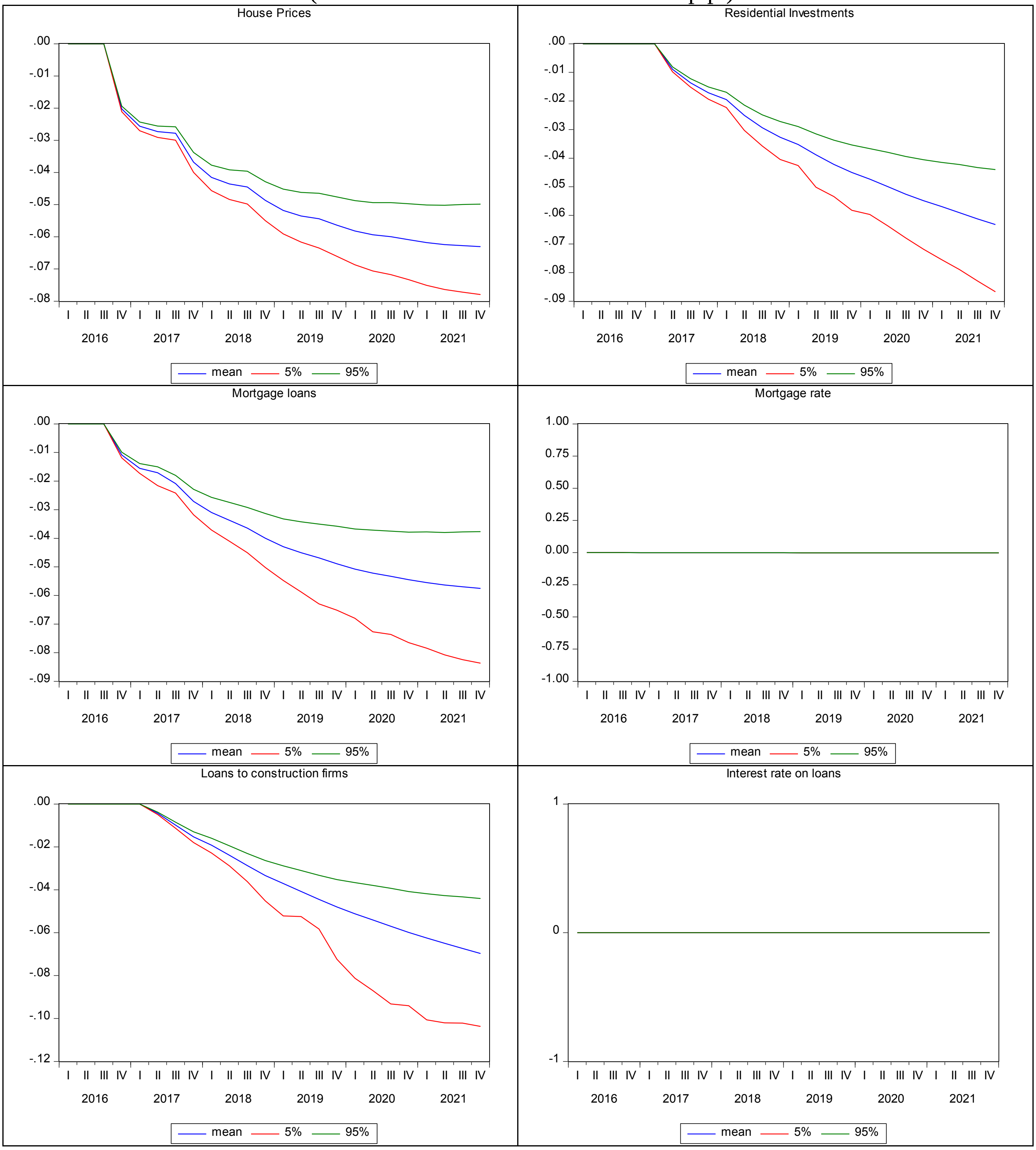


Fig. C4 Estimated effects of a 50 b.p. increase in sovereign spread
(deviations from baseline scenario in p.p.)

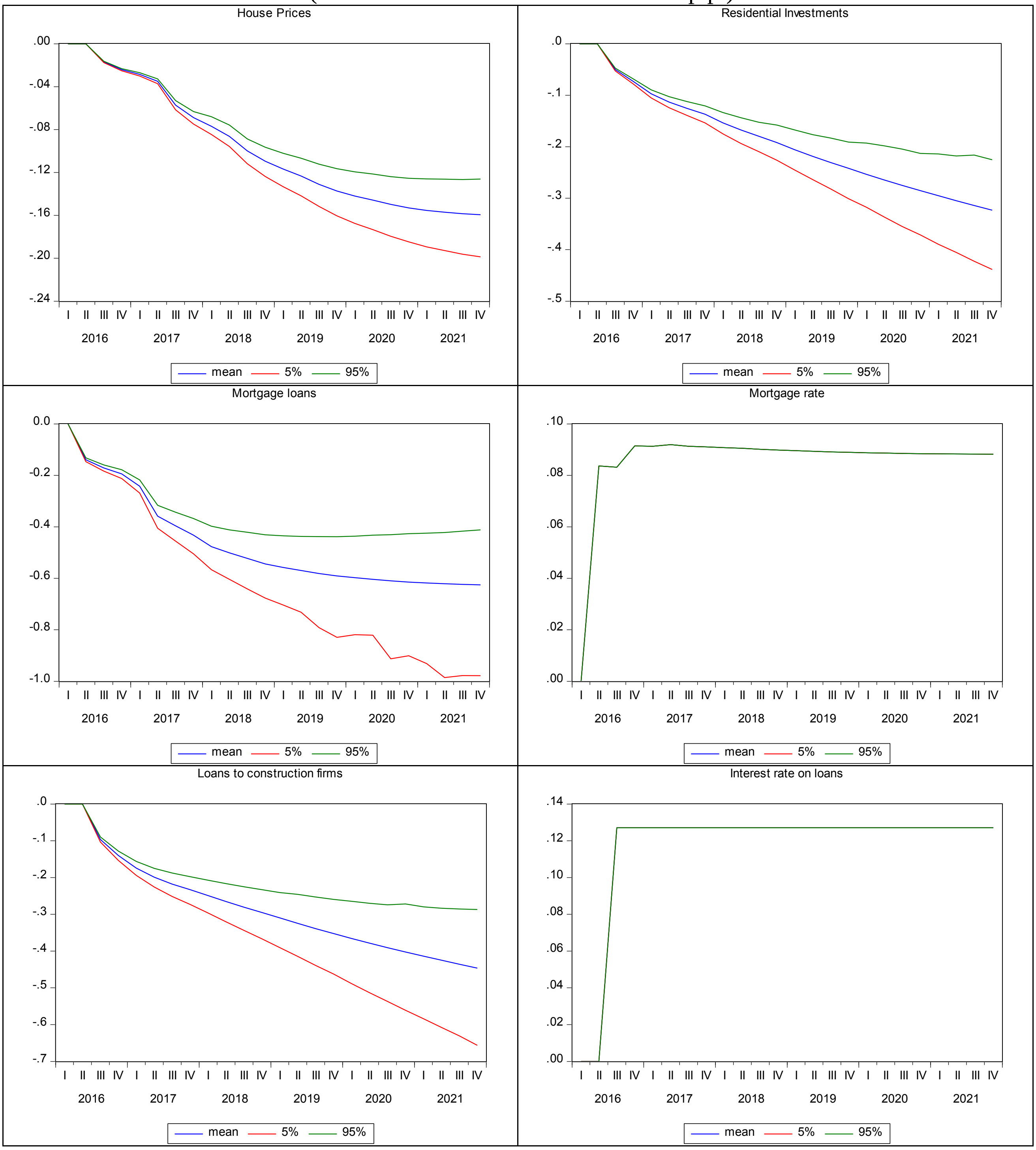


Fig. C5 Estimated effects of a 50 b.p. increase in bank capital ratio

(deviations from baseline scenario in p.p.)

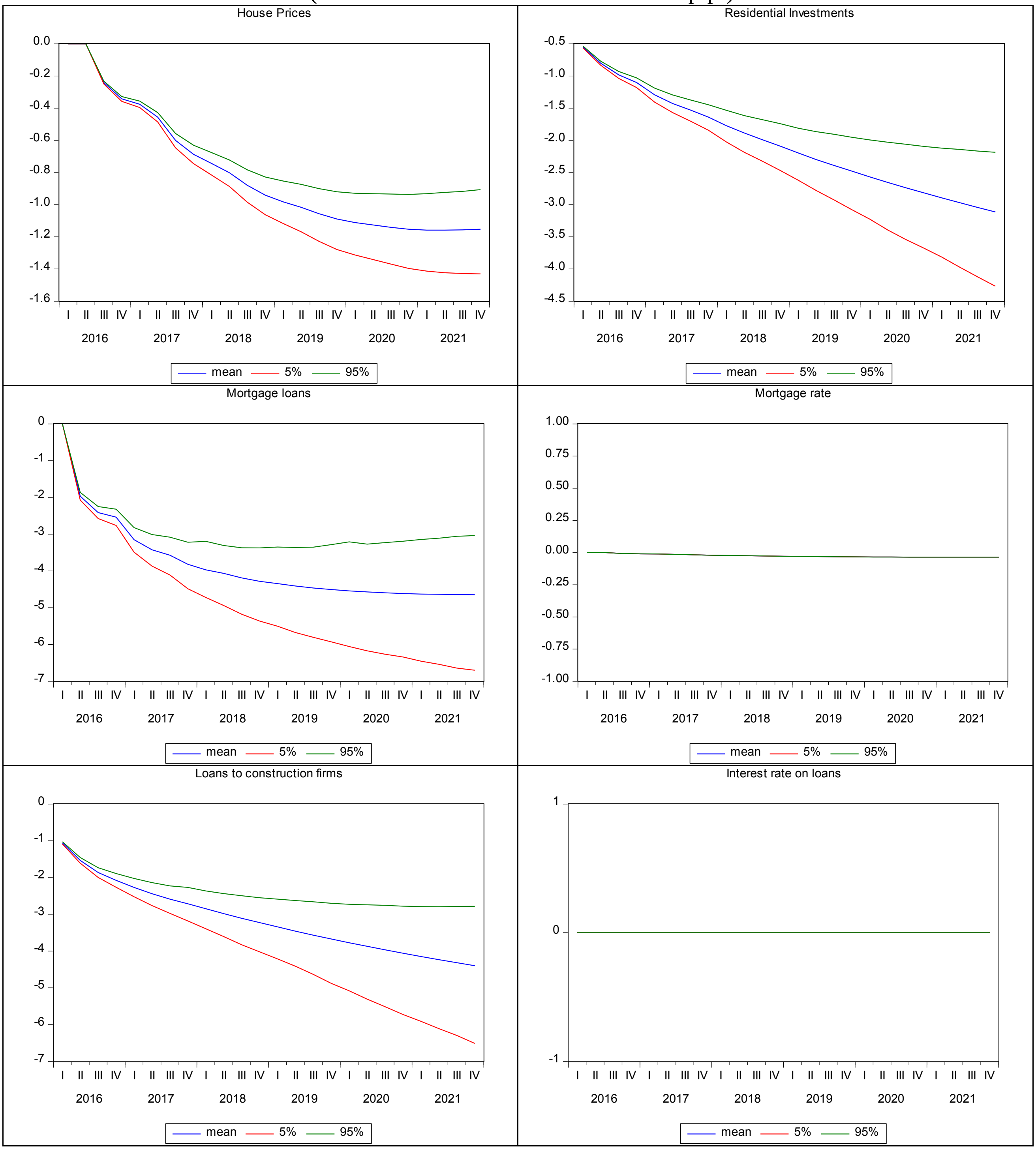
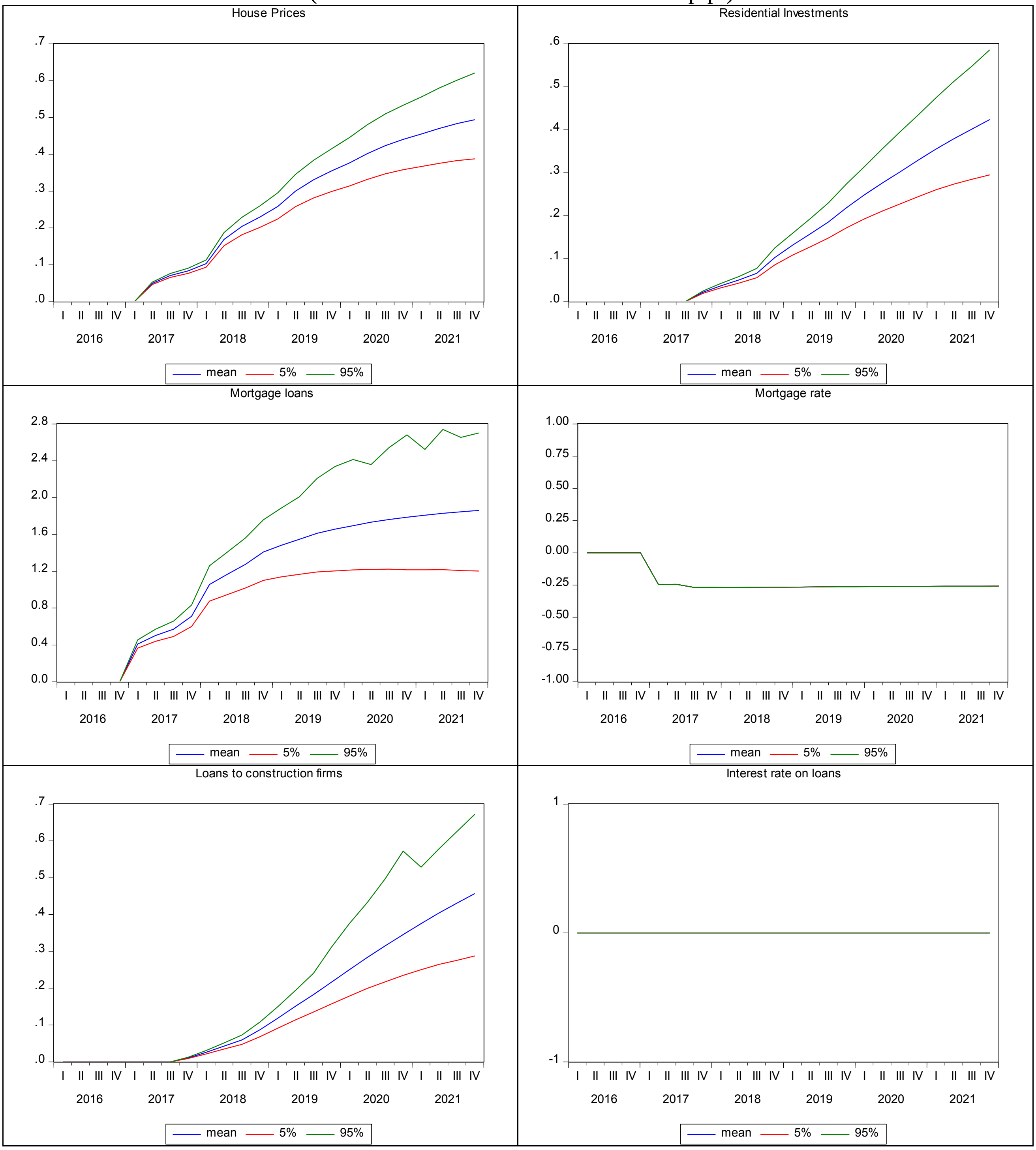


Fig. C6 Estimated effects of a 50 b.p. decrease in bank capital ratio

(deviations from baseline scenario in p.p.)



Appendix D. Historical decomposition

Fig. D1 Historical decomposition of house prices
(quarterly data; deviations from baseline scenario)

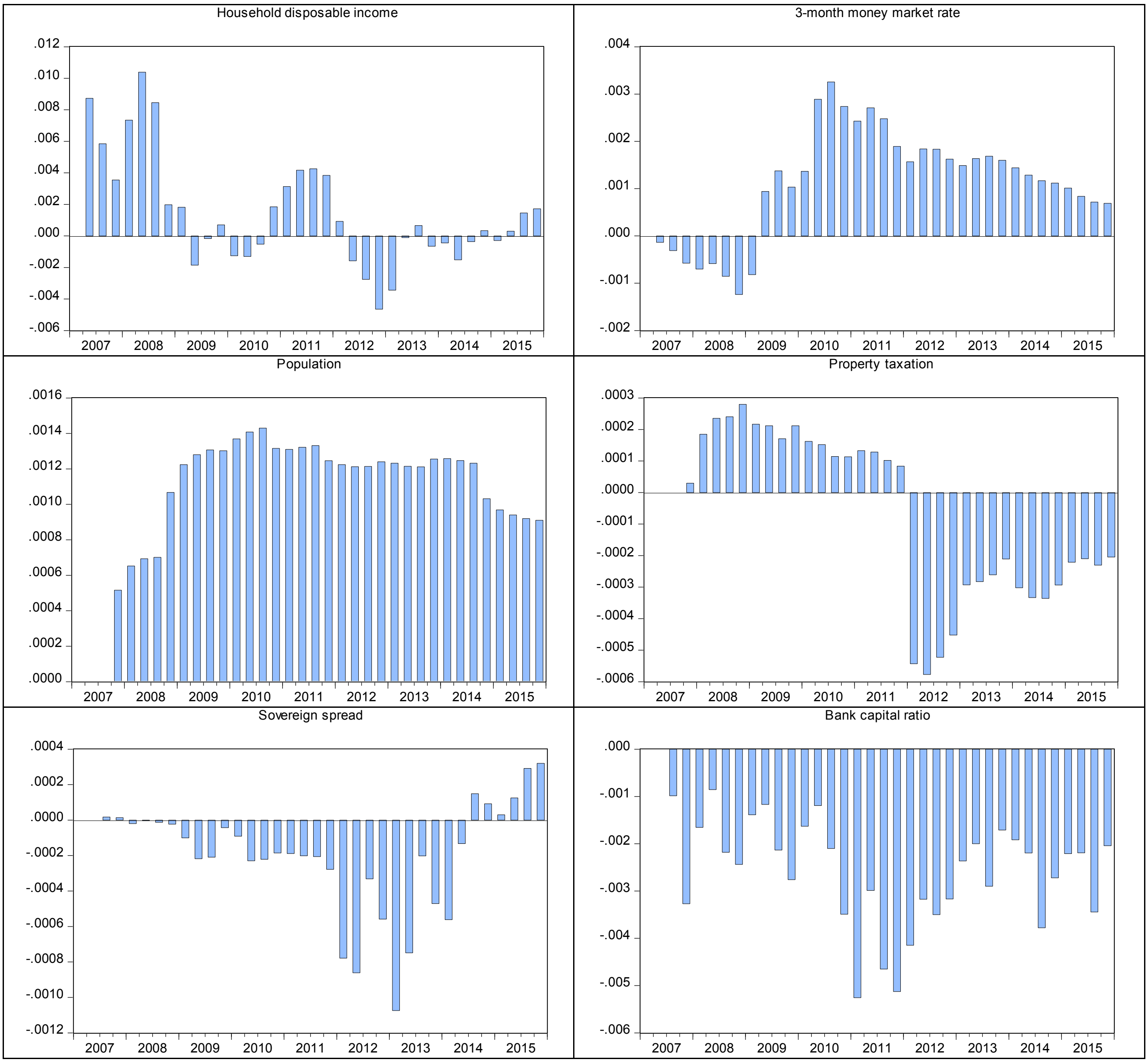


Fig. D2 Historical decomposition of residential investments
(quarterly data; deviations from baseline scenario)

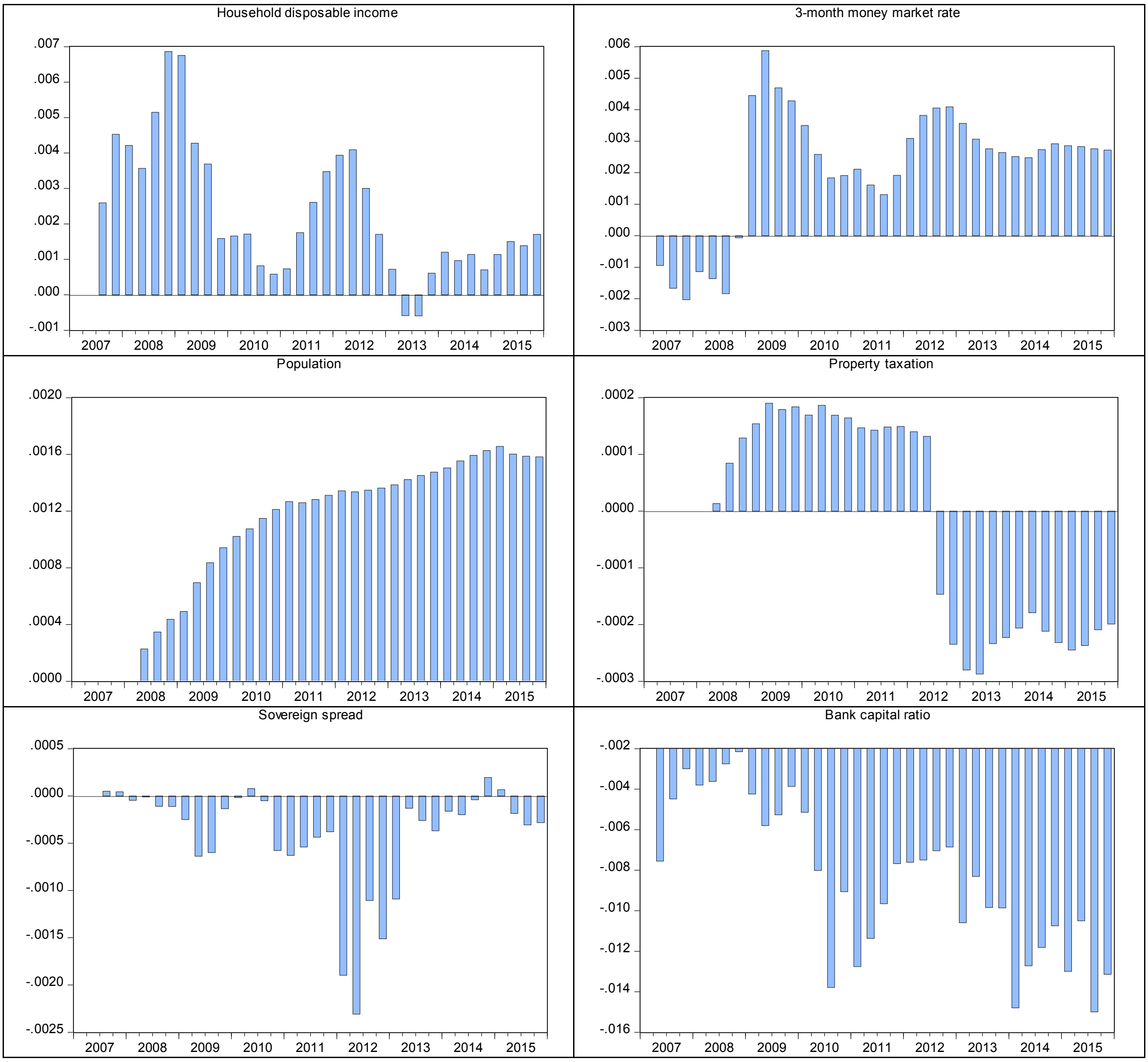


Fig. D3 Historical decomposition of mortgage loans
(quarterly data; deviations from baseline scenario)

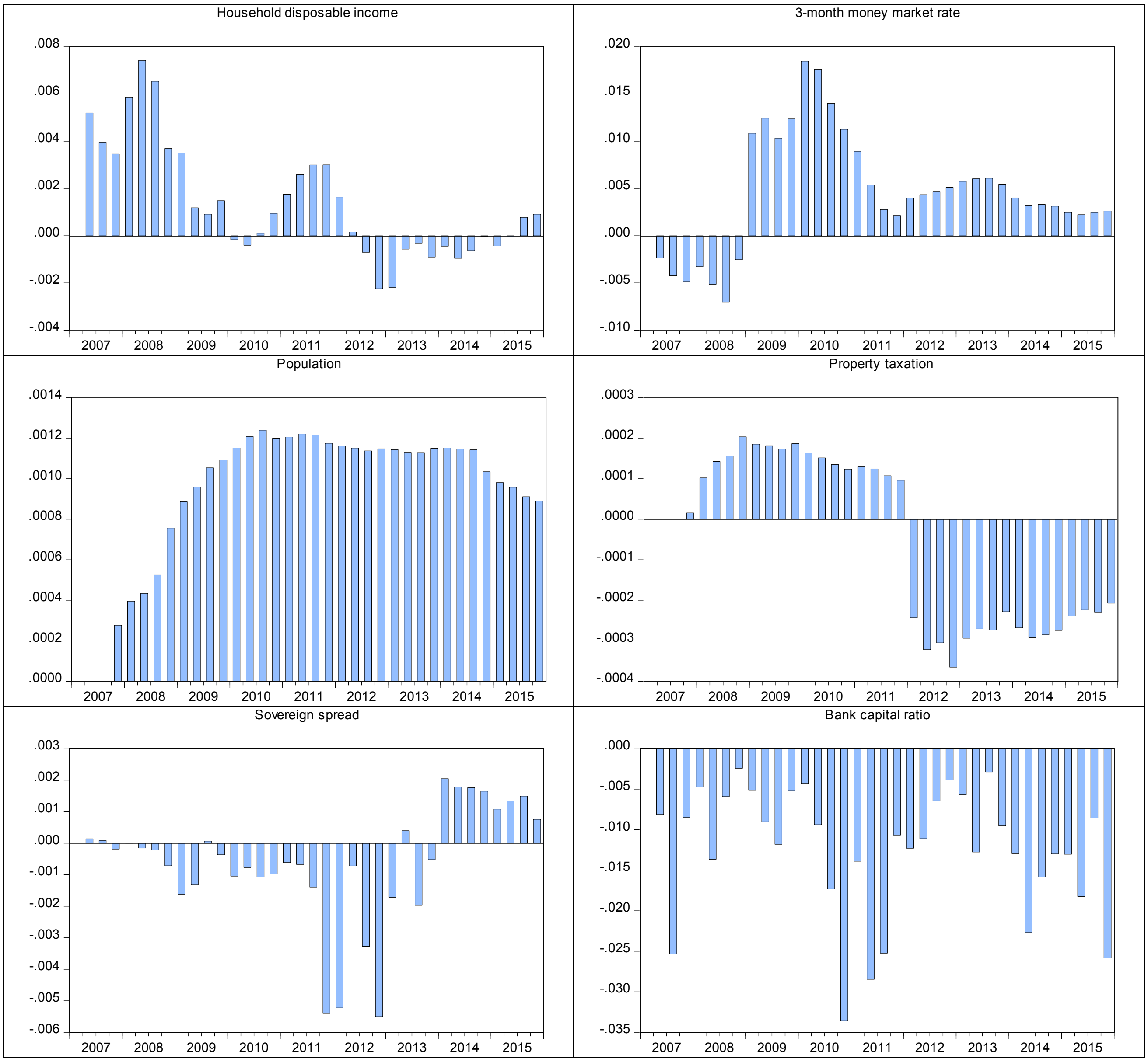
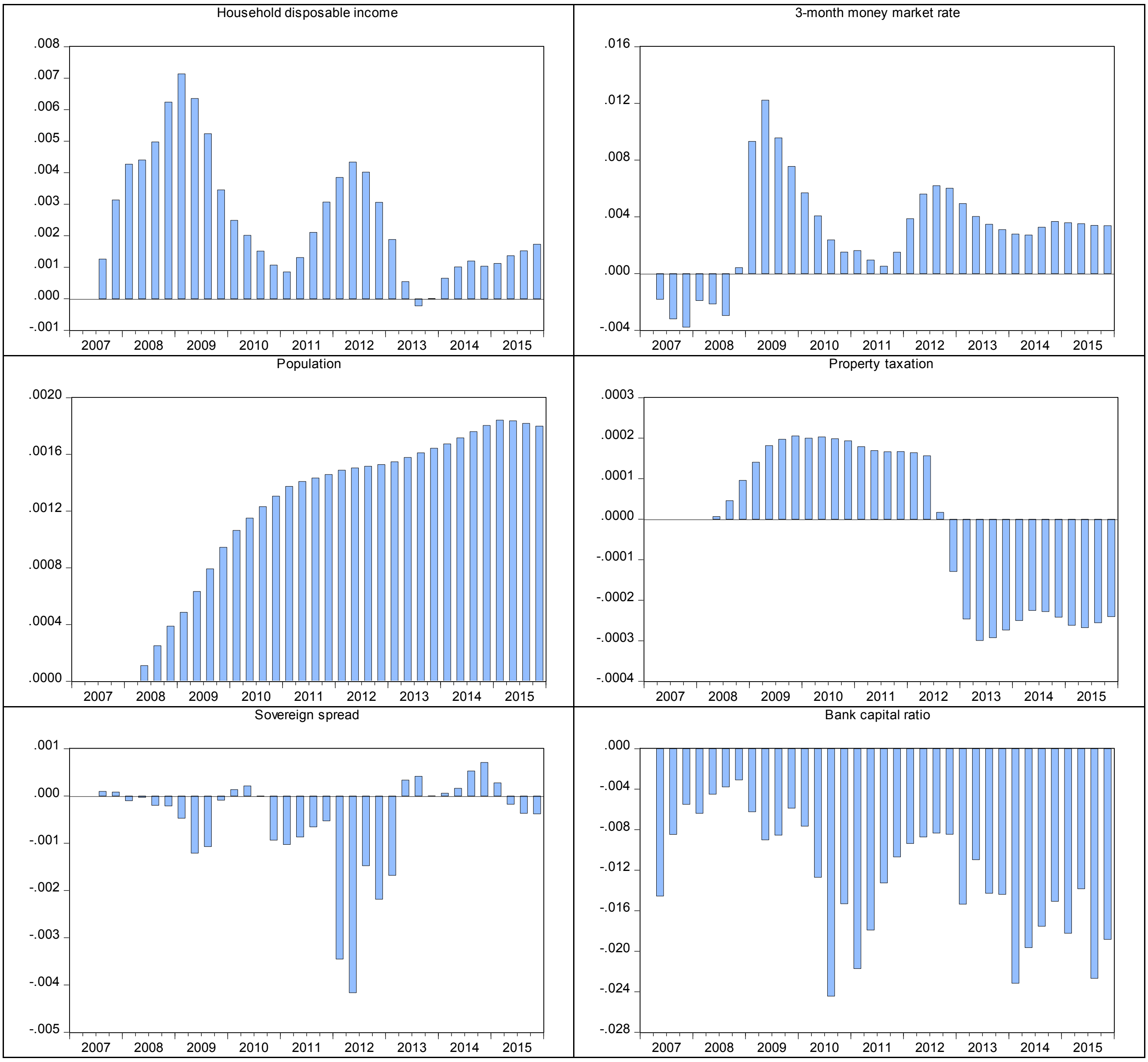


Fig. D4 Historical decomposition of loans to construction firms
(quarterly data; deviations from baseline scenario)



References

Bank of Italy (2015) *Annual Report on 2014*

Bank of Italy (2016) *Financial Stability Report 2016/1*

Bassanetti, A. and Zollino, F. (2010), "The effects of housing and financial wealth on personal consumption: Aggregate evidence for Italian households" in O. de Bandt., T. Knetch, J. Penalosa and F. Zollino (eds) *Housing Markets in Europe. A Macroeconomic Perspective*, Springer.

L. Burlon, A. Gerali, A. Notarpietro e M. Pisani (2016). "Macroeconomic effectiveness of non-standard monetary policy and early exit. A model-based evaluation," Temi di discussione (Economic working papers) 1074, Bank of Italy, Economic Research and International Relations Area.

Ciocchetta, F. M. Conti, I. Guida, A. Rendina e G. Santini, (2016), "Nuove misure per velocizzare il recupero dei crediti: una prima analisi del D.L. 59/2016", Note di stabilità finanziaria e vigilanza, n. 4 Bank of Italy

De Bandt, O., Knetch, T. , Penalosa, J. and Zollino, F. (2010) ed. *Housing Markets in Europe: A Macroeconomic Perspective,* Springer.

Del Giovane, P., Eramo G. and Nobili, A. (2011), "Disentangling demand and supply in credit developments: a survey-based analysis for Italy", *Journal of Banking and Finance*, 35, 2719-2732.

Del Giovane, P., Nobili, A. and Signoretti, F.M (2013), "Supply tightening or lack of demand? An analysis of credit developments during the Lehman Brothers and the sovereign debt crises", Temi di discussione (Economic working papers) 942, Bank of Italy, Economic Research and International Relations Area.

ECB (2016), *Monthly Bullettin*, December.

Fair, R. C. and Jaffee, D. M. (1972) "Methods of estimation for markets in disequilibrium", Econometrica, vol.40, pp. 497-514.

Gambacorta L. (2010), "Do bank capital and liquidity affect real economic activity in the long run? A VECM analysis for the US", BIS, mimeo.

Gambacorta L. and D. Marqués-Ibanez (2011), "The bank lending channel: lessons from the crisis", Bank for International Settlements, mimeo.

Gobbi, G. and F. Zollino (2013) "Tendenze recenti del mercato immobiliare e del credito" in *Le tendenze del mercato immobiliare: l'Italia e il confronto internazionale* Workshop and Conferences n.15, Bank of Italy

Guiso, L., Paiella, M. and I. Visco (2005), "Do capital gains affect consumption? Estimates of wealth effects from Italian households' behaviour", Bank of Italy, Working Paper, n. 555.

Hartmann, P. (2015), "Real estate markets and macroprudential policy in Europe", Working Paper Series 1796, European Central Bank.

Hendry, D. F. (1993) *Econometrics: Alchemy or Science? Essays in Econometric Methodology*, Blackwell Publishers, Oxford.

IMF (2007), World Economic Outlook, October.

IMF (2014), World Economic Outlook, April.

Liberati D. and Loberto M. (2016), "Taxation and Housing Market under Search Frictions", mimeo, Bank of Italy

Locarno, A. (2011) "The macroeconomic impact of Basel III on the Italian economy" mimeo, Bank of Italy

Nobili A. and Zollino F. (2012), "A structural model for the housing and credit markets in Italy," Temi di discussione (Economic working papers) 887, Bank of Italy, Economic Research and International Relations Area.

OECD (2009), “Housing Markets: A Progress Report”, mimeo.

Panetta, F. (2015), “The European Banking and Capital Markets Unions: Challenges and Risks”, Remarks at Foundation for European Progressive Studies and Fondazione Italianieuropei, February 6, 2015.

Poterba, J. M. (1984), “Tax subsidies to owner-occupied housing: a model with downpayment effects” *Quaterly Journal of Economics* 110, 729.752.

K.Tsatsaronis and H. Zhu (2004) “What drives housing price dynamics: cross-country evidence” BIS Quarterly Review, March

RECENTLY PUBLISHED "TEMI" (*)

N. 1062 – *Market timing and performance attribution in the ECB reserve management framework*, by Francesco Potente and Antonio Scalia (April 2016).

N. 1063 – *Information contagion in the laboratory*, by Marco Cipriani, Antonio Guarino, Giovanni Guazzarotti, Federico Tagliati and Sven Fischer (April 2016).

N. 1064 – *EAGLE-FLI. A macroeconomic model of banking and financial interdependence in the euro area*, by Nikola Bokan, Andrea Gerali, Sandra Gomes, Pascal Jacquinot and Massimiliano Pisani (April 2016).

N. 1065 – *How excessive is banks' maturity transformation?*, by Anatoli Segura Velez and Javier Suarez (April 2016).

N. 1066 – *Common faith or parting ways? A time-varying factor analysis*, by Davide Delle Monache, Ivan Petrella and Fabrizio Venditti (June 2016).

N. 1067 – *Productivity effects of eco-innovations using data on eco-patents*, by Giovanni Marin and Francesca Lotti (June 2016).

N. 1068 – *The labor market channel of macroeconomic uncertainty*, by Elisa Guglielminetti (June 2016).

N. 1069 – *Individual trust: does quality of public services matter?*, by Silvia Camussi and Anna Laura Mancini (June 2016).

N. 1070 – *Some reflections on the social welfare bases of the measurement of global income inequality,* by Andrea Brandolini and Francesca Carta (July 2016).

N. 1071 – *Boulevard of broken dreams. The end of the EU funding (1997: Abruzzi, Italy),* by Guglielmo Barone, Francesco David and Guido de Blasio (July 2016).

N. 1072 – *Bank quality, judicial efficiency and borrower runs: loan repayment delays in Italy,* by Fabio Schiantarelli, Massimiliano Stacchini and Philip Strahan (July 2016).

N. 1073 – *Search costs and the severity of adverse selection,* by Francesco Palazzo (July 2016).

N. 1074 – *Macroeconomic effectiveness of non-standard monetary policy and early exit. A model-based evaluation*, by Lorenzo Burlon, Andrea Gerali, Alessandro Notarpietro and Massimiliano Pisani (July 2016).

N. 1075 – *Quantifying the productivity effects of global sourcing,* by Sara Formai and Filippo Vergara Caffarelli (July 2016).

N. 1076 – *Intergovernmental transfers and expenditure arrears,* by Paolo Chiades, Luciano Greco, Vanni Mengotto, Luigi Moretti and Paola Valbonesi (July 2016).

N. 1077 – *A "reverse Robin Hood"? The distributional implications of non-standard monetary policy for Italian households*, by Marco Casiraghi, Eugenio Gaiotti, Lisa Rodano and Alessandro Secchi (July 2016).

N. 1078 – *Global macroeconomic effects of exiting from unconventional monetary policy,* by Pietro Cova, Patrizio Pagano and Massimiliano Pisani (September 2016).

N. 1079 – *Parents, schools and human capital differences across countries*, by Marta De Philippis and Federico Rossi (September 2016).

N. 1080 – *Self-fulfilling deflations*, by Roberto Piazza, (September 2016).

N. 1081 – *Dealing with student heterogeneity: curriculum implementation strategies and student achievement*, by Rosario Maria Ballatore and Paolo Sestito, (September 2016).

N. 1082 – *Price dispersion and consumer inattention: evidence from the market of bank accounts*, by Nicola Branzoli, (September 2016).

N. 1083 – *BTP futures and cash relationships: a high frequency data analysis*, by Onofrio Panzarino, Francesco Potente and Alfonso Puorro, (September 2016).

N. 1084 – *Women at work: the impact of welfare and fiscal policies in a dynamic labor supply model*, by Maria Rosaria Marino, Marzia Romanelli and Martino Tasso, (September 2016).

(*) Requests for copies should be sent to:
Banca d'Italia – Servizio Studi di struttura economica e finanziaria – Divisione Biblioteca e Archivio storico – Via Nazionale, 91 – 00184 Rome – (fax 0039 06 47922059). They are available on the Internet www.bancaditalia.it.

2014

G. M. TOMAT, *Revisiting poverty and welfare dominance*, Economia pubblica, v. 44, 2, 125-149, **TD No. 651 (December 2007).**

M. TABOGA, *The riskiness of corporate bonds*, Journal of Money, Credit and Banking, v.46, 4, pp. 693-713, **TD No. 730 (October 2009).**

G. MICUCCI and P. ROSSI, *Il ruolo delle tecnologie di prestito nella ristrutturazione dei debiti delle imprese in crisi*, in A. Zazzaro (a cura di), Le banche e il credito alle imprese durante la crisi, Bologna, Il Mulino, **TD No. 763 (June 2010).**

F. D'AMURI, *Gli effetti della legge 133/2008 sulle assenze per malattia nel settore pubblico*, Rivista di politica economica, v. 105, 1, pp. 301-321, **TD No. 787 (January 2011).**

R. BRONZINI and E. IACHINI, *Are incentives for R&D effective? Evidence from a regression discontinuity approach*, American Economic Journal : Economic Policy, v. 6, 4, pp. 100-134, **TD No. 791 (February 2011).**

P. ANGELINI, S. NERI and F. PANETTA, *The interaction between capital requirements and monetary policy*, Journal of Money, Credit and Banking, v. 46, 6, pp. 1073-1112, **TD No. 801 (March 2011).**

M. BRAGA, M. PACCAGNELLA and M. PELLIZZARI, *Evaluating students' evaluations of professors*, Economics of Education Review, v. 41, pp. 71-88, **TD No. 825 (October 2011).**

M. FRANCESE and R. MARZIA, *Is there Room for containing healthcare costs? An analysis of regional spending differentials in Italy*, The European Journal of Health Economics, v. 15, 2, pp. 117-132, **TD No. 828 (October 2011).**

L. GAMBACORTA and P. E. MISTRULLI, *Bank heterogeneity and interest rate setting: what lessons have we learned since Lehman Brothers?*, Journal of Money, Credit and Banking, v. 46, 4, pp. 753-778, **TD No. 829 (October 2011).**

M. PERICOLI, *Real term structure and inflation compensation in the euro area*, International Journal of Central Banking, v. 10, 1, pp. 1-42, **TD No. 841 (January 2012).**

E. GENNARI and G. MESSINA, *How sticky are local expenditures in Italy? Assessing the relevance of the flypaper effect through municipal data*, International Tax and Public Finance, v. 21, 2, pp. 324-344, **TD No. 844 (January 2012).**

V. DI GACINTO, M. GOMELLINI, G. MICUCCI and M. PAGNINI, *Mapping local productivity advantages in Italy: industrial districts, cities or both?*, Journal of Economic Geography, v. 14, pp. 365–394, **TD No. 850 (January 2012).**

A. ACCETTURO, F. MANARESI, S. MOCETTI and E. OLIVIERI, *Don't Stand so close to me: the urban impact of immigration*, Regional Science and Urban Economics, v. 45, pp. 45-56, **TD No. 866 (April 2012).**

M. PORQUEDDU and F. VENDITTI, *Do food commodity prices have asymmetric effects on euro area inflation*, Studies in Nonlinear Dynamics and Econometrics, v. 18, 4, pp. 419-443, **TD No. 878 (September 2012).**

S. FEDERICO, *Industry dynamics and competition from low-wage countries: evidence on Italy*, Oxford Bulletin of Economics and Statistics, v. 76, 3, pp. 389-410, **TD No. 879 (September 2012).**

F. D'AMURI and G. PERI, *Immigration, jobs and employment protection: evidence from Europe before and during the Great Recession*, Journal of the European Economic Association, v. 12, 2, pp. 432-464, **TD No. 886 (October 2012).**

M. TABOGA, *What is a prime bank? A euribor-OIS spread perspective*, International Finance, v. 17, 1, pp. 51-75, **TD No. 895 (January 2013).**

G. CANNONE and D. FANTINO, *Evaluating the efficacy of european regional funds for R&D*, Rassegna italiana di valutazione, v. 58, pp. 165-196, **TD No. 902 (February 2013).**

L. GAMBACORTA and F. M. SIGNORETTI, *Should monetary policy lean against the wind? An analysis based on a DSGE model with banking*, Journal of Economic Dynamics and Control, v. 43, pp. 146-74, **TD No. 921 (July 2013).**

M. BARIGOZZI, CONTI A.M. and M. LUCIANI, *Do euro area countries respond asymmetrically to the common monetary policy?*, Oxford Bulletin of Economics and Statistics, v. 76, 5, pp. 693-714, **TD No. 923 (July 2013).**

U. ALBERTAZZI and M. BOTTERO, *Foreign bank lending: evidence from the global financial crisis*, Journal of International Economics, v. 92, 1, pp. 22-35, **TD No. 926 (July 2013).**

R. DE BONIS and A. SILVESTRINI, *The Italian financial cycle: 1861-2011*, Cliometrica, v.8, 3, pp. 301-334, **TD No. 936 (October 2013).**

G. BARONE and S. MOCETTI, *Natural disasters, growth and institutions: a tale of two earthquakes*, Journal of Urban Economics, v. 84, pp. 52-66, **TD No. 949 (January 2014).**

D. PIANESELLI and A. ZAGHINI, *The cost of firms' debt financing and the global financial crisis*, Finance Research Letters, v. 11, 2, pp. 74-83, **TD No. 950 (February 2014).**

J. LI and G. ZINNA, *On bank credit risk: sytemic or bank-specific? Evidence from the US and UK*, Journal of Financial and Quantitative Analysis, v. 49, 5/6, pp. 1403-1442, **TD No. 951 (February 2015).**

A. ZAGHINI, *Bank bonds: size, systemic relevance and the sovereign*, International Finance, v. 17, 2, pp. 161-183, **TD No. 966 (July 2014).**

G. SBRANA and A. SILVESTRINI, *Random switching exponential smoothing and inventory forecasting*, International Journal of Production Economics, v. 156, 1, pp. 283-294, **TD No. 971 (October 2014).**

M. SILVIA, *Does issuing equity help R&D activity? Evidence from unlisted Italian high-tech manufacturing firms*, Economics of Innovation and New Technology, v. 23, 8, pp. 825-854, **TD No. 978 (October 2014).**

2015

G. DE BLASIO, D. FANTINO and G. PELLEGRINI, *Evaluating the impact of innovation incentives: evidence from an unexpected shortage of funds*, Industrial and Corporate Change, , v. 24, 6, pp. 1285-1314, **TD No. 792 (February 2011).**

M. BUGAMELLI, S. FABIANI and E. SETTE, *The age of the dragon: the effect of imports from China on firm-level prices*, Journal of Money, Credit and Banking, v. 47, 6, pp. 1091-1118, **TD No. 737 (January 2010).**

R. BRONZINI, *The effects of extensive and intensive margins of FDI on domestic employment: microeconomic evidence from Italy*, B.E. Journal of Economic Analysis & Policy, v. 15, 4, pp. 2079-2109, **TD No. 769 (July 2010).**

U. ALBERTAZZI, G. ERAMO, L. GAMBACORTA and C. SALLEO, *Asymmetric information in securitization: an empirical assessment*, Journal of Monetary Economics, v. 71, pp. 33-49, **TD No. 796 (February 2011).**

A. DI CESARE, A. P. STORK and C. DE VRIES, *Risk measures for autocorrelated hedge fund returns*, Journal of Financial Econometrics, v. 13, 4, pp. 868-895, **TD No. 831 (October 2011).**

G. BULLIGAN, M. MARCELLINO and F. VENDITTI, *Forecasting economic activity with targeted predictors*, International Journal of Forecasting, v. 31, 1, pp. 188-206, **TD No. 847 (February 2012).**

A. CIARLONE, *House price cycles in emerging economies*, Studies in Economics and Finance, v. 32, 1, **TD No. 863 (May 2012).**

D. FANTINO, A. MORI and D. SCALISE, *Collaboration between firms and universities in Italy: the role of a firm's proximity to top-rated departments*, Rivista Italiana degli economisti, v. 1, 2, pp. 219-251, **TD No. 884 (October 2012).**

A. BARDOZZETTI and D. DOTTORI, *Collective Action Clauses: how do they Affect Sovereign Bond Yields?*, Journal of International Economics , v 92, 2, pp. 286-303, **TD No. 897 (January 2013).**

D. DEPALO, R. GIORDANO and E. PAPAPETROU, *Public-private wage differentials in euro area countries: evidence from quantile decomposition analysis*, Empirical Economics, v. 49, 3, pp. 985-1115, **TD No. 907 (April 2013).**

G. BARONE and G. NARCISO, *Organized crime and business subsidies: Where does the money go?*, Journal of Urban Economics, v. 86, pp. 98-110, **TD No. 916 (June 2013).**

P. ALESSANDRI and B. NELSON, *Simple banking: profitability and the yield curve*, Journal of Money, Credit and Banking, v. 47, 1, pp. 143-175, **TD No. 945 (January 2014).**

M. TANELI and B. OHL, *Information acquisition and learning from prices over the business cycle*, Journal of Economic Theory, 158 B, pp. 585–633, **TD No. 946 (January 2014).**

R. AABERGE and A. BRANDOLINI, *Multidimensional poverty and inequality*, in A. B. Atkinson and F. Bourguignon (eds.), Handbook of Income Distribution, Volume 2A, Amsterdam, Elsevier, **TD No. 976 (October 2014).**

V. CUCINIELLO and F. M. SIGNORETTI, *Large banks,loan rate markup and monetary policy*, International Journal of Central Banking, v. 11, 3, pp. 141-177, **TD No. 987 (November 2014).**

M. FRATZSCHER, D. RIMEC, L. SARNOB and G. ZINNA, *The scapegoat theory of exchange rates: the first tests*, Journal of Monetary Economics, v. 70, 1, pp. 1-21, **TD No. 991 (November 2014).**

A. NOTARPIETRO and S. SIVIERO, *Optimal monetary policy rules and house prices: the role of financial frictions,* Journal of Money, Credit and Banking, v. 47, S1, pp. 383-410, **TD No. 993 (November 2014).**

R. ANTONIETTI, R. BRONZINI and G. CAINELLI, *Inward greenfield FDI and innovation,* Economia e Politica Industriale, v. 42, 1, pp. 93-116, **TD No. 1006 (March 2015).**

T. CESARONI, *Procyclicality of credit rating systems: how to manage it,* Journal of Economics and Business, v. 82. pp. 62-83, **TD No. 1034 (October 2015).**

M. RIGGI and F. VENDITTI, *The time varying effect of oil price shocks on euro-area exports*, Journal of Economic Dynamics and Control, v. 59, pp. 75-94, **TD No. 1035 (October 2015).**

2016

E. BONACCORSI DI PATTI and E. SETTE, *Did the securitization market freeze affect bank lending during the financial crisis? Evidence from a credit register,* Journal of Financial Intermediation , v. 25, 1, pp. 54-76, **TD No. 848 (February 2012).**

M. MARCELLINO, M. PORQUEDDU and F. VENDITTI, *Short-Term GDP forecasting with a mixed frequency dynamic factor model with stochastic volatility,* Journal of Business & Economic Statistics , v. 34, 1, pp. 118-127, **TD No. 896 (January 2013).**

M. ANDINI and G. DE BLASIO, *Local development that money cannot buy: Italy’s Contratti di Programma,* Journal of Economic Geography, v. 16, 2, pp. 365-393, **TD No. 915 (June 2013).**

F BRIPI, *The role of regulation on entry: evidence from the Italian provinces,* World Bank Economic Review, v. 30, 2, pp. 383-411, **TD No. 932 (September 2013).**

L. ESPOSITO, A. NOBILI and T. ROPELE, *The management of interest rate risk during the crisis: evidence from Italian banks,* Journal of Banking & Finance, v. 59, pp. 486-504, **TD No. 933 (September 2013).**

F. BUSETTI and M. CAIVANO, *The trend–cycle decomposition of output and the Phillips Curve: bayesian estimates for Italy and the Euro Area,* Empirical Economics, V. 50, 4, pp. 1565-1587, **TD No. 941 (November 2013).**

M. CAIVANO and A. HARVEY, *Time-series models with an EGB2 conditional distribution,* Journal of Time Series Analysis, v. 35, 6, pp. 558-571, **TD No. 947 (January 2014).**

G. ALBANESE, G. DE BLASIO and P. SESTITO, *My parents taught me. evidence on the family transmission of values,* Journal of Population Economics, v. 29, 2, pp. 571-592, **TD No. 955 (March 2014).**

R. BRONZINI and P. PISELLI, *The impact of R&D subsidies on firm innovation,* Research Policy, v. 45, 2, pp. 442-457, **TD No. 960 (April 2014).**

L. BURLON and M. VILALTA-BUFI, *A new look at technical progress and early retirement,* IZA Journal of Labor Policy, v. 5, **TD No. 963 (June 2014).**

A. BRANDOLINI and E. VIVIANO, *Behind and beyond the (headcount) employment rate,* Journal of the Royal Statistical Society: Series A, v. 179, 3, pp. 657-681, **TD No. 965 (July 2015).**

A. BELTRATTI, B. BORTOLOTTI and M. CACCAVAIO, *Stock market efficiency in China: evidence from the split-share reform,* Quarterly Review of Economics and Finance, v. 60, pp. 125-137, **TD No. 969 (October 2014).**

A. CIARLONE and V. MICELI, *Escaping financial crises? Macro evidence from sovereign wealth funds’ investment behaviour,* Emerging Markets Review, v. 27, 2, pp. 169-196, **TD No. 972 (October 2014).**

D. DOTTORI and M. MANNA, *Strategy and tactics in public debt management,* Journal of Policy Modeling, v. 38, 1, pp. 1-25, **TD No. 1005 (March 2015).**

F. CORNELI and E. TARANTINO, *Sovereign debt and reserves with liquidity and productivity crises,* Journal of International Money and Finance, v. 65, pp. 166-194, **TD No. 1012 (June 2015).**

G. RODANO, N. SERRANO-VELARDE and E. TARANTINO, *Bankruptcy law and bank financing,* Journal of Financial Economics, v. 120, 2, pp. 363-382, **TD No. 1013 (June 2015).**

S. BOLATTO and M. SBRACIA, *Deconstructing the gains from trade: selection of industries vs reallocation of workers,* Review of International Economics, v. 24, 2, pp. 344-363, **TD No. 1037 (November 2015).**

A. CALZA and A. ZAGHINI, *Shoe-leather costs in the euro area and the foreign demand for euro banknotes,* International Journal of Central Banking, v. 12, 1, pp. 231-246, **TD No. 1039 (December 2015).**

E. CIANI, *Retirement, Pension eligibility and home production,* Labour Economics, v. 38, pp. 106-120, **TD No. 1056 (March 2016).**

L. D'AURIZIO and D. DEPALO, *An evaluation of the policies on repayment of government's trade debt in Italy*, Italian Economic Journal, v. 2, 2, pp. 167-196, **TD No. 1061 (April 2016).**

FORTHCOMING

S. MOCETTI, M. PAGNINI and E. SETTE, *Information technology and banking organization*, Journal of Financial Services Research, **TD No. 752 (March 2010).**

G. MICUCCI and P. ROSSI, *Debt restructuring and the role of banks' organizational structure and lending technologies,* Journal of Financial Services Research, **TD No. 763 (June 2010).**

M. RIGGI, *Capital destruction, jobless recoveries, and the discipline device role of unemployment,* Macroeconomic Dynamics, **TD No. 871 July 2012).**

S. FEDERICO and E. TOSTI, *Exporters and importers of services: firm-level evidence on Italy*, The World Economy, **TD No. 877 (September 2012).**

P. BOLTON, X. FREIXAS, L. GAMBACORTA and P. E. MISTRULLI, *Relationship and transaction lending in a crisis*, Review of Financial Studies, **TD No. 917 (July 2013).**

G. DE BLASIO and S. POY, *The impact of local minimum wages on employment: evidence from Italy in the 1950s,* Regional Science and Urban Economics, **TD No. 953 (March 2014).**

A. L. MANCINI, C. MONFARDINI and S. PASQUA, *Is a good example the best sermon? Children's imitation of parental reading,* Review of Economics of the Household, **TD No. 958 (April 2014).**

L. BURLON, *Public expenditure distribution, voting, and growth,* Journal of Public Economic Theory, **TD No. 961 (April 2014).**

G. ZINNA, *Price pressures on UK real rates: an empirical investigation,* Review of Finance, **TD No. 968 (July 2014).**

U. ALBERTAZZI, M. BOTTERO and G. SENE, *Information externalities in the credit market and the spell of credit rationing,* Journal of Financial Intermediation, **TD No. 980 (November 2014).**

A. BORIN and M. MANCINI, *Foreign direct investment and firm performance: an empirical analysis of Italian firms,* Review of World Economics, **TD No. 1011 (June 2015).**

R. BRONZINI and A. D'IGNAZIO, *Bank internationalisation and firm exports: evidence from matched firm-bank data,* Review of International Economics, **TD No. 1055 (March 2016).**