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Michal Rubaszek & Margarita Rubio

Produced By:

Centre for Finance, Credit and Macroeconomics
School of Economics
Sir Clive Granger Building
University of Nottingham
University Park
Nottingham
NG7 2RD

Tel: +44(0) 115 951 4763
Fax: +44(0) 115 951 4159
suzanne.robey@nottingham.ac.uk

Does rental housing market stabilize the economy? A micro and macro perspective.*

Michał Rubaszek† Margarita Rubio‡

Abstract

The size of the rental housing market in most countries around the globe is low. In this article we claim that this may be detrimental for macroeconomic stability. Toward this aim we, determine the reasons behind rental market underdevelopment by conducting an original survey among a representative group of 1005 Poles, a country that is characterized by high homeownership ratio. We find that households' preferences are strongly influenced by economic and psychological factors. Next, we propose a DSGE model in which households satisfy housing needs both by owning and renting. We use it to show that reforms enhancing the rental housing market contribute to macroeconomic stability. This micro-macro approach allows us to dig into the causes of rental market underdevelopment and design appropriate policy recommendations.

Keywords: Rental housing market; survey data; DSGE model.
JEL Classification: C83, D91, E47, R21.

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†SGH Warsaw School of Economics and Narodowy Bank Polski, email: Michal.Rubaszek@sgh.waw.pl
‡University of Nottingham, email: Margarita.Rubio@nottingham.ac.uk

1 Introduction

The role of housing for the macroeconomy cannot be overstated. According to Leamer (2007) fluctuations in housing market activity are the core cause of the business cycle, whereas the data on residential investment can be successfully used as an early warning sign of an oncoming recession. In the context of the European monetary integration, the high importance of the housing market, which was well described before the launching the euro by Maclennan et al. (1998), has manifested in the form of substantial imbalances and painful adjustment in many countries such as Spain and Ireland (Rubio, 2014a). There are also numerous analyses on the importance of the housing market structure and its dynamics for the transmission of macroeconomic disturbances to the economy, which follow the seminal paper of Iacoviello (2005). Even though interactions between the housing market and the business cycle is extensively explored in the literature, the number of studies analyzing the role of the housing tenure structure for macroeconomic stability is scarce. An example of such a study is the work of Arce and Lopez-Salido (2011), who build a theoretical model to show that the availability of rental housing reduces the risk of a house price bubble. Similarly, Rubio (2014b) finds, with a DSGE model, that a larger rental market makes monetary policy more stabilizing. These results are confirmed by panel regressions of Cuerpo et al. (2014) or Czerniak and Rubaszek (2016), who indicate that the the rental market share diminish fluctuations in house prices and construction sector activity.

In this context, a low share of the private rental market observed in most countries around the globe might be considered as a serious structural weakness, and raises two important questions. The first one relates to the reasons behind this rental market underdevelopment. The literature provides some generic answers. At a macro level, it has been already shown that the different homeownership rates across European countries can be attributed to the efficiency of institutions, fiscal policies as well as cultural or educational factors (Earley, 2004; Mora-Sanguinetti, 2010). At a micro level, it has been established that households' tenure choices are affected not only by economic factors, but also by the fact that ownership usually provides higher housing satisfaction than renting (Elsinga and Hoekstra, 2005; Ben-Shahar, 2007; Diaz-Serrano, 2009). We contribute to this strand of the literature by conducting an original survey among a representative group of 1005 Poles, which allows us to better understand their attitudes toward various housing tenure choices. This is an important contribution because we take as an example a paradigmatic country that is characterized by a low rental market share. Our survey provides very relevant micro evidence on the reasons accounting for housing tenure choice and constitutes a crucial piece of information for policy makers. We find that the preferences of the respondents are strongly tilted toward owning, mainly because they perceive ownership as the only way to provide a safe place for the family and to really "feel at home". Moreover, renting is perceived to be a more expensive form of satisfying housing needs. Consequently, the rental market is currently treated as a short-term, temporary solution, and not as a vital alternative to ownership for a longer stay.

The results of the survey are of great importance as they serve to feed a macro model and determine the macroeconomic implications of a low rental market share. Therefore, the second contribution of this article is that we develop a Dynamic Stochastic General Equilibrium (DSGE) model with a rental market, in the spirit of Ortega et al. (2011); Rubio (2014b) framework, that can be used to asses the role of the housing tenure structure for macroeconomic stability. We calibrate the model to the Polish data so that the model economy is characterized by very low rental market share. Building on the results of the survey, which allow us to identify inefficiencies in the functioning of the rental market, we propose a series of reforms and conduct contractual simulations. In particular we quantify the effects of (i.) improving tenant protection legislation, (ii.) equalizing fiscal incentives for different types of housing tenures, and (iii.) improving the standard of rental services. All three reforms lead to an increase in the share of the rental market, which in turn contribute to macroeconomic stability. In particular, we show that rental market development diminishes the impact of shocks to the financial sector on the key macroeconomic variables.

The rest of the paper is organized as follows. Section 2 describes the typical reasons behind low popularity of the housing rental market using the data from the survey. Section 3 presents the DSGE model. Section 4 discusses the effects of rental market reform. The last section concludes and provides some interpretation of the results in the form of policy recommendations.

2 Rental market size determinants. Micro evidence.

The size of the private rental market in Poland is relatively small compared to other EU countries. According to Eurostat data, in 2014, the share of owners without and with mortgage stood at 72.7% and 10.8%, respectively, which gives the homeownership rate at 83.5%. The share of public and private rental amounted to 12.2% and merely 4.3%, respectively. This points to a serious underdevelopment of the private rental market in Poland, as compared to the Western EU countries, such as Germany (39.6 %), Denmark (36.6%), not to mention Switzerland (49.2%). At the same time, the size of the private rental market was comparable to other countries in Eastern Europe, except for the Czech Republic (Figure 1). Figure 1 also shows that the share of the private rental market is much more developed in the German-speaking countries than in the Anglo-Saxon or Southern European ones. According Elsinga and Hoekstra (2005) this can be explained by institutional and cultural factors. For example, in the Anglo-Saxon countries, owning a house is usually associated with a sense of security, autonomy, personal identity and it is considered to be a sign of economic success. As a result, a subjective utility from living in a dwelling that is owned is much higher than from living in the same dwelling that is rented. This individual preference is explained by Saunders (1990) in terms of people's possessive instinct and the desire to mark out their own territory. The individual preference for homeownership in many countries is reinforced by the housing policy that is based on the assumption that a high proportion of owners has a

positive impact on economic and social development (DiPasquale and Glaeser, 1999). This kind of policy, in the form of fiscal incentives for owners, combined with a strong protection of tenants at the expense of landlords, stands behind the relatively high homeownership rates in the Southern European countries (Mora-Sanguinetti, 2010). In the case of the German-speaking countries, the situation is different. The preference for ownership, both at the individual and country level, is not as strong as in other places in Europe. At an individual level, a sense of security is provided by a developed social system and a high protection of tenants, under which evictions or excessive rents increases are limited. At a country level, fiscal support and good legislation encourage institutional investors to locate funds in the rental housing. As a result, the private rental market is relatively well developed and rental prices are affordable, which allows people to choose more freely on the timing of entering the ownership.

In the case of Poland, as well as in other Eastern European countries, a high proportion of owners and a marginal share of the rental market can be justified by a number of factors. As indicated by Lux and Sunega (2014) for the countries of the region, a very important factor was the transfer of public rental housing into private hands, which took the form of a massive sale to sitting tenants. They could buy occupied apartments at a very discounted price. For Poland, this is well illustrated by the Eurostat data, according to which the share of public rental decreased from 34.9% in 2007 to just 12.3% in 2014 (Figure 2). The second factor is related to changes in the mortgage market, in particular a steady decrease of inflation and nominal interest rates, which in the 1990s often stood at two digit levels, combined with better access to FX denominated loans, especially in Swiss francs. The changes in the financial sector and a variety of programs enhancing house purchases on credit[1] led to an increase in the proportion of owners with a mortgage (from 2.9% in 2007 to 10.8% in 2014, Figure 2). Third, ineffective regulations are another factor behind the low rental share. For example, an excessive protection of "bad" tenants within open-ended rent contract combined with no support for the landlords is increasing the risk of investment in rental housing. This, in turn, is reflected in higher rents and lower supply of houses to let. Moreover, new rental contracts are usually temporary ones (usually for one year), which reduces the demand of households for long-term rental. The lack of a consistent housing policy to develop the rental market is nicely summarized by Priemus and Mandic (2000), who claim (as indicated by the title of their article) that in the countries of the region both private and public rental market at the beginning of the twenty-first century was "no man's land."

The elements of this bad institutional setup prevailing in Poland are present in many countries around the globe and constitute a hindrance to rental market development. In order to correct for these inefficiencies it is crucial to better understand why so many people decide to own and not to

[1]In Poland there were two such programs. Within the first program, *Rodzina na Swoim* (Family on its Own), the government was subsidising up to 50% of mortgage interest payments for the first eight years after the purchase of an apartment. In 2014 *Rodzina na Swoim* was modified into *Mieszkanie dla Młodych* (Apartment for the Young), in which the government was subsidising downpayments for young families, where the subsidy amounted up to 30% of an apartment value.

rent. Thus, we have asked a representative group of 1,005 Poles about their attitude toward both housing tenures. The survey was conducted between 9 and 13 June 2016 within a regular Omnibus CAPI survey by IPSOS. The exact content of the survey (in Polish) as well as the distribution to all answers are discussed in detail in Rubaszek and Czerniak (2017). Here we present the most important results in the context of discussion on what determines tenure choices in countries with underdeveloped rental market. Moreover, in the Appendix we provide the translation of selected questions into English. These results are a very valuable piece of information that can be extended to other countries with a low share of the residential rental market.

We start by describing the characteristics of the rental market that emerge from the survey. It turns out that private market tenants are usually unmarried and young (up to 30 years), do not have children, inhabit relatively small dwellings (for over half of respondents the surface was smaller than 45 sq. meters) that are located in large cities. The duration of their residence in the currently occupied dwelling is rather short (for almost three quarters of respondents it is less than 5 years) and they plan to change their address in a short-term horizon (almost half of the respondents plan to move within five years). This description fits well students or people who just started their professional careers, for whom renting is a temporary form of satisfying housing needs. The above characteristics indicate that the private rental market is not treated as a serious alternative to ownership for long-term stay.

To check whether respondents to the survey really prefer ownership to renting, we have asked them directly about their potential choices and attitudes toward both tenure forms. The results are presented in Table 1. The first question was about the most likely tenure choice in case of moving. The answers were very skewed towards owning: only 17.3% of respondents indicated renting, whereas 58.5% of them pointed to ownership. It can be noted, however, that the distribution of answers was very dependent on the current tenure status. In the next question, the choice was between renting and buying a house with a mortgage. In this case 29.7% of people selected renting against 52.6% of respondents indicating owning. In the third question, we tested if the respondents to the survey agree with the flawed economic statement: *Buying a dwelling is financially better than renting it because after repaying the mortgage you are left with a dwelling and after paying rents you are left with nothing.* (Ben-Shahar, 2007). We consider this statement to be flawed *flawed* because the evaluation of relative financial attractiveness of the two tenure forms should be based on the comparison of the present value of rent payments to the present value of the payments on mortgage loan instalments less the value of the property after the repayment of the loan. It turns out that as many as 78.0% of respondents agree with this statement, while only 10.9% respondents are of a different opinion. Our interpretation of the above results is that preferences of households are strongly tilted towards ownership.

To further explore the reasons behind tenure choices, we have asked a series of questions related to economic and psychological reasons to own or rent. As regards the former, based on the literature, we have focused on the four following factors (Henderson and Ioannides, 1983;

Bourassa, 1995; Harding et al., 2000; Sinai and Souleles, 2005):

E1. The relative cost of renting and servicing a mortgage

E2. The risk of house prices or rents fluctuations

E3. Transaction costs

E4. Taxes and fiscal incentives

Then, taking into account the results of Coolen et al. (2002) and, above all, Ben-Shahar (2007), we selected the following psychological factors:

P1. Social status

P2. A sense of freedom and independence

P3. Comfort

P4. Peace of mind

P5. The well-being

P6. Attachment to the housing unit

P7. Family

P8. Happiness

Results in Table 2 clearly show that the respondents prefer owning to renting due to both psychological and economic reasons. The distribution of answers to question $E1$ shows that 64.0% of respondents think that servicing a mortgage is cheaper than paying a rent, whereas 12.6% is of the opposite opinion. Moreover, answers to $E2$ demonstrate that for a dominant part of respondents (65.6%) the risk of rental price changes is higher than the risk of house price fluctuations. This means that for most households renting is considered to be financially less attractive than owning. Regarding the eight psychological factors, the distribution of answers is broadly similar for all of them: about 70% of respondents prefer owning and about 10% of them indicate renting, whereas about 20% has no opinion. These shares would indicate that psychological factors are even more important for tenure decisions than the economic ones. The result that is worth emphasizing is that for question $P7$, the shares are the most skewed toward owning, which indicates that the respondents do not consider rented dwellings to be a good place for a family. Our survey clearly indicates that households derive greater utility from living in owned rather than rented houses.

To understand the reluctance toward renting even better, we have also asked a series of questions that could help to assess which factors are the main hindrance to the rental market development.

The upper panel of Table 3 analyzes the barriers to demand for rental housing. It shows that among factors that are considered to decrease the comfort of being a tenant, the most important ones are related to how the rental market is organized and regulated. In the former case, more than half of respondents agrees that tenants are excessively constrained in arranging the interior of the rented apartment and landlords are inspecting housing units too often. This lack of professionalism among individual landlords obviously decreases satisfaction from living in a rented apartment as compared to owning it. In the latter case, also more than half of the respondents agrees that inefficient regulations related to rent control and tenant protection are decreasing the comfort of renting. It should be noted that regulations protecting tenants against unexpected eviction and reducing the risk of rent increases are of crucial importance for developing the demand for long-term rental. Finally, the level of rents and the offer of dwellings for rental also turned out to be important, albeit to a lower extent than the previous factors. The lower panel of Table 3 analyzes the barriers to the supply of rental housing. It demonstrates that the main factor that decreases the attractiveness of investment in houses to let is related to the low culture of tenants. This, combined with high protection of "bad" tenants against eviction, causes that the risk of investing in rental housing in Poland is high. This, in turn, leads to lower supply and higher level of rents on the private market.

To sum up, the results of the survey lead to the following conclusions. Households strongly prefer owning to renting due to economic and psychological factors. As regards the former, the level of rents might be high in comparison to the cost of owning due to the "bad tenant" risk of investing in rental housing as well as fiscal policy that is tilted towards owning. On top of that, the financial attractiveness of renting might be further diminished by flawed economic reasoning. In the case of psychological factors, many households do not consider rental housing as a serious alternative to owning in case of a long-term stay, especially if the household is a family with children. This might be partly explained by inefficient regulations as well as low professionalism of landlords, which decrease satisfaction from living in rented dwellings.[2]

3 A macro model

In the previous section we have described the main factors that are hindrance to rental market development. In this section we propose a theoretical framework that can be used to assess the effects of changes in the organization of the housing rental market. The result from the previous section will be crucial to the development and implementation of the macro model. To be more precise, the model will be used to evaluate the macroeconomic effect of three reforms:

[2]It can be noted that this is in line with the findings of two empirical studies based on individual data from Eurostat's European Community Household Survey (Elsinga and Hoekstra, 2005; Diaz-Serrano, 2009), which show that the tenure status significantly affects the answers to the question: *How satisfied are you with your housing situation?*.

i. decreasing the impact of "bad tenant" risk on the level of rents,

ii. removing fiscal incentives to own,

iii. increasing the professionalism of landlords (lower psychological disadvantages of renting).

The proposed DSGE model is based on the framework of Iacoviello (2005), whereas the description of the rental market is closely related to the recent works by Ortega et al. (2011) and Rubio (2014b). It can be noted that DSGE models are very powerful tools used by many central banks and policy institutions around the world for policy evaluation, i.a. due to their simplicity and ability to perform counterfactual simulations. The main structure of the DSGE model used in this article is as follows.

1. There are two types of consumers, which differ in their discount factors (savers and borrowers).
2. Borrowers face collateral constraints when applying for a mortgage.
3. There are two production sectors (construction and consumption goods).
4. Housing can be purchased or rented.
5. Savers are the landlords and provide rental services to borrowers.
6. There are fiscal incentives to purchase/rent a dwelling (subsidies and taxes).

A more elaborated description, with optimisation problems is presented below.

3.1 Savers

Savers maximize their utility from consumption $C_{s,t}$, housing services $H_{s,t}$ and working hours $N_{s,t}$:

$$\max E_0 \sum_{t=0}^{\infty} \beta_s^t \left(\log C_{s,t} + j \log H_{s,t} - \frac{(N_{s,t})^{1+\eta}}{1+\eta} \right), \tag{1}$$

where $\beta_s \in (0,1)$ is the discount factor and E_0 the expectation operator. $1/\eta > 0$ is the labor supply elasticity and $j > 0$ constitutes the relative weight of housing in the utility function. $N_{s,t}$ is a composite of labor supply to the consumption $N_{cs,t}$ and housing sector $N_{hs,t}$,

$$N_{s,t} = \left[\omega_l^{1/\varepsilon_l} \left(N_{cs,t}\right)^{(1+\varepsilon_l)/\varepsilon_l} + (1-\omega_l)^{1/\varepsilon_l} \left(N_{hs,t}\right)^{(1+\varepsilon_l)/\varepsilon_l} \right]^{\varepsilon_l/(1+\varepsilon_l)}, \tag{2}$$

where ω_l is a weight parameter and ε_l the elasticity of substitution between both labor types.

The budget constraint is:

$$C_{s,t} + b_{s,t} + q_{h,t}\left[\left(1-\tau_h\right)\left(H_{s,t} - \left(1-\delta_h\right)H_{s,t-1}\right) + \left(H_{z,t} - \left(1-\delta_z\right)H_{z,t-1}\right)\right] \leq$$
$$\frac{R_{t-1}b_{s,t-1}}{\pi_t} + w_{cs,t}N_{cs,t} + w_{hs,t}N_{hs,t} + q_{z,t}H_{z,t} + S_t - T_t, \tag{3}$$

where $q_{h,t}$ is the real housing price and $w_{cs,t}$ ($w_{hs,t}$) denotes real wages in the consumption (housing) sector. Savers can purchase or sell houses either to live in $H_{s,t}$ or to rent it $H_{z,t}$ at price $q_{z,t}$. δ_h and δ_z are the depreciation rates for owner-occupied and rented dwellings, respectively. They might differ due to the "bad tenant" risk, which was discussed in the previous section. We allow for the existence of tax incentives to own, in particular a subsidy τ_h. Next, the level of savings is given by $b_{s,t}$ and the risk free interest rate by R_{t-1}. π_t is the inflation rate at period t. Finally, S_t are the profits of firms and T_t a lump-sum government transfer.

The first-order conditions for this optimization problem are as follows.

$$\frac{1}{C_{s,t}} = \beta_s E_t\left(\frac{R_t}{C_{s,t+1}\pi_{t+1}}\right) \tag{4}$$

$$\frac{j}{H_{s,t}} = \left(1-\tau_h\right)\left[\frac{q_{h,t}}{C_{s,t}} - \beta_s\left(1-\delta_h\right)E_t\left(\frac{q_{t+1}}{C_{s,t+1}}\right)\right] \tag{5}$$

$$\frac{q_{h,t}}{C_{s,t}} = \frac{q_{z,t}}{C_{s,t}} + \beta_s\left(1-\delta_z\right)E_t\frac{q_{h,t+1}}{C_{s,t+1}} \tag{6}$$

$$\frac{w_{cs,t}}{C_{s,t}} = \left(N_{s,t}\right)^{\eta}\omega_l^{1/\varepsilon_l}\left(\frac{N_{cs,t}}{N_{s,t}}\right)^{1/\varepsilon_l} \tag{7}$$

$$\frac{w_{hs,t}}{C_{s,t}} = \left(N_{s,t}\right)^{\eta}\left(1-\omega_l\right)^{1/\varepsilon_l}\left(\frac{N_{hs,t}}{N_{s,t}}\right)^{1/\varepsilon_l} \tag{8}$$

Equation (4) is the standard Euler equation for consumption. Equations (5) and (6) represents the intertemporal condition for housing purchased to own and let, respectively. In these equations benefits of purchasing a housing unit equate the alternative costs of forgone consumption. Finally, equations (7) and (8) describe the labor-supply conditions for consumption goods and housing sector.

3.2 Borrowers

Borrowers solve a similar optimisation problem as savers:

$$\max E_0\sum_{t=0}^{\infty}\beta_b^t\left(\log C_{b,t} + j\log\widetilde{H}_{b,t} - \frac{\left(N_{b,t}\right)^{1+\eta}}{1+\eta}\right), \tag{9}$$

where $\beta_b < \beta_s$ is the discount factor, and

$$N_{b,t} = \left[\omega_l^{1/\varepsilon_l} \left(N_{cb,t}\right)^{(1+\varepsilon_l)/\varepsilon_l} + \left(1-\omega_l\right)^{1/\varepsilon_l} \left(N_{hb,t}\right)^{(1+\varepsilon_l)/\varepsilon_l}\right]^{\varepsilon_l/(1+\varepsilon_l)}. \tag{10}$$

The key difference in the optimisation problems of savers and borrowers is that $\tilde{H}_{b,t}$ is a composite of owned housing purchased with a mortgage $H_{b,t}$ and rental housing $H_{z,t}$:

$$\tilde{H}_{b,t} = \left[\omega_h^{1/\varepsilon_h} \left(H_{b,t}\right)^{(\varepsilon_h-1)/\varepsilon_h} + \left(1-\omega_h\right)^{1/\varepsilon_h} \left(H_{z,t}\right)^{(\varepsilon_h-1)/\varepsilon_h}\right]^{\varepsilon_h/(\varepsilon_h-1)}. \tag{11}$$

The parameter ω_h is very important in our analysis, as it approximates the preference for owning a house (purchased on credit) versus the rental housing. In turn, ε_h describes the elasticity of substitution between preferences for owner-occupied housing and rental. In this way, borrowers derive utility from the two types of housing. It should be emphasized that that this does not literally mean that each borrower lives simultaneously in their own house and in a rented house. Instead, the interpretation is that there exists a large representative borrower-type household with a continuum of members, some of whom live in owner-occupied houses, the rest of whom live in rented houses. This composite index in the equation thus represents the aggregate preferences of all household members with respect to each kind of housing service.

The budget constraint and the collateral constraint for the borrowers are as follows:

$$\begin{aligned} C_{b,t} + \frac{R_{t-1} b_{b,t-1}}{\pi_t} + q_{h,t}\left(1-\tau_h\right)\left(H_{b,t} - \left(1-\delta_h\right)H_{b,t-1}\right) + q_{z,t}\left(1-\tau_z\right)H_{z,t} = \\ = b_{b,t} + w_{cb,t} N_{cb,t} + w_{hb,t} N_{hb,t} \end{aligned} \tag{12}$$

$$b_{b,t} \leq E_t\left(\frac{1}{R_t} k_t q_{h,t+1} H_{b,t} \pi_{t+1}\right) \tag{13}$$

where $b_{b,t}$ represents the level of debt and k_t is a maximum loan-to-value ratio (LTV) that follows an autoregressive process $\log k_t = (1-\rho_k) * log(\overline{k}) + \rho_k \log k_{t-1} + \zeta_t$ with normally distributed shocks. A shock to the LTV represents a credit constraint loosening or tightening.

The first-order conditions of this maximization problem are:

$$\frac{1}{C_{b,t}} = \beta_b E_t\left(\frac{R_t}{C_{b,t+1}\pi_{t+1}}\right) + \lambda_t, \tag{14}$$

$$\frac{j}{\tilde{H}_{b,t}}\left(\frac{\omega_h \tilde{H}_{b,t}}{H_{b,t}}\right)^{1/\varepsilon_h} = \left(1-\tau_h\right)\left(\frac{q_{h,t}}{C_{b,t}} - \beta_b\left(1-\delta_h\right)E_t\frac{q_{h,t+1}}{C_{b,t+1}}\right) - \lambda_t k_t E_t q_{h,t+1}\frac{\pi_{t+1}}{R_t}, \tag{15}$$

$$\frac{j}{\tilde{H}_{b,t}}\left(\frac{\left(1-\omega_h\right)\tilde{H}_{b,t}}{H_{z,t}}\right)^{1/\varepsilon_h}=\left(1-\tau_z\right)\frac{q_{z,t}}{C_{b,t}}, \tag{16}$$

$$\frac{w_{cb,t}}{C_{b,t}}=\left(N_{b,t}\right)^{\eta}\omega_l^{1/\varepsilon_l}\left(\frac{N_{cb,t}}{N_{b,t}}\right)^{1/\varepsilon_l}, \tag{17}$$

$$\frac{w_{hb,t}}{C_{b,t}}=\left(N_{b,t}\right)^{\eta}\left(1-\omega_l\right)^{1/\varepsilon_l}\left(\frac{N_{hb,t}}{N_{b,t}}\right)^{1/\varepsilon_l}, \tag{18}$$

where λ_t is the Lagrange multiplier of the collateral constraint. The above conditions can be interpreted analogously to those for the savers. The most important difference is in demand equation for owned and rented housing (15 and 16), which mow equates the marginal utility from housing services (and the marginal value of housing as collateral in the case of (15)) with the alternative cost of forgone consumption.

3.3 Firms

The intermediate consumption goods market is monopolistically competitive. The individual firm production function is:

$$Y_t\left(z\right)=A_t\left(N_{cs,t}\left(z\right)\right)^{\gamma}\left(N_{cb,t}\left(z\right)\right)^{(1-\gamma)}, \tag{19}$$

where the only factor of production is labor supplied by each agent, with $\gamma\in[0,1]$ measuring the relative size of each group in terms of labor. A_t represents technology, which is an autoregressive process $\log A_t=\rho_A\log A_{t-1}+u_t$ with normally distributed shocks. The symmetry across firms allows avoiding index z and re-writing the above equation in the form of the aggregate production function for consumption goods:

$$Y_t=A_tN_{cs,t}^{\gamma}N_{cb,t}^{(1-\gamma)},. \tag{20}$$

The intermediate housing investment goods market is also assumed to be monopolistically competitive and subject to the same technology shock A_t. Both types of households also supply labor to the construction sector, with the same relative size as in the consumption sector. The aggregate production function for housing investment is therefore:

$$IH_t=A_tN_{hs,t}^{\gamma}N_{hb,t}^{(1-\gamma)}, \tag{21}$$

Intermediate goods producers maximize profits:

$$\max_{N_{cs,t},N_{hs,t},N_{cb,t},N_{hb,t}}\frac{Y_t}{X_t}+q_{h,t}IH_t-w_{cs,t}N_{cs,t}-w_{hs,t}N_{hs,t}-w_{cb,t}N_{cb,t}-w_{hb,t}N_{hb,t}, \tag{22}$$

where X_t is the markup that is equal to the inverse of real marginal costs. The first-order conditions

are the following:

$$w_{cs,t} = \frac{1}{X_t}\gamma\frac{Y_t}{N_{cs,t}}, \tag{23}$$

$$w_{cb,t} = \frac{1}{X_t}\left(1-\gamma\right)\frac{Y_t}{N_{cb,t}}, \tag{24}$$

$$w_{hs,t} = \gamma\frac{q_{h,t}IH_t}{N_{hs,t}}, \tag{25}$$

$$w_{hb,t} = \left(1-\gamma\right)\frac{q_{h,t}IH_t}{N_{hb,t}}, \tag{26}$$

These first order conditions represents the labor demanded for each type of consumer by each sector, respectively. The price-setting problem for the intermediate-goods producers is a standard Calvo-Yun case. They sell goods at price $P_t(z)$. They can re-optimize the price with $1-\theta$ probability in each period. The optimal reset price $P_t^{OPT}(z)$ solves:

$$\sum_{k=0}^{\infty}\left(\theta\beta\right)^k E_t\left\{\Lambda_{t,k}\left[\frac{P_t^{OPT}(z)}{P_{t+k}} - \frac{\varepsilon/\left(\varepsilon-1\right)}{X_{t+k}}\right]Y_{t+k}^{OPT}(z)\right\} = 0. \tag{27}$$

The aggregate price level is therefore:

$$P_t = \left[\theta P_{t-1}^{1-\varepsilon} + \left(1-\theta\right)\left(P_t^{OPT}\right)^{1-\varepsilon}\right]^{1/(1-\varepsilon)}. \tag{28}$$

By combining (27) with (28) and log-linearizing, we can obtain the standard forward-looking Phillips curve.

3.4 Monetary authority and equilibrium conditions

To close the model we assume that central bank sets interest rates according to a Taylor rule that responds to inflation and output growth:

$$R_t = \left(R_{t-1}\right)^{\rho}\left[\pi_t^{(1+\phi_\pi)}\left(\frac{Y_t}{Y_{t-1}}\right)^{\phi_y}R\right]^{(1-\rho)}\varepsilon_{R,t}, \tag{29}$$

where $0 \leq \rho \leq 1$ is the parameter associated with interest rate smoothing. $\phi_\pi > 0$, $\phi_y > 0$ measure the interest rate response to inflation and output growth, respectively. R is the steady-state value of the interest rate. $\varepsilon_{R,t}$ is a white noise shock with 0 average and σ_ε^2 variance.

The equilibrium condition for the consumption goods and housing investment markets are:

$$Y_t = C_{s,t} + C_{b,t} \tag{30}$$

$$IH_t \equiv (H_{s,t} - (1-\delta_h) H_{s,t-1}) + (H_{b,t} - (1-\delta_h) H_{b,t-1}) + (H_{z,t} - (1-\delta_z) H_{z,t-1}) . \quad (31)$$

Finally, the equilibrium government budget constraint is:

$$T_t = \tau_z q_{z,t} H_{z,t} + \tau_h q_{h,t} \left[(H_{s,t} - (1-\delta_h) H_{s,t-1}) + (H_{b,t} - (1-\delta_h) H_{b,t-1}) \right] . \quad (32)$$

4 Reforming the rental market

Calibrating the model

To calibrate the model, we use data from the Polish economy, including the data that we collected in the survey. The weight parameter in the CES baskets of housing services ω_h is set 2/3 on the basis of answers to the question on the preferred tenure choice in case of no funds to buy a dwelling (Table 1). The parameters describing the labor market were fixed at $\omega_l = 0.14$ and $j = 0.06$ so that the share of labor in the construction sector stood at 7.6%. The value of j parameter, together with depreciation rates at $\delta_z = 1\%$ and $\delta_h = 0.75\%$ quarterly, were additionally fixing the residential investment to GDP ratio at 3.3%, close to the 2007-2015 average from the OECD data. The discount factor β_s was set to 0.995 so that, taking into account the value of δ_z, the ratio of quarterly rents q_z were equal to 1.5% of house value, in line with the National Bank of Poland data presented in quarterly reports "Information on home prices and the situation in the housing and commercial real estate market in Poland". As regards parameters describing regulations, we set the steady state LTV value $\overline{k}$ to 0.8, in line with the current restrictions related to the maximum LTV, and took into account that landlords have to pay 8.5% turnover taxes ($\tau_z = -0.085$). Finally, given all the above parameters, we have set the share of savers to be $\gamma = 2/3$, so that the share of the rental market stood at 6.8%, in line with the survey data (if we exclude public rental). The above choice implies that the share of owners with a mortgage is 17.2%, much more than in the survey (10.4% if we exclude public rental). We have considered that this share is higher than what is observed in the data as the mortgage markets in Poland were almost non-existent before 2004, hence it is difficult to claim that the current share is the steady-state value.

The remaining parameters are set to standard values in the literature. For borrowers, we use a slightly lower discount factor than the one of the savers, in line with the literature on DSGE models with housing and financial frictions. Following Horvath (2000), we set the elasticity of substitution between labor types to $\varepsilon_l = 1$. For the elasticity of substitution between services from home ownership and renting we follow Ortega et al. (2011) and take the value $\varepsilon_h = 2$ in order to make households more sensitive to the relative price of houses and rents than would be the case under lower values. The value for the elasticity of substitution among final goods, $\varepsilon_p = 6$, implies

a markup of 20% in the steady state, a value commonly found in the literature. The probability of not changing prices is chosen to be $\theta = 0.75$, implying that prices change every four quarters on average. The coefficients in the Taylor rule are set to $\rho = 0.9$ for the lagged interest rate and $\phi_\pi = 0.5$ for inflation and $\phi_y = 0.5$ output, respectively, as proposed in the seminal paper by Taylor. The values for the above parameters are reported in Table 4. The resulting model steady-state ratios, compared to their data counterparts, are presented in Table 5. It shows that the model reproduces the average proportion of residential investment over GDP, 3.4% (3.3% in the data), as well as the weight of employment in construction over total employment (7.7% in the model, 7.6% in the data). The rental share in the model is 6.9% (consistent with the 6.8 %, found in the survey), whereas the share of housing with mortgages is 17.2% in the model, which is above the number found in the data (10.4%) due to the reasons discussed above.

Steady-state analysis

We now can use the DSGE model described previously to evaluate the effects of residential rental market reforms on the main macroeconomic variables. In particular, basing on the micro evidence, we focus on the quantitative effects of:

i. removing fiscal disincentives to rent (neutral txes),

ii. increasing the protection of landlords (lower bad tenant risk),

iii. lowering the disutility of renting (professional rental services).

In terms of the model, this would correspond to setting taxes on rental income (τ_z) equal to zero, lowering the depreciation rate of rental housing (δ_z) and lowering the preference parameter of owner-occupied housing (ω_h), respectively. It should be noted that the time horizon of the above three reforms is different. As reforms (i.) and (ii.) can be introduced relatively quickly, reform (iii.) should be considered as a long lasting process, requiring an increase in the quality of rental services and a gradual shift in attitudes.

Here, we display the consequences of these reforms on steady-state values, to capture the long-run or structural effects of these measures. The results for the key variables and ratios are displayed in Table 6. Specifically, in the second column of the table we present the results for a fiscal policy reform, the third column displays the steady-state values associated with better protecting the landlords against the "bad tenant" risk, and the fourth column presents the long-run effects of lowering the disutility of renting. The fifth column presents the combined effect of the above three reforms.

We can observe that the first reform, moving to a neutral fiscal policy with no subsidies on housing markets has relatively small effects on the overall economic activity although it contributes to increasing the housing rental share. This measure implies a reallocation of the available housing

stock from the ownership to the rental segment of the market. In particular, the rental share in the housing market increases to 7.7%. On the contrary, borrowers reduce their holdings of mortgaged houses, so that the share of mortgaged houses in the total housing stock falls from 60.9% to 59.4% of GDP. The effects of the second reform, which is increasing the protection of landlords against bad tenants, are quite similar, in the sense that the overall economic activity is not affected much and the largest effect is the reallocation of the housing stock from the ownership to the rental segment, which translates into changes in mortgage debt. Finally, an increase in the household preference for renting has also similar effects to the other two measures. It increases the size of the rental market and lowers the amount of houses that are purchased with a mortgage. This measure brings the strongest effects, although it is more difficult to implement in the short run because it implies changing preferences or cultural factors. The last column displays the combined effects of all three reforms together. Since they all have effects that go almost in the same direction, we see that the housing rental share increases sizably from a value of 6.8% to 15%, whereas the value of mortgage debt decreases by one-third, from 60.9% to 40.9% of GDP. As regards the effect on the level of the real sector activity, it is barely noticeable. This suggests that there should be an effort toward implementing a combination of these measures in order to obtain stronger results.

Impulse-response analysis

We have already shown that the reforms of the rental market are mainly affecting the steady-state values of two variables: the rental share and the level of mortgage debt to GDP ratio. A question arises whether these changes affect fluctuations of the economy over the business cycle, that is, if they also have short run effects. In order to assess this, we compare the dynamic response of the economy before and after the rental market reform to three macroeconomic disturbances: productivity, monetary and loan-to-value shocks. The shape of the impulse-response functions are presented in Figure 3. Each row represents the variable of interest, which include two key macrovariables, inflation and GDP, as well as house prices. In the case of columns, they represent three macroeconomic shocks (productivity, monetary, LTV). Finally, each panel presents the effect of a given shock (one standard deviation) on the variable of interest (expressed in percentage deviations from the steady-state) in two scenarios (before and after the full reform).

Figure 3 shows that the reform of the rental market is not changing the aggregate effect of a monetary and a productivity shock on the macroeconomy. This can be interpreted by the fact that both shocks do not have a significant impact on the relative costs of owning in comparison to renting. The availability of mortgages does not get affected either because the strength of the financial accelerator, which is driven by the collateral constraint described in the model, does not change with these shocks. In turn, the rental market reform affects how the economy responds to the LTV shock, defined as loosening the credit constraint. Our interpretation is as follows. The initial shock, i.e. credit loosening, is affecting positively the demand for mortgages as borrowers can

now afford to acquire more housing services with credit. A well-functioning and affordable rental sector provides a viable alternative to satisfy these needs, hence limits the demand for mortgages, thus softening the financial accelerator effect. During the expansion phase on the housing market, affordable rental opportunities would then tame demand pressures and thus limit price increases. Equivalently, less indebted households means that price corrections during downturns are less severe. As a result, one would expect more stable housing markets after the reform. Since housing markets and the macroeconomy are linked through the collateral constraint, this will also bring higher macroeconomic stability. As shown in Table 7 this is exactly the case. After the reform the volatility of house prices attributed to LTV shocks declines from 0.71 to 0.55 . This, in turn, leads to higher macroeconomic stability as evidenced by almost 30% decline in standard deviation of both GDP and inflation attributed to LTV shock (Table 7). Overall, a reform in the housing market that enhances the share of the rental market brings more stability to the economy in the aftermath of financial shocks, but not monetary or productivity shocks.

5 Conclusions and policy recommendations

The share of the rental housing market in many countries around the globe, including Poland, is low. A micro-macro analysis is crucial to understand better the causes and effects of this phenomenon, as well as to provide some policy recommendations. In this paper we have explored the reasons behind rental housing market underdevelopment using individual data from an original survey that was conducted among the representative sample of 1005 Poles. We have found that tenants are usually young, unmarried persons with low income, who cannot afford to buy a dwelling. The rental market is treated a short-term, temporary solution, and not as a vital alternative to ownership for a longer stay. The results of the survey also show that the preferences of the respondents are strongly skewed toward owning due to both economic and psychological factors. Households perceive ownership not only as a cheaper form of satisfying housing needs, but also as the only way to provide a safe place for the family and to really "feel at home". The survey also allows us to identify the most important barriers to demand for and supply of rental housing. Among the former, inefficient institutions and the lack of professional renting services turned out to be the most important factors. In the case of the latter, the low culture of tenants combined with their high protection seems to dominate.

Given the above diagnosis, we have proposed a DSGE model with rental housing and collateral constraints and calibrated it to the Polish data. This model allows us to quantify the effects of three reforms of the rental market: (i.) equalizing fiscal incentives for different types of housing tenure, (ii.) removing the "bad tenant effect" on the level of rents, and (iii.) improving the standard of rental services leading to a shift in housing tenure preferences. All three reforms lead to an increase in the share of the rental market in the long run. Our computations indicate that introducing the three reforms would shift the rental share from 6.8% to 15.0%. Moreover, we show

that reforming the rental market is also beneficial for macroeconomic stability. For LTV shocks, the financial accelerator effects deriving from loosening the collateral constraint are dampened after the reforms. Then, even though this financial shock promotes borrowing and consumption, well-functioning rental markets mitigate its effects and bring more stable housing markets and the macroeconomy. Therefore, reforming the housing market in this direction, not only increases the share of the rental market but also brings more stability to the economy.

The above results justify why in some countries making the rental market functioning effectively should be considered as a top priority for housing policy. Based on the results of the study we may formulate a number of recommendations for housing policy. First of all, lowering the relative cost of renting in comparison to owning seems to be one of the key factors. This could be achieved by introducing smart regulations protecting landlords against "bad" tenants, which would limit the risk associated with investing in rental housing that is included in the level of rents. Eliminating fiscal measures promoting ownership would also help. Second, stimulating the professionalization of rental services would contribute to changing psychological attitudes toward renting. This could be achieved by encouraging professional investors that specialize in managing and building rental housing, but also by supporting associations of individual landlords or rental management companies. Third, smart regulations that protect "good" tenants against the risk of large rent increases or unexpected eviction would increase the sense of security and stability of the rent contract. This would reduce one of the most important barriers to demand for rental houses: the belief that renting is not a stable form to meet housing needs. Finally, it is worth mentioning that the decision about buying a dwelling is often based on a flawed economic reasoning. This might lead to the conclusion that education or information campaigns about advantages and disadvantages of different forms of housing tenure could contribute to the increase in demand for rental as well as better housing choices of households.

References

Arce, O., Lopez-Salido, D., 2011. Housing bubbles. American Economic Journal: Macroeconomics 3 (1), 212–41.

Ben-Shahar, D., 2007. Tenure choice in the housing market: Psychological versus economic factors 39 (6), 841–858.

Bourassa, S. C., 1995. A model of housing tenure choice in Australia. Journal of Urban Economics 37 (2), 161–175.

Coolen, H., Boelhouwer, P., Driel, K. V., 2002. Values and goals as determinants of intended tenure choice. Journal of Housing and the Built Environment 17 (3), 215–236.

Cuerpo, C., Pontuch, P., Kalantaryan, S., 2014. Rental market regulation in the European Union. European Economy. Economic Papers 515, European Commission.

Czerniak, A., Rubaszek, M., 2016. The size of the rental market and housing market fluctuations, unpublished.

Diaz-Serrano, L., 2009. Disentangling the housing satisfaction puzzle: Does homeownership really matter? Journal of Economic Psychology 30 (5), 745 – 755.

DiPasquale, D., Glaeser, E. L., 1999. Incentives and social capital: Are homeowners better citizens? Journal of Urban Economics 45 (2), 354–384.

Earley, F., 2004. What explains the differences in homeownership rates in Europe. Housing Finance International 19, 25–30.

Elsinga, M., Hoekstra, J., 2005. Homeownership and housing satisfaction. Journal of Housing and the Built Environment 20 (4), 401–424.

Harding, J., Miceli, T. J., Sirmans, C., 2000. Do owners take better care of their housing than renters? Real Estate Economics 28 (4), 663–681.

Henderson, J. V., Ioannides, Y. M., 1983. A model of housing tenure choice. American Economic Review 73 (1), 98–113.

Horvath, M., 2000. Sectoral shocks and aggregate fluctuations. Journal of Monetary Economics 45 (1), 69–106.

Iacoviello, M., 2005. House prices, borrowing constraints, and monetary policy in the business cycle. American Economic Review 95 (3), 739–764.

Leamer, E. E., 2007. Housing is the business cycle. Proceedings - Economic Policy Symposium - Jackson Hole, 149–233.

Lux, M., Sunega, P., 2014. Public housing in the post-socialist states of Central and Eastern Europe: Decline and an open future. Housing Studies 29 (4), 501–519.

Maclennan, D., Muellbauer, J., Stephens, M., 1998. Asymmetries in housing and financial market institutions and EMU. Oxford Review of Economic Policy 14 (3), 54–80.

Mora-Sanguinetti, J., 2010. The effect of institutions on European housing markets: An economic analysis. No. 77 in Estudios Económicos. Banco de Espana.

Ortega, E., Rubio, M., Thomas, C., 2011. House purchase versus rental in Spain. Moneda y Credito 232.

Priemus, H., Mandic, S., 2000. Rental housing in Central and Eastern Europe as no man's land. Journal of Housing and the Built Environment 15 (3), 205–215.

Rubaszek, M., Czerniak, A., 2017. Preferencje Polakow dotyczace struktury wlasnosciowej mieszkan: Opis wynikow ankiety. Bank i Kredyt.

Rubio, M., 2014a. Housing-market heterogeneity in a monetary union. Journal of International Money and Finance 40 (C), 163–184.

Rubio, M., 2014b. Rented vs. owner-occupied housing and monetary policy. National Bank of Poland Working Papers 190, National Bank of Poland, Economic Institute.

Saunders, P., 1990. A Nation of Home Owners. Unwin Hyman, London.

Sinai, T., Souleles, N. S., 2005. Owner-occupied housing as a hedge against rent risk. The Quarterly Journal of Economics 120 (2), 763–789.

Table 1: Tenure preferences by tenure status
(% shares of answers for households with a given tenure status).

	tenant		**owner**		**total**
	private	public	mortgage	no mtg.	
The most likely tenure status of new residence in case of moving					
renting	44.2	42.0	16.6	9.0	17.3
buying	34.6	28.0	74.4	66.9	58.6
don't know	21.2	30.0	9.0	24.1	24.1
Preferred tenure choice in case of no own funds to buy a dwelling					
renting	50.0	61.5	19.2	21.6	29.7
buying with mortgage	38.5	25.2	78.2	55.6	52.6
don't know	11.5	13.3	2.6	22.8	17.7
Flawed economic reasoning					
agree	63.5	69.2	89.7	80.8	78.1
don't agree	13.5	18.9	7.7	8.2	10.9
no opinion	23.1	11.9	2.6	11.0	11.0

Note: The question that we call *flawed economic reasoning* is as follows: *Buying a dwelling is financially better than renting it because after repaying the mortgage you are left with a dwelling and after paying rents you are left with nothing.*
Source: The results of the survey.

Table 2: Economic and psychological factors influencing housing tenure preferences.

	owning	no opinion	renting
Economic factors			
E1. Mortgage / rental costs	64.0	23.4	12.6
E2. Risk of house price / rent fluctuations	65.6	22.8	11.6
E3. Transaction costs	62.1	26.1	11.8
E4. Taxes	61.0	25.3	13.7
Psychological factors			
P1. Social status	70.8	19.5	9.7
P2. Freedom and independence	71.1	16.5	12.3
P3. Comfort	71.6	17.0	11.3
P4. Peace of mind	70.9	17.8	11.2
P5. Well-being	71.5	17.9	10.5
P6. Attachment to dwelling	70.1	18.5	11.3
P7. Family	72.6	18.0	9.4
P8. Happiness	68.8	21.1	10.1

Source: The results of the survey.

Table 3: The reasons of rental market underdevelopment in Poland

	Agree	No opinion	Don't Agree
Factors decreasing the comfort of being a tenant			
Tenants are too much constrained in arranging apartment	56.8	30.2	12.9
Landlords are inspecting the apartment too often	53.3	34.4	12.2
Tenants are not well protected against rent increases	56.2	31.0	12.7
Tenants are not well protected against eviction	56.7	31.1	12.1
Rents are too high in comparison to mortgage installment	53.9	33.3	12.7
The offer of dwellings to rent is too scarce to meet preferences	46.8	35.9	17.3
Factors decreasing the attractiveness of investing in rental housing			
Low culture tenants	62.6	28.9	8.6
Excessive rent control	50.3	37.2	12.4
Excessive protection of tenants against eviction	40.3	43.6	16.1
Low rate of return	39.4	47.3	13.3
Low demand	44.0	41.6	14.4

Source: Calculations on the basis of the results of the survey.

Table 4: Calibration of the DSGE model

Parameter	**Value**	**Description**
β_s	0.995	Discount factor of savers
β_b	0.985	Discount factor of borrowers
j	0.06	Relative weight on utility from housing services
ω_l	0.14	Weight parameter in labor services aggregator
ω_h	2/3	Weight parameter in housing services aggregator
ε_l	1	Elasticity of substitution between labor types
ε_h	2	Elasticity of subst btw. home ownership and rent
η	1	Inverse elasticity of labor supply
ε_p	6	Elasticity of substitution among final goods
γ	2/3	Savers labor-income share
δ_h	0.75%	Depreciation rate of the housing stock
δ_z	1.00%	Depreciation rate of the rental stock
$\overline{k}$	0.8	Makimum LTV ratio (steady-state)
θ	0.75	Calvo parameter
τ_h	0	Subsidy rate house purchases for owner occupation
τ_z	-0.085	Subsidy rate on rent payments (here taxes)
ϕ_R	0.9	Coefficient on lagged nominal interest rate in Taylor rule
ϕ_Π	0.5	Coefficient on inflation in the Taylor rule
ϕ_Y	0.5	Coefficient on output in the Taylor rule

Table 5: Steady State Ratios

	Data	**Model**	**Data Sources**
Housing rental Share, H_z/H	0.069	0.068	Survey data
Share of housing w/ mortgage, H_b/H	0.104	0.172	Survey data
Rent over housing price, q_z/q_h	0.015	0.015	National Bank of Poland, 2007-2015
Residential investment / GDP, $q_h IH/GDP$	0.033	0.034	OECD, 2007-2015
Construction labor share, $L_{h/}(L_c + L_h)$	0.076	0.077	OECD, 2007-2015

Table 6: Steady-state effects of rental market reforms

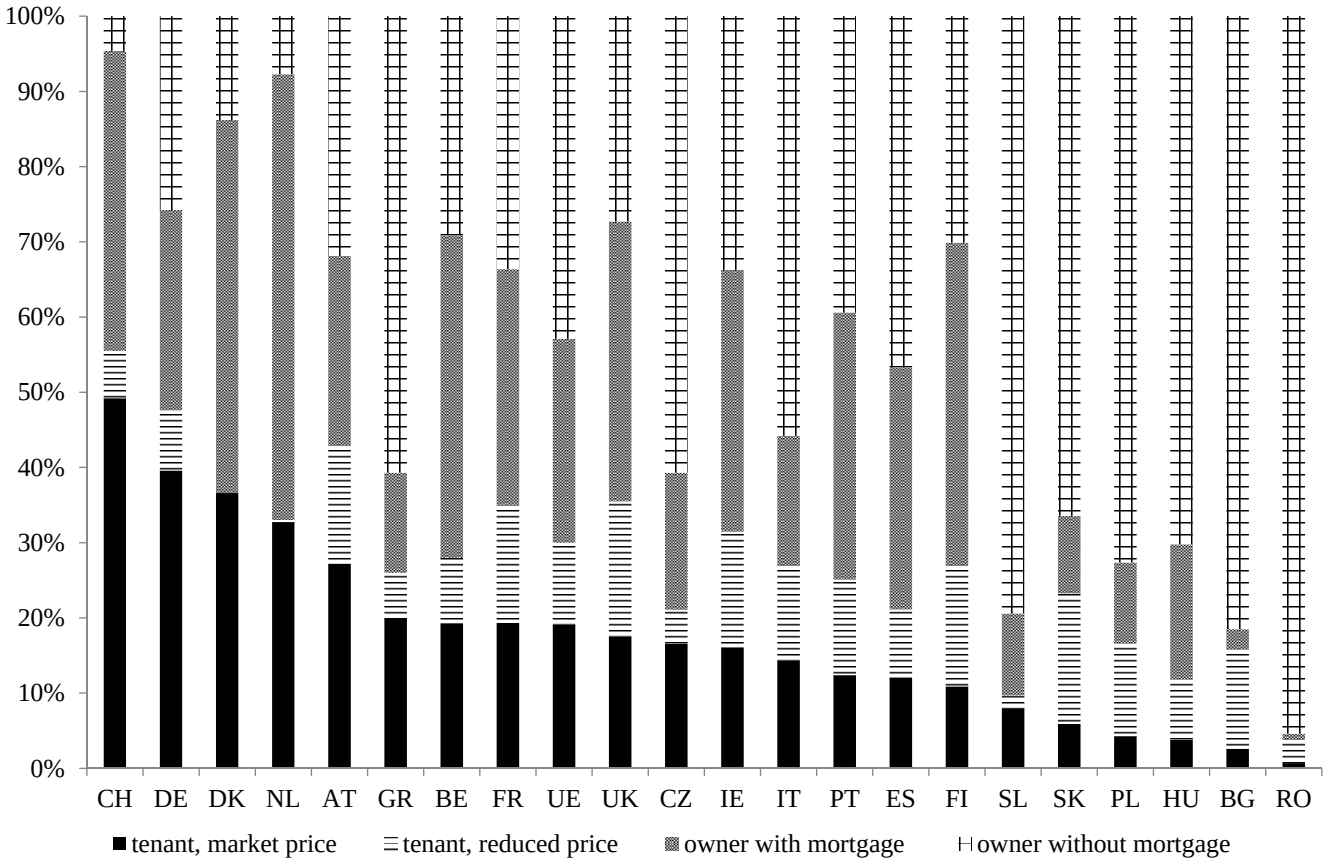
	Benchmark	Neutral taxes $\tau_z = 0$	Lower bad tenant risk $\delta_z = 0.75\%$	Professional rental services $\omega_h = 0.5$	Combined
Housing rental Share	0.068	0.077	0.091	0.104	0.150
Share of housing w/ mortgage	0.172	0.167	0.160	0.132	0.113
Rent over housing price	0.015	0.015	0.0125	0.015	0.0125
Residential investment / GDP	0.034	0.034	0.034	0.034	0.034
Construction labor share	0.077	0.077	0.076	0.077	0.077
Mortgage debt / GDP	0.609	0.594	0.574	0.466	0.409

Table 7: The effects of rental market reforms on macroeconomic volatility

	IR Shock		**Technology Shock**		**LTV Shock**	
	Benchmark	Reform	Benchmark	Reform	Benchmark	Reform
GDP	1.5722	1.5505	1.8121	1.8071	1.0934	0.7935
Inflation	0.8037	0.7902	0.3655	0.3751	0.4310	0.3092
House Prices	0.8427	0.8248	1.9734	2.0049	0.7124	0.5548

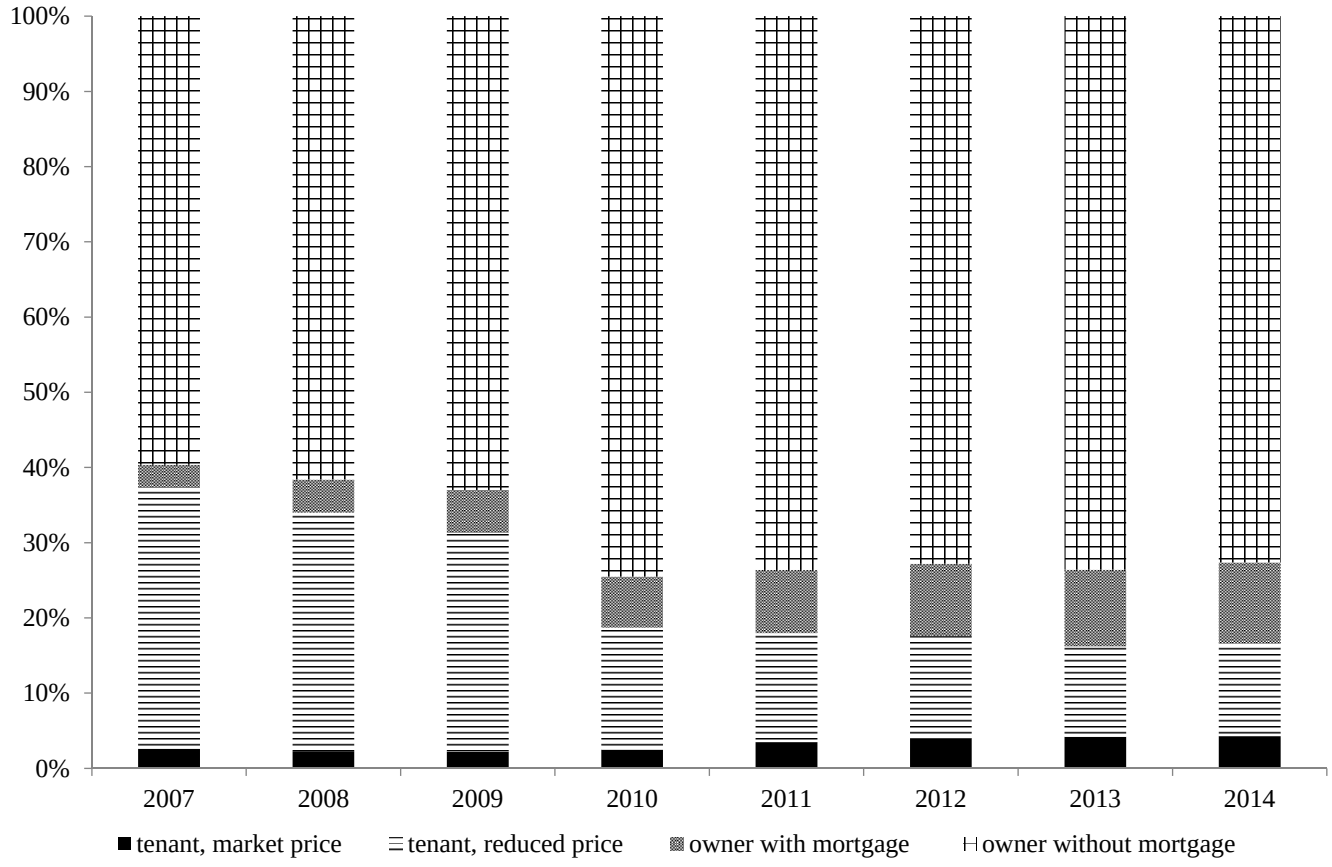
Notes: The figures present the standard deviation of a given variable that can be attributed to a given shock.

Figure 1: The structure of housing tenure status in European countries in 2014.



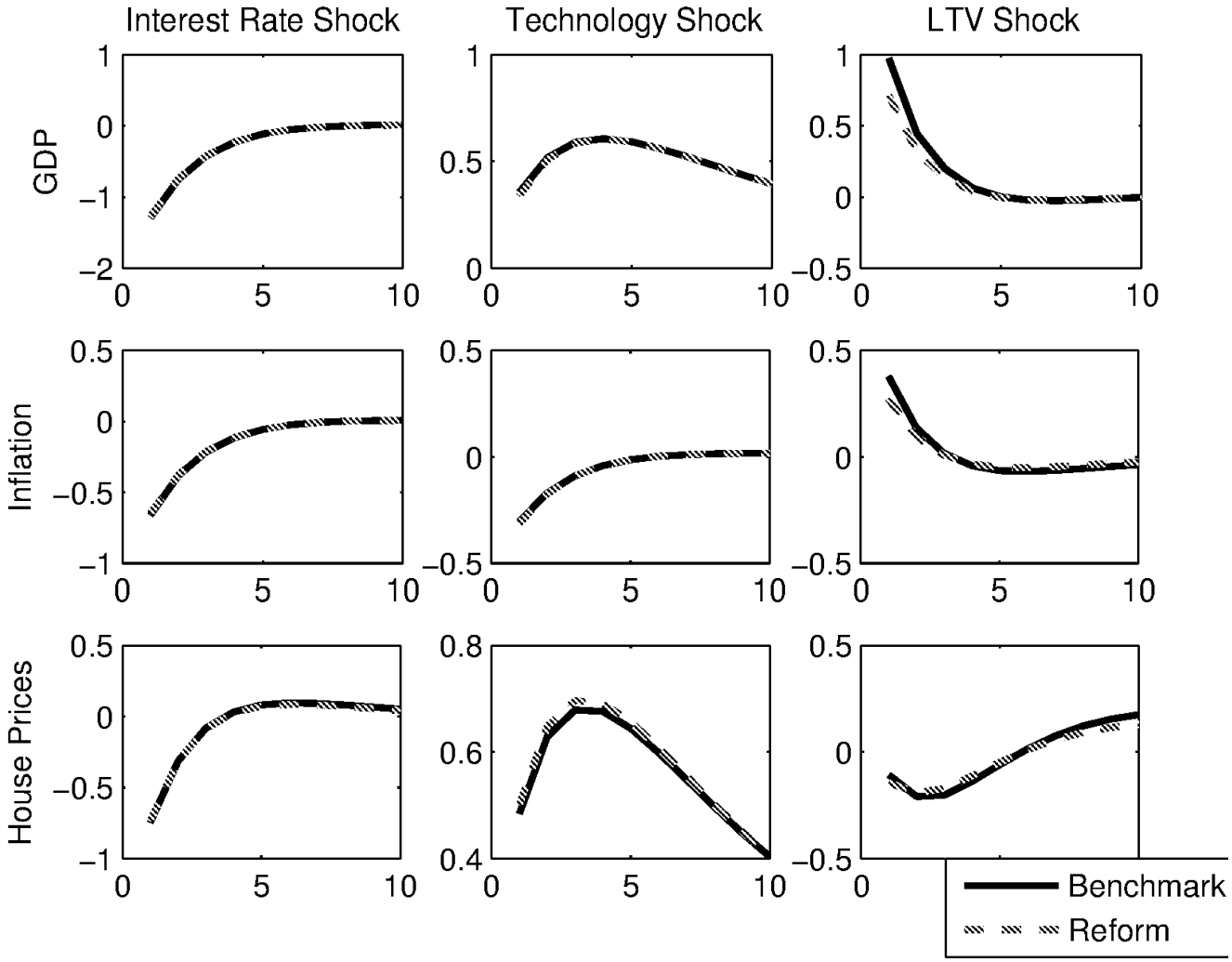
Source: Eurostat.

Figure 2: The structure of housing tenure status in Poland over 2007-2014.



Source: Eurostat.

Figure 3: Impulse responses to a monetary policy shock.



Appendix. Fragments of the survey questionnaire

Q1. Year of birth

Q2. Sex

Q3. Marital status

Q4. Number of children

Q6. Education

Q7. Employment status

Q8. Income (your economic situation on a scale of 1 to 10)

Q9. Size of town

Q10. Tenure status of currently inhabited residence

Q11. In comparison to the current place of your residence you grew up in:

a. different country
b. different town
c. the same town

Q12. Since when do you live in your current address?

Q13. When do you expect to change your residence

Q14. The most likely tenure status of new residence in case of moving

Q15. A choice in case of no funds to buy a dwelling

Q16. Do you agree with the statement *Buying a house is financially better than renting it because after repaying the mortgage you are left with a house and after paying rents you are left with nothing*

Q17. Ignoring other factors, please indicate if you prefer renting or buying with a mortgage:

E1. The burden of paying mortgage installments vs. the cost of renting
E2. Risk of house price vs. rent price fluctuations
E3. Transaction costs
E4. Taxes

Q18. Ignoring other factors, please indicate if you prefer renting or buying with a mortgage:

P1. Social status
P2. Sense of freedom and independence
P3. Comfort
P4. Peace of mind

P5. Well-being

P6. Attachment to dwelling

P7. Family

P8. Happiness

Q19. Please indicate, which factors are decreasing the comfort of being a tenant?

a. Tenants are not well protected against rent increases

b. Tenants are too much constrained in decorating and modifying the apartment

c. Landlords are inspecting the apartment too often (invigilation in private life)

d. Tenants are not well protected against eviction

e. Rents are too high in comparison to mortgage installment

f. The offer of dwellings to rent is too scarce to meet preferences

Q20. Please indicate, which factors reduce the attractiveness of buy-to-let investment?

a. Excessive restrictions on rent increases

b. Lack of culture of tenants (eg. devastation of rented dwellings)

c. Excessive protection of tenants against eviction, increasing the risk of business

d. The expected rate of return is too low because of the low levels of rents

e. Low demand for renting, i.a. due to strong preferences towards ownership