Macroeconomic Effects of an increase in housing rents in Sweden

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Abstract

This thesis uses a Bayesian VAR to investigate the macroeconomic effects of an increase to housing rents in Sweden. In this paper I conduct a quantitative assessment of a considerable increase in housing rents in order to explore its relationship with macroeconomic variables such as national income, national savings, unemployment, house prices and interest rates. The main results of this paper comes in the form of impulse responses and conditional forecasts. The scenario analysis indicates considerable macroeconomic effects from a large increase in the price level of rents over five years. As a BVAR model is utilized, prior knowledge is incorporated. Two prior beliefs are explored in this thesis: Minnesota priors as well as normal-diffuse priors.

Keywords: *Macroeconomics, Time-series, Rent control, Economic shocks, Bayesian vector autoregressive model, Sweden, Growth, National income, National savings, Consumption, Small open economy, Minnesota priors, Normal-diffuse priors.*

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1 Introduction

"There are no solutions, only trade-offs." - Thomas Sowell

In terms of policy decisions there is seldom a clear path to making the right decision, rather one has to carefully consider possible outcomes and do ones utmost to evaluate the trade-offs at hand. The purpose of this thesis is to investigate the macroeconomic effects of a large increase to the rents for housing tenants in Sweden, here the motivation is to assess whether such an increase would have considerable effects on macroeconomic variables such as national income, national savings, unemployment, interest rates and house prices. If the macroeconomic impact is large this is something that ~~feasibly~~ should be taken into account when making policy decisions which may cause a sudden increase to the price level of rents. The scenario of a sudden increase in rents for housing tenants is relevant as there is a risk of ~~this~~ associated with policies such as the proposed de-regulation of the renters' market in Sweden or an abrupt stop in governmental housing incentives. Another feasible reason for why the price level of rents would experience a sudden increase is large scale renovations to the current stock of rental dwellings. Empirical work that has evaluated the macroeconomic effects of shocks in Sweden include Gustafsson et al. [2016], the authors investigate the effects of a sharp decrease in house prices and conclude that it would lead to a recession-like impact on household consumption and unemployment, this thesis follows some of the principles outlined in that paper, in line with Gustafsson et al. the method employed to answer this research question is a Bayesian Vector auto regression (BVAR) model. The variables included in the model are national income, house rents, unemployment, national savings, house prices and interest rates. In order to deal with the over-fitting problem which is often described in traditional VAR-models I opt to utilize a bayesian VAR model in this thesis, which uses prior beliefs in order to shrink the parameters. For the purposes of this thesis two commonly used prior beliefs are deployed; Minnesota and Normal-diffuse. Note that even though possible causes of a large increase in rents are discussed in this thesis they are not the primary focus; for an example, one of the possible causes for a large increase in rents is the deregulation of the current renters' market in Sweden. Even though this possible scenario is greatly considered and described in this paper it is outside the scope of this thesis to evaluate exactly what the results of such a deregulation would mean or to argue whether such a policy is preferable or not. Rather the focus of this thesis is to provide a quantitative estimation of the macroeconomic effects of a large increase in the rents of housing tenants, taking the large increase as given.

1.1 Research Question

What are the macroeconomic effects of a large increase in the rents of housing tenants in Sweden?

1.2 Disposition

This thesis is organized as follows: Section 2 and 3 contains a background and literature review, section 4 includes variable selection and a presentation of the theoretical framework that links the price level of rents to various macroeconomic variables. A concise review of bayesian econometrics and its relevance is provided in Section 5. Section 6 explains the methodological approach, describing the vector auto regression framework. Section 7 presents the empirical analysis, the subsections here include: identification, data and the specifications of the model(s). Section 8 presents the results in terms of the impulse responses as well as the scenario analysis, furthermore a brief sensitivty analysis is performed. Lastly section 9 and 10 consists of caveats & limitations as well as a section for discussion and conclusions regarding the analysis and the thesis in general.

2 Background

Since the end of the second world war the renters market for residential housing in Sweden has been regulated, this regulation is an exemption to the principle of free contract as it thwarts tenants and landlords from freely coming to a mutual agreement regarding the price and conditions of the tenancy. Although the form of this exemption has changed over time the fact remains that the equilibrium rates is not the sole determinant of the rent level in Sweden. Rather, the price level of rent is determined by what is known as "bruksvärdessystemet" and "presumptionshyra". Bruksvärdessystemet is a system which was set in place in 1968 in order for the price level of the housing provided to reflect living conditions and amenities as well as to provide stability for the renters by ensuring more price stability over time. Presumptionshyra has been implemented in Sweden since 2006 and is an addition to the forementioned framework, it was added as a way of allowing more flexibility in setting rates when it comes to new developments, allowing newer projects to charge higher rents. Part of the motivation of presumptionshyra was to incentivize new housing projects by private contractors. Despite these efforts, many parts of Sweden has seen a shortage of affordable rental housing as a result of little governmental housing projects and insufficient private initiatives according to Hyresgästföreningen

[2017]. Opponents[1] to some of the regulations imposed on the Swedish rental market claim that these regulations have caused a stagnation in housing initiatives and that it has resulted in a large shadow economy in the residential housing arena. The Swedish econonomist Assar Lindbeck famously critiqued the Swedish regulations in the 1960s by stating that rent control was the fastest way "to destroy a city, other than bombing.". On the other hand, proponents of the current regulations of the renters' market point to a lack of governmental housing initiatives as the main driver of the observable adverse outcomes.

For the purposes of this thesis I conducted a written interview[2] with Ragnar Bengtsson whom is a housing market analyst at the Swedish union of tenants'. Ragnar points out that there is a widespread shortage of housing in all types of housing in Sweden and that what differs between segments of the housing market is not whether there is a shortage but rather how this shortage manifests. Ragnar goes on to say that the housing shortage on the owners market manifests mainly through increased prices in contrast to the renters market where it is shown in lengthier waiting lines. A report produced by SABO [2016] studied an array of european countries and noted that all the countries that relied on market rates suffered from housing shortages, they reached the conclusion that there is no natural link between access to housing and market rates, at least not in the European context.

When asked what might cause a sudden increase in the price level of rents, Ragnar explains that the use of renovations of the current stock of rental housing can be one way in which actors can use the current regulatory framework to close the gap between the price level of rental housing and the current willingness to pay. The phenomenon that Ragnar describes is one that has been shown in many cases during recent years. In an article from Hem & hyra (Karlsson [2021]) the tenants in Solna, a part of Stockholm describe the proposed shock increase in rents of close to 55 percent on the grounds outlined above. It is not clear exactly how common the use of these practices are, nor is it clear whether this is something will develop further but for our purposes it is clear that this could be a driving factor for an increase in the price level of rents in Sweden.

As stated in the introductory paragraph of this thesis, it is outside the scope of this thesis to investigate exactly what a potential deregulation of the Swedish housing rental market would lead to; rather, the focus of this paper is to investigate the macroeconomic effects of a large increase in the rents of housing tenants in Sweden while taking this increase as given. Nevertheless,

[1] One opponent of heavy regulation on the renters' market is the liberal think tank Timbro, here several papers regarding this have been published Bustos and Örjes [2017], and Faust and Karreskog [2017] to name a few.

[2] Note that the answers to the interview questions were given in Swedish and that the full and unrefined interview can be found in Appendix C.

it is important to contextualize this potential increase in order to understand its relevance. One proposed policy that may cause a large increase in rents in Sweden is the deregulation of the renters market, or "market rates". Estimates by Pistol and Tegin [2021] at Ramboll, Persson and Englund [2017] and others as well as comparisons to other comparable cases such as the deregulation in Finland indicate that an abrupt[3] deregulation in Sweden would result in a large increase in the rents of housing tenants. Pistol and Tegin [2021] investigate the effects of a transition to market rates in the capital of Sweden, Stockholm and conclude that it would result in an average rent increase of approximately 52 percent. The authors utilize the unregulated housing market to estimate the cost of living and what the rent level would be in absence of regulations. The following example from the study conducted by Ramboll illustrate the case for a 3 000 000 SEK apartment with a 3000 SEK monthly housing cooperative fee and a reasonable yield of 2 percent. This postulation results in an estimated rent of 8000 SEK:

$$3000 + 0.02 \times \frac{3000000}{12} = 8000. \tag{1}$$

Persson and Englund [2017] conducted a report for the financial council in which they utilized a similar approach, with the key difference of utilizing the price level of the unregulated market for coops to estimate what the rent level would be in absence of market regulations. The authors find that rent increases in wealthy central-city Stockholm would be around 30-70 percent whereas suburban neighborhoods would experience rent increases of around 20-40 percent. Both these studies investigate the Stockholm case, it is likely that the effects of market rates would differ greatly in different areas of the country, and that the rent increases would be larger in the large cities.

In 1995 Finland went through a similar transition from a regulated housing market to market rates. According to Hyresgästföreningen [2021] this deregulation resulted in a 42 percent increase in rents in the capital, Helsinki and an approximate increase of 26 percent in average domestically over a five year time span. These facts provide suggestive evidence that a deregulation of the renters market could lead to a sharp increase in rents; however , as Ragnar Bengtsson points out it is important to note that there are differences between the Finnish and the Swedish case. In Finland, the deregulation of the renters market was coupled with increased housing allowances and a political climate with great emphasis on increasing the stock of housing. PWC [2016] conducted a study of a potential shift towards market rates in the Swedish context in which they

[3]It is not clear how abrupt the introduction of marknadshyror would be in Sweden, proponents such as Faust and Karreskog Faust and Karreskog [2017] argue that market rates would be phased in, perhaps avoiding a large abrupt shock to the rates.

conclude that the overall competition in real estate construction would have to increase substantially for production to increase to the demanded levels and that a shift to market rates are unlikely to spur this increase. Furthermore they conclude that a shift to market rates would have to be contingent on an increase in governmental subsidies and perhaps lead to a greater necessity of social housing[4].

In terms of demographics, there is reason to believe that the population of renters in Sweden is more susceptible to an increase in livings costs than those who own their homes. Ragnar highlights the fact that renters, in contrast to owners do not obtain the appreciation of the asset in which the price level increase is based on. A rent increase can be see as a response to the increased value of an underlying asset such as a house, bruksvärdessystemet is an attempt to make sure that at least some of that increase in value results in improved living conditions for the renters but this dynamic results in renters being far more vulnerable to an increase in price level since it is not accompanied by a wealth effect. In addition to this dynamic there is a clear sorting effect, Ragnar explains. Far more households with lower disposable incomes rent their homes, as low incomes comes with smaller margins in terms of expenditures which results in a large sensitivity to economic shocks. Ragnar goes on to say that the sensitivity that one observes amongst lower income households is exacerbated by the fact that these are less likely to have complementary insurances compared to households with average disposable incomes. Considering some of these points one could suspect that a sudden increase in living costs to the population of renters in Sweden could have macroeconomic effects.

Many of the studies conducted in the past observe the effects of an increase in housing rents or an introduction to market rates in Sweden by mainly observing household consumption, disposable income, inequality metrics or other micro variables. For the sake of novelty and because of the feasibility of macroeconomic effects being present, a macroeconomic approach is taken in this thesis. The fact of the matter is that an estimated 1.5 million of the 4.8 million or close to 30 percent of the households in Sweden are rented dwellings (SCB [2022]). As a sudden increase in rents would affect such a large proportion of the population it is reasonable to surmise that this would have considerable effects.

[4]Socialbostäder

3 Literature review

One of the main motivations of this thesis is novelty, the macroeconomic effects of a large increase in rents is something that has not, to my knowledge been studied to a large extent internationally nor in the Swedish context. With that being said there is a fair amount of relevant literature for our purposes. The subsequent subsections presents some of the most central empirical work and include papers on the effects of abolishing rent control as well as studies investigating other price level shocks and their macroeconomic effects.

3.1 Sweden and rent control

As mentioned in the background section of this thesis there are several reports investigating the effects of a shift to market rates on the Swedish housing market. Pistol and Tegin [2021], Juhlin et al. [2015], Persson and Englund [2017], SABO [2016] and PWC [2016] to name a few. These studies all find that a shift to market rates, particularly in larger cities such as Stockholm would lead to an increase in housing rents, PWC [2016] further investigate the societal implications of a shift to market rates and conclude, as fore-mentioned, that the overall competition in real estate construction would have to increase substantially for production to increase to the demanded levels and that a shift to market rates are unlikely to spur this increase. Furthermore they conclude that a shift to market rates would have to be contingent on an increase in governmental subsidies and perhaps lead to a greater necessity of social housing [5]. Persson and Englund [2017] illuminate the disputed effects of market rates in terms of redistribution. The authors show that a proposed shift could be seen as progressive in that many of the highest rent increases would affect richer populations as these are more likely to live close to city centres, however it can be seen as regressive in that the population of renters have lower incomes in relation to the general population.

The Swedish economists Lindbeck and Blomquist [1972] published the renowned paper Hyreskontroll & bostadsmarknad in which the dangers of rent control are outlined in the Swedish context with basis in economic theory as well as the Swedish data that was available at the time. Among other things Assar Lindbeck conclude that the rent control system implemented in Sweden cause misallocations in housing in terms of vacancies, less movement on the housing market and various other adverse outcomes. The liberal think tank Timbro have published several papers) Bustos and Örjes [2017] and Faust and Karreskog [2017] to name a few. These studies are of more argumentative na-

[5] Socialbostäder

ture, even so they do provide some evidence for the implications of rent control in the Swedish context and the potential advantages of a more market based system. In terms of Swedish studies focusing on the macroeconomic effects of either an increase in the price level of rents there are to my knowledge none. In section 3.3 a couple of Swedish studies looking at macroeconomic impacts will be presented.

3.2 Previous international studies

Oust [2018] exploited the removal of the Norwegian rent control in 1982 in order to Investigate the impact of the search and miss-matching costs in Oslo. These findings indicated that this removal would reduce these costs for tenants in Oslo. Liu and Chang [2021] use 465 panel data from 31 provinces in China in order to investigate the impact of Rising Housing Rent on Residents' Consumption. The authors find that this rise in housing rent increases consumption in terms of residents' daily necessities and services consumption, while it decreases the consumption of items such as food, tobacco, alcohol and clothing. This micro-based study performed in China published atypical results: the authors observe different effects on consumption in different subcategories, however they do find an overall positive linear relationship between China's housing rent and residents' overall consumption.

3.3 Previous studies on price-shocks and macroeconomics

The field of shocks to the macro economy is one that has been studied thoroughly over time. Shocks to supply, demand and particular asset prices are examples which have been utilized to study the responses of macroeconomic variables such as unemployment, inflation consumption and growth. One paper is Gustafsson et al. [2016] who postulate a scenario in which house prices diminish substantially. The authors explore the macroeconomic effects of such an abrupt diminution by utilizing a Bayesian VAR framework. Their results show that a 20 percent devaluation in house prices have a recession-like impact on household consumption and unemployment. They further conclude, by the use of conditional forecasts that this impact would be even greater if it coincided with a global economic downturn. This is one of many papers investigating house prices and their macro-economic effects, although thematically similar there are key differences when probing into the macroeconomic effects of changes in the price level of rental housing. One of these differences is that the former mainly focuses on wealth effects whereas a shock to the rent level is more accurately characterized as a shock to disposable income or a sudden shock to living conditions. Studies that have instead focused on the macro-

economic effects of a shock to a price level include the 2007 paper written by Blanchard and Gali [2007] in which the effects of price shocks to oil shocks the macro-economy. This is one of many studies investigating the effects of shocks to oil prices, the authors specifically probe into why the economy seems less vulnerable to oil shocks in the 2000s as compared to the 1970s. These authors conclude that good luck, smaller share of oil in production, more flexible labor markets and improvements in monetary policy all have played a role in reducing the significance of oil shocks. There are countless studies that could be included in this section, nevertheless there are few to none that investigate the specific research question proposed in this thesis: What are the macroeconomic effects of a large increase in the rents of housing tenants? This paper hopes to contribute by filling this gap in the existing literature.

4 Theory & variable selection

There are many things to take into account when contemplating whether a large increase in the rents of housing tenants in Sweden would affect macroeconomic variables. In this section the variables that are included in the BVAR model are stated, additionally a brief motivation for each variable is provided. For each variable economic theory is provided to illustrate the proposed interdependence between the variable and our variable of interest: Price level of rent. Other than rent the included variables are: national income, national savings, unemployment, house prices and Interest rates.

4.1 National income & national savings

National income & national savings[6] are two central macroeconomic variables for our purposes. The inclusion of GDI and national savings in the model is based in previous empirical findings which indicate that market rates could decrease consumption and household savings[7]. In the selection of the GDI variable the inclination to select gross national income (GDI) rather than consumption is due to the relatively low variation observed in the consumption variable due to consumption smoothing. GDP, Consumption and GDI are all highly correlated variables and either one could have been selected for our purposes. A shock to the price level of rents in Sweden should reasonably affect the national income and the national savings. An increase in the price of housing could be seen as a

[6]Note that here household savings or savings rate could be used as well. As the figures for these variables are yet not published for the year 2021, national savings is used (any missing values can be reliably constructed by taking the difference between the national income and consumption.

[7]Please see section 3.1

negative income shock as it effectively is a decrease of the disposable income of households, with this line of inquiry one could reach the conclusion that a shock to the rent level would lessen the multiplier effect and hinder economic growth. An increase in the price level of rent could thus entail lower national income and feasibly decrease the national savings, here national savings is defined as the gap between consumption and the national income. Whichever way one looks at it, national income and national savings are two relevant variables to include in the model.

4.2 Unemployment & Inflation

~~Unemployment is a standard variable to include in any VAR model,~~ the unemployment variable is defined as the total population of unemployed for the age group 15 and over in proportion to the total population within that subset. It is not exactly clear how the rent level moves in relation to the unemployment rate however it is feasible that there is an interdependence between the two, economic theory tells us that high levels of inflation is associated with low unemployment as one can illustrate by observing a simple version of the Phillips curve,

$$\pi = \pi^e + \beta(u - u^n) + \alpha. \tag{2}$$

Here we have that π is inflation "e" denotes expectations. $u - u^n$ denotes the cyclical unemployment and α is supply shocks. It is feasible that unemployment and rent level are related through inflation, furthermore it is plausible that the rent level affects unemployment through the channel of consumption and national income. Here the intuition is that money that is spent on rent cannot be spent elsewhere, meaning that consumption and demand is lowered, which can cause unemployment levels to rise.

4.3 House prices & Interest rates

In understanding how house prices, interest rates and the rent level can be related to one another one can turn to the standard textbook model of house prices and rents (In a friction-less market). Rent should cover the user cost of housing. Borrowing the notation from a 2004 paper by Gallin [2008] we get:

$$R_t = P_t[(i_t + \tau_t^p)(1 + \tau_t^y) + \delta_t + \lambda_t - E_t G_{t+1}]. \tag{3}$$

Here we have that i_t is the real interest rate, τ_t^p t is the property tax(rate), τ_t^y is the marginal income tax rate, δ_t is a combination between maintenance and depreciation rate. We also have that λ_t is the risk premium associated with housing, and $E_t G_{t+1}$ is the expected capital gains. The result of this

equation is, that in a friction-less market, owned housing and rental housing are substitute goods. Anything that increases the attractiveness of purchasing a house/apartment will decrease the price of rent. If interest rates are low, it is more preferable to get a mortgage to buy a house, the same is true for the property tax rate[8] If the expected capital gains of housing rises this too will lower the price of rent. In any standard substitute framework a shock to the price level of one substitute, all else equal, should decrease the attractiveness and thus increase the demand and price for the substitute. The case which is postulated in this thesis is a substantial increase in the price level of rents in Sweden, this should thus decrease the attractiveness of rental housing and increase the equilibrium price of houses. Ownership housing and the rental housing are however far from perfect substitutes, as noted in the background section of this paper, the regulations on the rental market makes it so that the price level of rents is not necessarily directly affected by a change in demand. Because of these reasons it is unclear exactly how house prices respond to a change in the price level of rents.

5 Bayesian econometrics

Bayesian econometrics[9] allows us to characterize uncertainty about our parameters given information that actually has been observed. One significant difference between the frequentist view and the Bayesian view is that in Bayesian econometrics all unknown variables are treated as uncertain, because of this they are also described by a probability distribution (Van de Schoot et al. [2014]). In Bayesian econometrics one wants to estimate this distribution. This approach is based on that we have some prior beliefs and that we do not start from scratch. We want to acknowledge our prior beliefs and update these given the data that we observe. Ultimately, Bayesian thinking allows us to impose the information that we have or do not have before exploring the data at hand.

Bayes theorem is widely considered to be one of the most powerful formulas used in statistics. For our case one can utilize this theorem in order to obtain the probability distribution of an outcome based on prior information, this type of conditional probability can assist us in investigating the relationship between the price level of rents and other macroeconomic variables, feasibly resulting in more apt impulse responses and conditional forecasts.

The basis for utilizing a Bayesian variant of VAR is for our purposes twofold: (1) The fact that we have yearly data points for our main variable of interest coupled with the inclination not to go to far back in time means that we have

[8]Note that Sweden has not had a federal property tax since 2008.
[9]Parts of this section is originally from Söderlind Söderlind [2021]

limited observations. Prior knowledge can support the data we have and could feasibly result in more accurate estimates. (2) Using a Bayesian VAR framework introduces shrinkage to the model by the use of prior information, which can be of great benefit when dealing with over-parametrization problems (Koop and Korobilis [2010]) which can occur when including many variables in a standard VAR framework. Over-parametrization could potentially be a problem in our case as there are six variables included in the model(s).

5.1 Bayes theorem

Below, one can see an expression for Bayes rule. For the notation I follow O'Hara (2015). The notations are as follows: θ is the parameter of interest γ is the observed data *pr* is the probability. We start by formulating an arbitrary model where our parameter of interest, θ in an element of the set, M which is a subset of ν . This formula illustrates the Bayesian theorem:

$$Pr(\theta \mid \gamma, M_i) = \frac{Pr(\gamma \mid \theta, M_i)Pr(\theta \mid M_i)}{Pr(\gamma \mid M_i)}. \tag{4}$$

On the left hand side is our posterior distribution, on the right hand side in the numerator we have the likelihood of observing the data given our model($Pr(\gamma \mid \theta, M_i)$), and our prior belief, ($Pr(\theta \mid M_i)$). In the denominator one finds the probability of the observed data, formally this term is the integral of the numerator.

The prior density reflects our prior beliefs, this can be previous research, a theorized hypothesis, previous data or simply stating absolute uncertainty in terms of a distribution. In our case the distribution above reflects our beliefs about the k-dimensional parameter vector regarding the variables included in our model.

6 Vector Auto Regression

In this thesis[10] I follows the fundamental framework for VAR models which was set up by Christopher Sims in 1980. Sims originally proposed VAR as an alternative to the dominant practices of the time which was multivariate simultaneous equation models. In VAR models, the endogenous variables are functions of lagged values of the endogenous variables (Stock and Watson [2015]) and can be used to forecast and run policy simulations. It is apparent that in our case we are looking at a variable, the price level of housing rents which is potentially interdependent with other variables. Rents may well be a result of

[10]Parts of this section is originally from Söderlind [2021]

historical rents, historical inflation, historical income, current income etc. Because of this dynamic between our variables of interest a vector auto-regression model is the obvious choice. As noted by Sims [1980] , the flexible nature of VAR models comes at a price, namely greater parameter uncertainty. Because of this, VAR models often suffer from the over-fitting problem. Over-fitting is something that occurs a large set of variables are used in the VAR, and is something that can cause flawed estimates. One potential solution to this issue is using a Bayesian specification, which is done in this paper. By employing a Bayesian vector auto-regression (BVAR) one can shrink the model parameters by using prior information. Following Koop and Korobilis [2010] and others one can state a basic VAR-model with a $M \times 1$ vector of TS variables, a $M \times 1$ vector of intercepts, a $M \times M$ matrix of coefficients, a $M \times 1$ vector of i.i.d and normally distributed error terms as follows. Please note that seasonal or deterministic trends also can be included in these derivations, for the sake of brevity deterministic trends are not included in this illustration:

$$y_t = a_0 + \sum_{j=1}^{p} \mathbf{A_j} y_{t-j} + \epsilon_t. \tag{5}$$

In this specification $\mathbf{y_t}$ is a $m \times 1$ vector containing the variables at time t. $\mathbf{A_j}$ is an $m \times m$ matrix of coefficients, $\epsilon_\mathbf{t}$ is a $m \times 1$ i.i.d $\sim N(\mathbf{0}, \mathbf{\Psi})$, i.e normally distributed error terms at time t. The VAR specification (5) can be condensed into matrix notation (6) by stacking the data, for a lengthier discussion and derivations of this please see the work of Zellner [1971] or Koop and Korobilis [2010].

$$\mathbf{Y} = \mathbf{XA} + \mathbf{E} \tag{6}$$

By using a BVAR framework we can shrink the parameters, this is done by specifying priors for the parameter mean and variance. The priors that are used are clearly stated in section 7.3.

7 Empirical analysis

The approach taken in terms of the empirical analysis is, as much as possible, an agnostic one. Regarding prior beliefs, conditional forecasts and general specifications these are all set with the objective of creating an unbiased model. The empirical analysis is divided into three segments, section 7.1 presents the identification scheme, section 7.2 describes the data whereas section 7.3 outlines the BVAR models. Results in terms of impulse responses and forecasts are displayed in section 8.

7.1 Identification

In this thesis the commonly used Cholensky decomposition of the impact matrix is utilized in order to calculate the impulse responses. Because the model includes 6 variables This implies that there are 15[11] short run identifying assumptions. The variables included in the empirical analysis are the following: national income, house prices, national savings, price level of rent, unemployment and interest rates. In terms of the identifying assumptions these are determined by relative exogeneity, with theoerical and empirical basis. It is assumed that national income (5) is contemporaneously independent of all shocks except its own, the variable house rents (4) is thought to be contemporaneously dependent only on GDI as rents in Sweden are negotiated on term basis. unemployment (3) is taken as contemporaneously independent from shocks to national savings, house prices and interest rates as unemployment is perceived as a rather sticky variable, meaning that it responds rather slowly to a change in market conditions thus these variables do not affect unemployment contemporaneously. Because of consumption smoothing national savings (2) is assumed not to respond contemporaneously from a shock to interest rates and house prices. House prices (1) is assumed to not respond contemporaneously to a change in interest rates. In line with Gustafsson et al. [2016] and others the financial variable interest rates is ordered last, thus no identifying assumptions is made for the interest rate variable. In terms of the variable order some alternative cases could feasibly be deployed[12]. The variable order used in the analysis can then be illustrated by figure 7.

$$\mathbf{x_t} = (GDI_t\ ,\ HR_t\ ,\ U_t\ ,\ NS_t\ ,\ HP_t\ ,\ R_t)' \tag{7}$$

7.2 Data

In this section the sources for the data-collection of all variables is provided. When it comes to the main variable, house rents in Sweden, a yearly data set on price per square meter is utilized. This data is retrieved from Statistics Sweden (SCB). Data on national income and inflation is retrieved from the same source [13]. The variable for unemployment is unemployed people 15 and over, this data is extracted from the Federal Reserve Economic Data (FRED)[14]. The national savings variable is defined as Swedens gross savings (as a percentage

[11]The number of contemporaneous restrictions for each variable is in parenthesis.

[12]Please see section 7.5: Sensitivity analysis for further discussion

[13]Data from SCB is in some cases extracted by the use of the package pxweb in the programming software R

[14]The data on unemployed persons for 2021 was yet to be published in FRED, this data point is therefore complemented by SCB

Variable	Min	Max	Mean	SD	Observations
ΔGDI	-34.21	24.01	1.58	11.20	38
ΔHR	-1.77853	13.55	1.67	2.49	38
ΔU	-22.60	58.09	2.34	19.05	38
ΔNS	-14.80	18.58	0.71	7.12	38
ΔHP	-14.03	14.38	3.60	6.47	38
ΔR	-125.50	61.17	-7.37	34.04	38

Table 1: Summary statistics

of GDI), this data is extracted from worldbank[15]. The Interest rates variable is also from FRED, here the 3-month rates are used. National income, rent, national savings and house price are all adjusted for price level and unemployed persons is adjusted for population. In figure 1 one can observe the movement of these variables, both rent level and house prices have both gone up substantially although house prices have has experienced a sharper increase. National income has increased over time. Interest rates has been declining over the entire time-frame, stabilizing at around zero in present times. All variables are stationary in first difference and all variables are logged. An augmented dicker fuller (ADF) test is performed to ensure stationarity. In addition to the ADF-test a Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test is performed, this also indicates stationarity in the data. All variables are tested for cointegrating relationships using an ADF-test on the linear relationship of the residuals, there is no co-integration between variables. One additional thing to note in regards to the time-frame of the data is the possibility for structural breaks, there is a possibility that different time-segments differ so much that the employed model cannot take in the shifts in the series as the time-frame considered for this model includes the early 90s Swedish crisis. There are no guarantees that there are no structural breaks present. One strong assumption made for the purposes of this thesis is thus that the Swedish crisis can be seen as just another shock. The table below shows the summary statistics of all time-series in question.

[15]As data for 2021 is yet not published this is imputed as the mean of the series

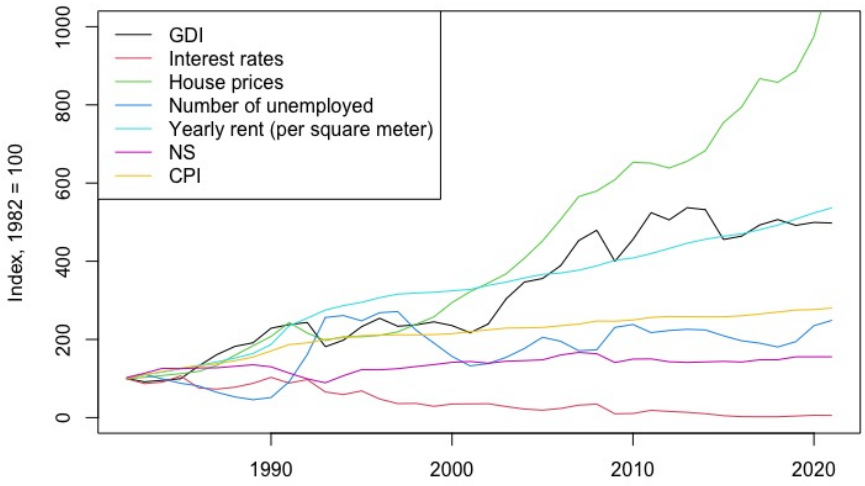


Figure 1: Time series (indexed)

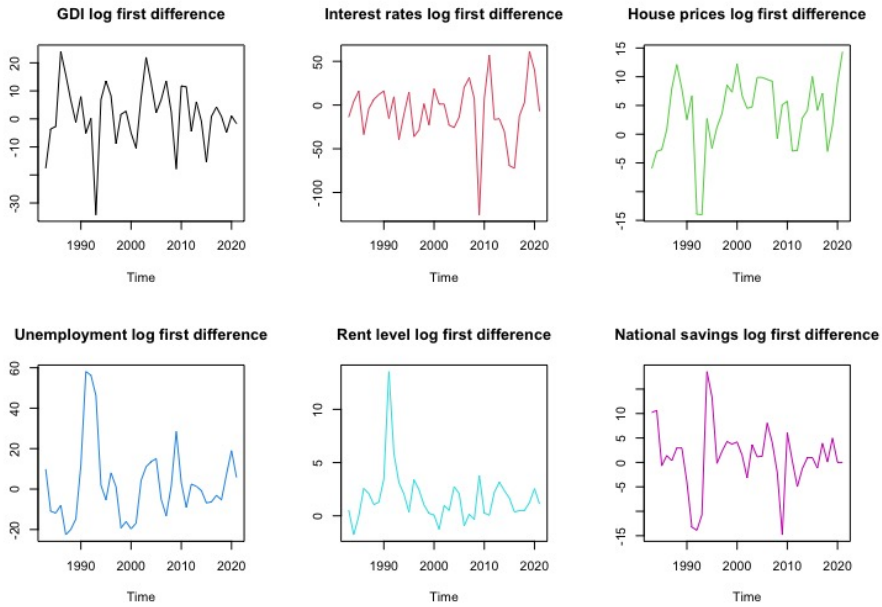


Figure 2: Variables (Logged first difference)

7.3 Bayesian VAR

As mentioned in the background section of this thesis, two sets of prior beliefs are deployed. Section 7.3.1 introduces The Minnesota priors and its specifications whereas section 7.3.2 present the normal-diffuse prior beliefs. For a lengthier discussion on the relevance of prior information and why Bayesian econometrics is utilized in this thesis please see section 5. The number of lags used in the BVAR is 4, following Koop and Korobilis [2010] and others.

7.3.1 Minnesota priors

The baseline prior beliefs used in this thesis are modeled as Minnesota priors, these were first introduced by Litterman et al. [1979]. Minnesota priors are centered upon the assumption that each endogenous variable follows a random walk process, this implies that as the number of lags increase the prior precision goes towards zero. The version of Minnesota priors employed in this thesis are uni-variate AR. In understanding why one might use random walks as prior information this is because univariate random walk models typically are very good in forecasting macroeconomic time series, in the posterior estimates each time series may follow a much more complicated process if sufficient information is supplied by the data Canova [2011]. Since the prior variance-covariance matrix is diagonal the prior beliefs are such that there is no relationship between the variables included in the model. The minnesota prior utilized in this thesis does thus; in a way, demand more information from the data in order to estimate significant effects than in a comparable standard VAR framework. One of the advantages of using a bayesian approach is that we are able to include plausible prior specifications in terms of **hyper-parameters.** For the Minnesota priors four hyper-parameters are specified. Firstly, λ_0 is the autoregressive coefficient. Secondly, λ_1 controls the overall tightness of the prior distribution. In short this parameter determines how important the prior beliefs are in relation to the information contained in the data at hand, the higher this hyper-parameter is set the more weight is put on the data and the less weight is put on the prior beliefs. To avoid over-fitting this parameter should be chosen in relation to the size of the system, it should be smaller if more parameters are included in the model (Banbura et al. [2008]), as our model has relatively low variable inclusion in terms of Bayesian VAR models we opt for a bit higher value than the baseline value for λ_1, it is set to 0.4. The second hyper-parameter, λ_2, is set to the standard value of 0.5. λ_2 is defined as the cross-variable weight, this allows for weighing the information that is provided by the lags of other variables. Lastly λ_3 is defined as the lag decay hyper-parameter, it is used in order to specify the importance of earlier lags, this too is set to the standard

value of 1.0. Setting λ_3 higher means entitling greater importance for the first lag and less so for the subsequent lags.

7.3.2 Normal-diffuse priors

In addition to the Minnesota priors, normal-diffuse prior beliefs are deployed in this thesis, following the methods outlined by Kadiyala and Karlsson [1997]. As fore-mentioned, Minnesota prior beliefs implies that the expectation is that there is no relationship between variables. The diffuse prior beliefs are slightly different as we combine the multivariate normal prior on the regression parameters of the Minnesota beliefs with a diffuse prior on the residual variance-covariance matrix. Diffuse prior beliefs on the covariance matrix implies; in essence a frequentist approach, namely that we see each value of the parameters as equally likely rather than imposing the prior belief that there is no relationship between variables. When using the Normal-Diffuse priors there exists no closed form solution, to overcome this, gibbs sampling is used. Gibbs sampling is used to avoid explicit calculations of integrals in Bayes formula. Gibbs sampling performs as well as or better than comparable methods and are less so affected by model-size Kadiyala and Karlsson [1997]. The hyper-parameters for the normal-diffuse prior beliefs are identical to the Minnesota priors.

Hyper-parameters	Description	Allowed range	Value
λ_0	autoregressive coefficients	$0 < \lambda_0 < 1$	0.9
λ_1	Overall tightness	$0.5 < \lambda_1 < 1$	0.4
λ_2	cross-variable weight	$0 < \lambda_2 \leq 1$	0.5
λ_3	Lag decay	$1.0 \leq \lambda_3 \leq 2.0$	1.0

8 Results

8.1 Impulse responses

In this section one can observe the impulse responses. Figure 3 displays the impulse responses from a shock to house rents, the left hand side is the estimated responses taking into account the minnesota prior beliefs whereas the right hand side displays the responses in terms of the normal-diffuse priors. All Shocks have a magnitude of one standard deviation and the credibility intervals are set to the default value of 68 percent. The maximum horizon is 8 periods (years). The functions are calculated using the cholensky decomposition. Observing the impulse responses the first thing to note is that none of the responses in the Minnesota prior case are statistically significant. The Minnesota

prior beliefs are such that one puts more weight on the previous lags of the variable in question and less weight on the lags of the other variables as the prior covariance matrix is diagonal, in this case the prior beliefs crowd out any significant shocks. In terms of the Normal-diffuse prior case 4 shocks display statistically significant responses from a one standard deviation shock to the price level of rents: Unemployment (+), national savings (-), house prices (+) and interest rates (-), these shocks are all within the credibility intervals. The signs of the responses for the shock to house rents are in large part in line with economic theory and previous literature. In terms of the normal-diffuse model the responses are in large part feasible. Any price increase for a significantly sized segment of the Swedish population would feasibly lead to a diminution in the capacity to consume for households and thus decrease the Δ national income and increase the Δ unemployment. That an increase to the price level of house rents would lead to an increase in house prices is also feasible looking through the lens of a standard substitute framework; as one substitute gets less attractive (because of the higher price) the demand for the other increases. In summation, the model appear to exhibit reasonable properties as the response of the variables in large align with economic theory and previous literature. The full set of impulse responses can be found in the appendix.

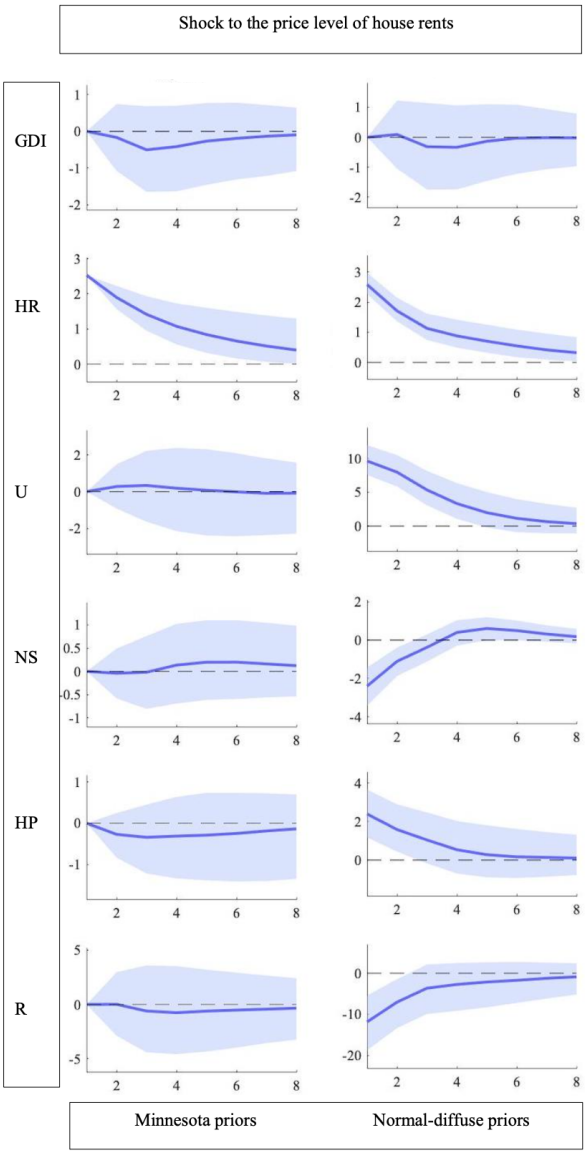


Figure 3: Impulse responses

8.2 Scenario analysis

In order to explore the scenario of an increase in the price level of rent one can put the unconditional forecast in relation to a conditional forecast in line with Gustafsson et al. [2016]. In this section the BVAR models are utilized to create conditional forecasts, here side by side comparisons of unconditional and conditional forecasts are provided for four variables[16], the comparison is displayed for the four variables in which the impulse responses are within the credibility intervals for any period.

In regards to the scenario explored in this analysis, the cause of the increase to the rent level is not outlined, rather it is taken as given. Whilst the cause of the shock is unknown one should note that it is not peripheral to discuss how the conditions that are imposed on the forecast are generated. The standard way to generate the conditions is to use the impulse responses[17]; this however, implies a rather strong assumption as it means that all the shocks from the endogenous variables assist in generating the conditions. For the conditional forecasts the "tilting" approach outlined by Dieppe et al. [2016] is taken, in terms of economic theory this is a relatively agnostic approach where the procedure starts in the posterior distribution of the unconditional forecasts, this distribution is then modified to match the conditions. As the reason for the increase in rents is seen as unknown the tilting approach is a considerable asset for our purposes, the tilting methodology also has an appreciable quality in that it ensures that the imposed conditions are within the the "allowed range" of the unconditional distribution. For intuitive purposes one could imagine the scenario as a sharp increase in the rent level as a result of an abrupt shift to a market rate system in the rental housing market, as fore-mentioned, the model employed does however not distinguish between causes of the increase. The results of these findings are, in line with Gustafsson et al. [2016] interpreted as the effects determined by the average historical correlations between variables.

The scenario performed in the conditional forecasts can be described as an isolated increase in the price level of rent. It is assumed that the Δ price level of rent is 5 percent for five consecutive periods[18]. This value is significantly higher than the estimated mean change of house rents which is an approximate 1.7 percent increase. The conditions are not arbitrary; rather, these are loosely based on the rent level increase which was observed in Finland subsequent to

[16]Note that the unconditional forecast displayed is the one calculated with minneosta priors, it is very similar to the unconditional normal-diffuse case (see table 2 for more detailed differences). It is probable that the small differences are mainly due to variation in the Gibbs sampler.

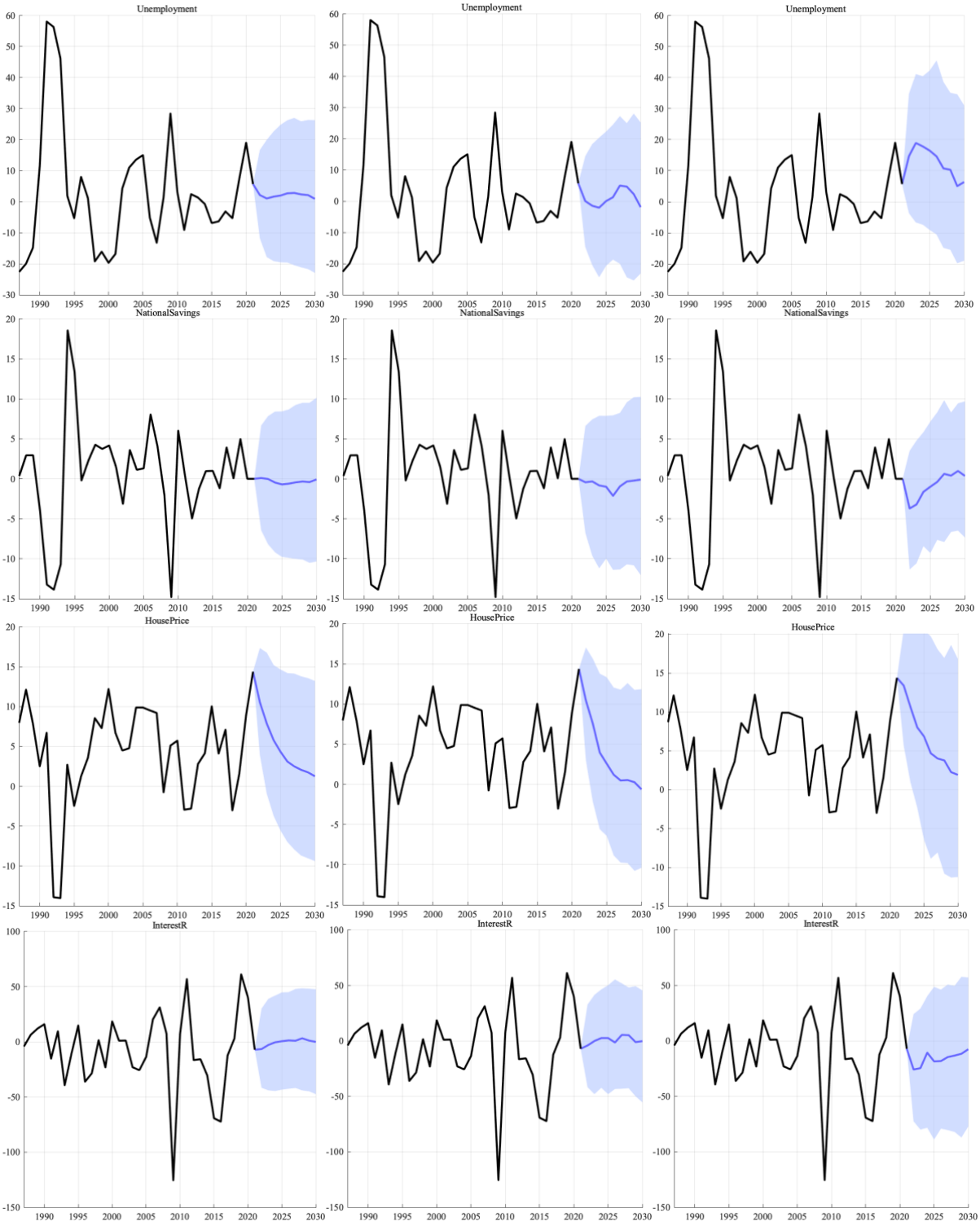
[17]The shocks can be observed individually in section 7.4: Impulse responses.

[18]Please not that although the conditions are set to a 5 percent increase each year this is not a strict condition in that the unconditional distribution is tilted to come as closely to the condition as possible and is roughly 5 percent.

the deregulation of the renters market[19]. No further conditions are imposed on the paths of the variables.

A slight increase in Δ unemployment can be observed in relation to the unconditional forecasts, the difference is largest in the Normal-diffuse model. In the house price variable one can observe that the sharp decrease is not quite as sharp in the conditional cases. Interest rates are slightly lower in the conditional forecast. The most apparent difference can be seen in the Δ national savings, here the scenario in which rents are increased one can observe a decrease in national savings, most notable in the Normal-diffuse model. Notably all forecasts in this scenario differ from the unconditional case. Table 2 displays the differences between the three cases (Normal-diffuse priors in parenthesis).

[19]Please see the background section for a lengthier discussion



Unconditional	Minnesota priors	Normal-Diffuse priors

Variable	unconditional min	conditional min	unconditional max	conditional max
ΔGDI	0.06(0.00)	-2.76(-1.48)	0.71(1.21)	1.69 (0.14)
ΔHR	0.15(0.14)	1.10 (2.07)	0.55(0.50)	4.97 (5.0)
ΔU	0.61(1.46)	-2.09 (5.05)	2.90(3.07)	5.71 (18.96)
ΔNS	-0.69(-0.41)	-2.13 (-3.71)	0.02(0.17)	-0.10 (0.98)
ΔHP	1.60(1.63)	-0.62 (1.89)	10.48(10.86)	10.45 (13.38)
ΔR	-2.0(-7.28)	-1.47 (-25.82)	1.95(1.66)	5.42 (-7.53)

Table 2: Difference between conditional and unconditional forecast

8.3 Sensitivity analysis

In this section I will discuss some alternative specifications of the BVAR model deployed in this thesis. In terms of the identifying assumptions made in regards to the cholesky decomposition there are some possible alternative routes which one could take. In order to examine whether the impulse responses are similar with other plausible identifying assumptions about contemporaneous effects I deployed the BVAR model by ordering unemployment ahead of the house rents variable, implying that the assumption is that house rents does not affect unemployment contemporaneously rather than the inverse case. Other than that the specification remained identical, the same was done in ordering the national savings variable ahead of both unemployment and house rents, allowing national savings to affect these variables contemporaneously. These alternations of the model showed close to identical impulse responses, indicating that either of the feasible specifications could be used for the purposes of this thesis. Furthermore a standard 4 lag VAR-model was ran as-well, here all data and specifications were identical to the baseline BVAR model. The impulse responses from the VAR model are similar to the baseline BVAR, the main difference being that the estimates; for the most part, are slightly higher in the standard VAR cases. This is perhaps not surprising as the Minnesota prior beliefs are such that the endogenous variables are not related to each-other and thus estimate smaller cross-variable effects. In summation the sensitivity analysis suggests that the baseline BVAR model is reasonable as adjustments to the model do not give radically different estimates, the findings from the sensitivity analysis indicates that the baseline model could; if anything, underestimate cross variable effects.

9 Caveats & limitations

In this section I would like to raise caution in terms of the interpretation of the results from the analysis conducted in this thesis. First and foremost it is important to note that results extracted from any time-series analysis is most

accurately interpreted as results determined by the average historical correlations between variables. The results from this time-series analysis are indicative in nature rather than claims of causality between variables. Secondly, the main variable of interest for the purposes of this paper is the price level of rent. The data for this variable is limited as the only data interval available is yearly, furthermore as a result of the relatively stable price development of housing rents in Sweden there is little variation in this time series. Thirdly, the data used for this time-series analysis covers a long time-span where different periods perhaps are not comparable, in the Swedish context the time frame includes the 90's crisis and thus includes great changes to the Swedish krona, interest rates, employment and overall market conditions. The rather large differences between time segments is something that could potentially impair the potency of the model.

10 Discussion & Conclusions

In this thesis I have conducted a quantitative assessment of the macro-economic consequences of a considerable increase in the price level of housing rents in Sweden with the research question being: "What are the macroeconomic effects of a large increase in hte rents of housing tenants in Sweden?". The relevance of this conduction is in large part due to policy proposals which feasibly could bring about a substantial rise to the price level of rents in Sweden. One example of such a policy would be the shift towards a market-rate system, although this is not the solitary case in which such an increase could be observed. Another proposed reason for why the price level of rents in Sweden would experience a shock increase is the up tick in the use of renovations to the current stock of rental housing. The main tools of interest for the purposes of this thesis is impulse response functions and conditional forecasts. The impulse responses show that the macro-economic variables national savings, unemployment, house prices and interest rates respond to a one standard deviation shock to the price level of rents, these responses are within the credibility interval when taking into account Normal-diffuse prior beliefs, when taking into account Minnesota prior beliefs no response is within the credibility intervals. The sensitivity analysis does show that a comparable 4 lag VAR model does display similar results for the four variables where the estimated responses are within the credibility intervals. In this thesis the BVAR model is also utilized to perform conditional forecasts. The results of the conducted scenario-analysis indicate that national savings, unemployment, house prices and interest rates are four variables that would be affected by the postulated 25 percentage points increase in rents over 5 years, showing that Δ national savings and Δ interest rates are more nega-

tive for several horizons in the scenario than in a comparable baseline case, and that the Δ unemployment and the Δ house prices are more positive than the baseline case. The findings of this study are in line with micro-economic studies conducted in the past which indicate that a shift towards market rates would decrease household savings and consumption, the results are however suggestive in nature. The impulse responses in the baseline model are in line with economic theory, here the model with normal-diffuse priors is the only one that displays statistically significant responses. The scenario analysis that is conducted suggest that a sudden substantial increase in housing rents over a short period of time could have considerable macroeconomic effects, at least in the short term. The effects are most noticeable in terms of the national savings variable, here the forecast in which the scenario of a large increase in house rents over five years display a down-tick in the national savings. The Unemployment is one additional variables in which the policy analysis indicate a noticeable increase. These findings are in large part, consistent with earlier empirical findings and economic theory.

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Appendix

1, Is there any way the price level of housing rents in Sweden experiences a shock increase? If so, what possible causes do you see?
Renoveringar i syfte att via bruksvärdesystemet närma sig marknadens betalningsvilja.

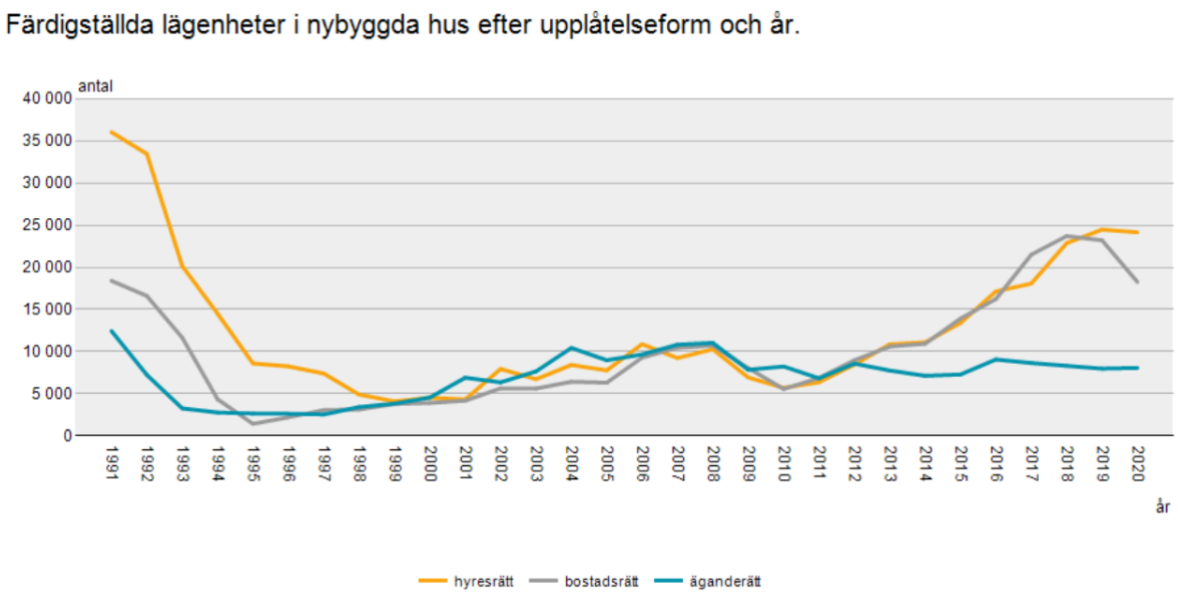
Prövningar i hyresnämnden, men det är så pass ovanligt att det knappast är relevant i sammanhanget.

2, There have been reported cases where the current regulations are exploited in terms of landlords/contractors performing minor adjustments or unwanted renovations to rental dwellings to shock-raise rents. How do you view this phenomenon and how do you see it developing?
Förmodligen kommer det fortsätta så länge det säljs hyresfastigheter där standarden i lägenheten inte har optimerats i syfte att höja hyran. Försäljningen av hyresfastigheter med sådan karaktär kommer främst ur kommuner och kommunala bolag med ansträngd ekonomi och stora investeringsbehov. Att sälja delar av beståndet har blivit ett sätt att finansiera renovering i vissa av fastigheterna. Kommunerna har varit ovilliga att höja standarden mot hyresgästernas vilja, enbart i syfte att höja hyran. Därför finns möjligheten att göra det i fastigheterna som kommunen säljer.

3, Do we have a shortage of rental housing in Sweden? If so, what are the main reasons?
Ja, men vi har brist på alla typer av bostäder I Sverige, främst I storstadsregionerna men egentligen i alla regioner som växer befolkningsmässigt. På ägarmarknaden syns bristen främst genom ökade priser. Eftersom hyrorna är bestämda genom förhandling når hyresmarknaden inte jämvikt i Sverige, därför är vakansnivåerna låga, eller obefintliga och fördelningen sker via köer istället för via betalningsförmåga.

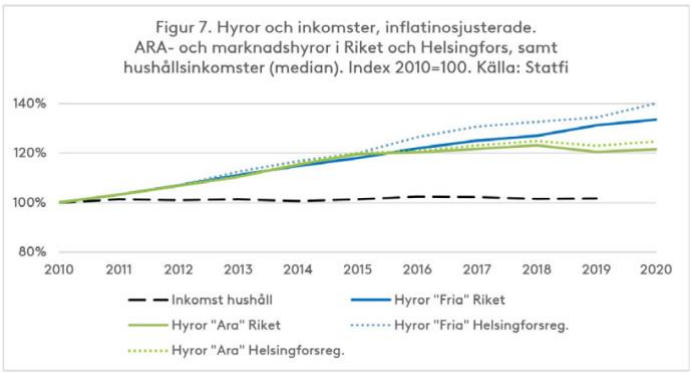
4, What would you say to people who claim that, in the long run a shift towards a market rates system would lead to more rental housing and stable prices?

Byggnation begränsas inte idag av betalningsvilja inom hyresrätten. Hade det varit fallet hade nybyggnationen av hyresrätter minskat som andel av all nybyggnation. Det är inte fallet, den har i stället ökat och utgör idag ungefär hälften av alla färdigställda bostäder.



Sannolikt beror detta på att marknaden är så kraftigt begränsad av den kommunala planeringen. Kommunerna har helt avgörande möjligheter att påverka, vad, var och när saker byggs och allt tyder på att kommuner som vill bygga kan bygga och hitta ekonomi i det så länge de är i växande regioner. Tydligast syns detta på småhusbyggandet som inte har ökat alls under 2000-talet trots kraftigt minskade räntor.
Att hyrorna skulle stabiliseras under marknadshyra är tveksamt, det bygger helt på tanken om att bristen inte skulle fortsätta att bli mer allvarlig. Om byggnationen fortsatt understiger efterfrågeutvecklingen kommer hyrorna försätta att öka men även öka genom att ta en allt växande andel av hushållens inkomster.

Som exempel går det att ta Finland som inte ser ut att ha haft någon stabilisering av marknadshyrorna, trots att det idag var länge sedan de infördes och trots en mycket omfattande nybyggnation.



Källa: Vad kan svensk bostadspolitik lära av: Finland

5, What do you believe would be the main outcome from a (rather abrupt) shift towards a market rates-based system, short term, and long term?

Först skulle hyrorna börja öka, sannolikt skulle marknaden börja testas av olika aktörer genom att de försöker höja priset stegvis för att hitta vilken nivå marknaden kan bära.

Samtidigt skulle en norm och juridikutveckling ske som reglerar hyreshöjningar och vilka krav som kan ställas på underhåll.

På medellång sikt skulle vakanserna öka och marknaden skulle hitta sätt att ha lediga lägenheter tillgängliga för hushåll med mer eller mindre hög betalningsförmåga. Samtidigt skulle allt fler hushåll uppleva att de får problem med att betala de hyror som marknaden begär.

Beroende på vad som händer med de allmännyttiga bolagen sim äger en stor del av lägenheterna idag så kommer marknadsfenomenen bli mer eller mindre dominerande på marknaden.

Över tid kommer antingen de kommunala bestånden minska och omvandlas till ett smalt bestånd med sociala bostäder, eller så kommer politiska reformer komma till som syftar till att få marknaden att likna den finska, eller möjligen den norska (få/ inga hyresfastigheter).

6, Do you believe that a shock to the price level of rents would have macro-economic effects? If so what effects?

På kort sikt är detta svårt att säga, det beror helt på hur marknadspriser introduceras på marknaden. Fler skulle söka sig till den ägda marknaden. Sannolikt skulle en ökad andel av hushållens inkomster gå till boende, både i ägda och hyrda bostäder.

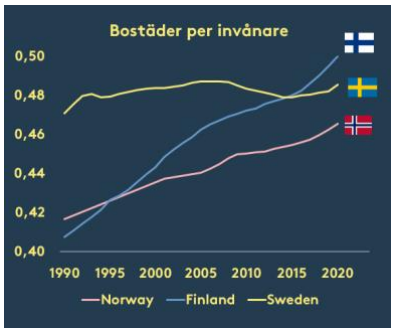
7, Which macro-economic variables would be interesting to explore in this context?

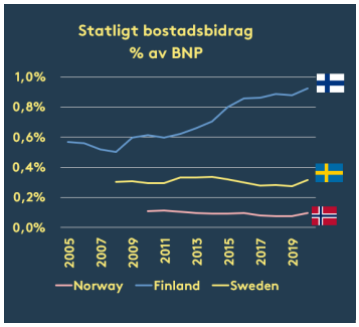
Sparkvot (för att få handpenning), amorteringskostnad, skulduppbyggnad, kapitalackumulation, ojämlikhet. Minskad konsumtion rörande vardagsvaror, importläckage skulle sannolikt öka då inkomster bland höginkomsttagare skulle öka relativt medel och låginkomsttagare.

Sannolikt skulle policy utvecklas för att begränsa kostnadsutvecklingen för medelinkomsttagare vilket skulle leda till att kostnadsökningen främst drabbar hushåll med låga inkomster (och särskilt hushåll med stor andel bidragsinkomster).

8, According to the renters' associations website, Finland experienced a 26 percent (average) increase to rents when they shifted towards a market rate system. What similarities and differences are important to highlight between the Finnish case and the Swedish case?

Stor skillnad finns I den finska byggpolitiken som har sett till att det byggs mycket i landet. Bostäder per capita har ökat på ett sätt som inte går att förutsätta att det skulle göra i Sverige. Därtill är det finska bostadsbidraget generöst och har tillåtits växa på ett sätt som inte är rimligt att förutsätta att det svenska skulle tillåtas göra. Detta har begränsat marknadshyrornas påverkan på de finska hushållen och sannolikt bidragit till de ökade hyrorna.





Källa: SCB, Statfi, Statistikcentralen

9, Is there any reason to believe that the population of renters are more sensitive to an increase in living costs than other demographics?

Ja, särskilt eftersom de inte får del av värdeökningen som den högre hyran baseras på. De kan inte låna och amorteringen av skulden på fastigheten tillfaller ägaren vilket gör att hushållet som äger sin bostad inte behöver spara utöver amorteringen medan den som hyr sin bostad behöver göra det (ägarens amortering är del av hyran).

Därtill sker en sortering av hushåll så att hushåll med låga inkomster oftare hyr sin bostad. Låga inkomster sammanfaller med låga ekonomiska marginaler och därmed större känslighet för störningar i ekonomin. Inte bara för att marginalerna är mindre utan även för att hushåll med låga inkomster sannolikt avstår från att teckna olika försäkringar i större utsträckning än hushåll med genomsnittliga inkomster.

10, Do you have any recommendations in terms of previous literature/studies/policies that might be relevant for the purposes of my thesis, where the main research question is: What are the macroeconomic effects of a large increase in the rents of housing tenants in Sweden?

Perspektivet har varit väldigt frånvarande i SOU:erna. Utredningen om Marknadshyror i nyproduktion hade att utreda inte övergång till marknadshyror i beståndet, så jag tror inte att det finns något där.

Den första Ramböllrapporten kan ha något:
https://www.hyresgastforeningen.se/globalassets/faktabanken/rapporter/marknadshyrerapporter/2015/den-svenska-hyresmarknaden--scenarioanalys--maj2015.pdf

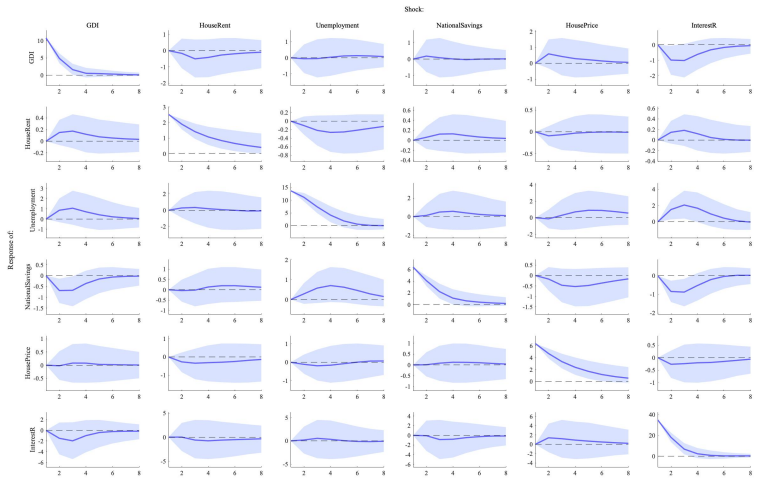


Figure 4: Minnesota:Impulse responses

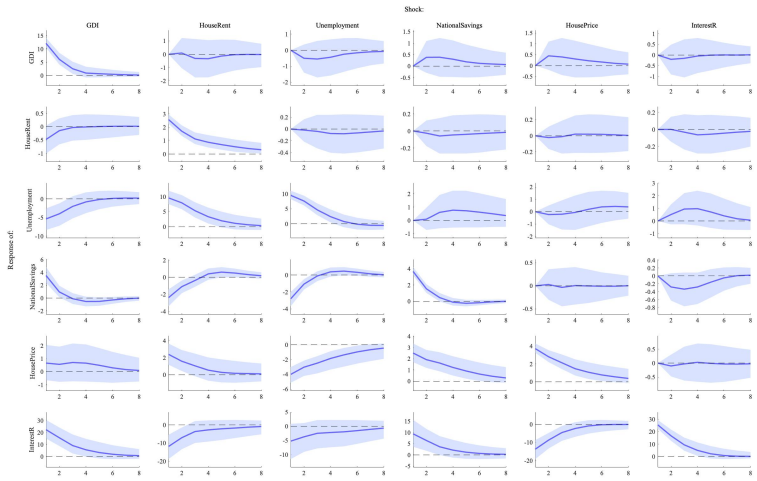


Figure 5: Normal-diffuse: Impulse responses

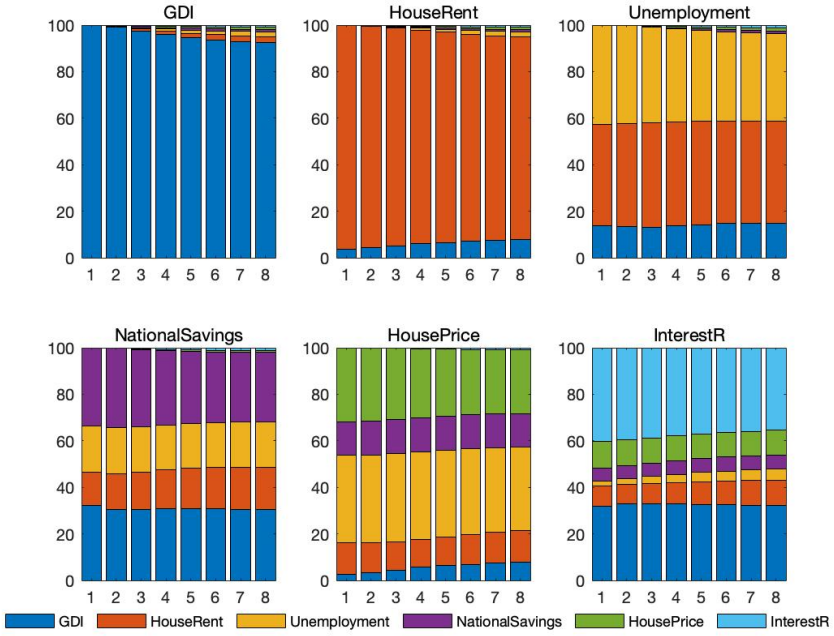


Figure 6: Normal-diffuse: FEVD

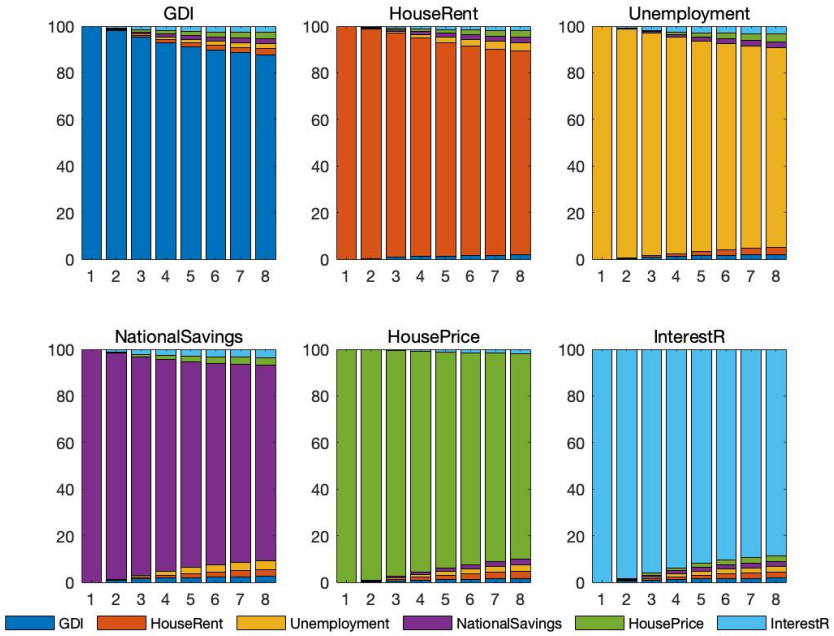


Figure 7: Minnesota: FEVD

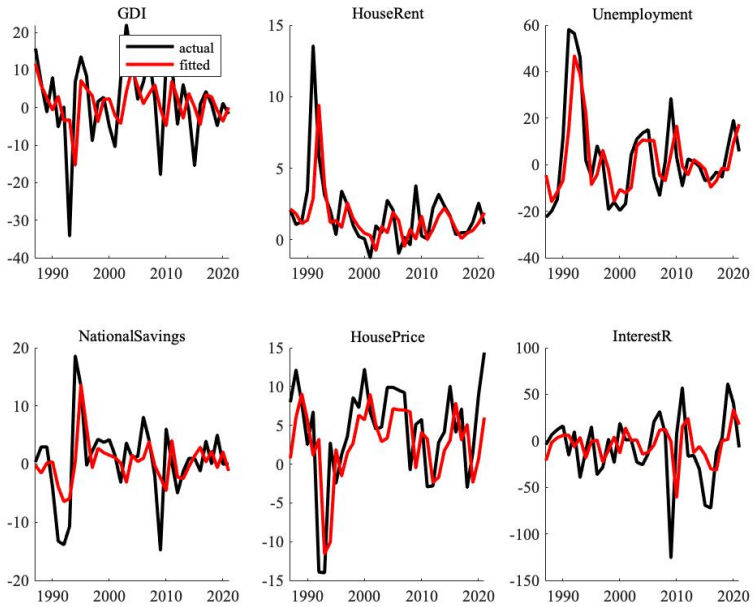


Figure 8: Minnesota: Model estimation

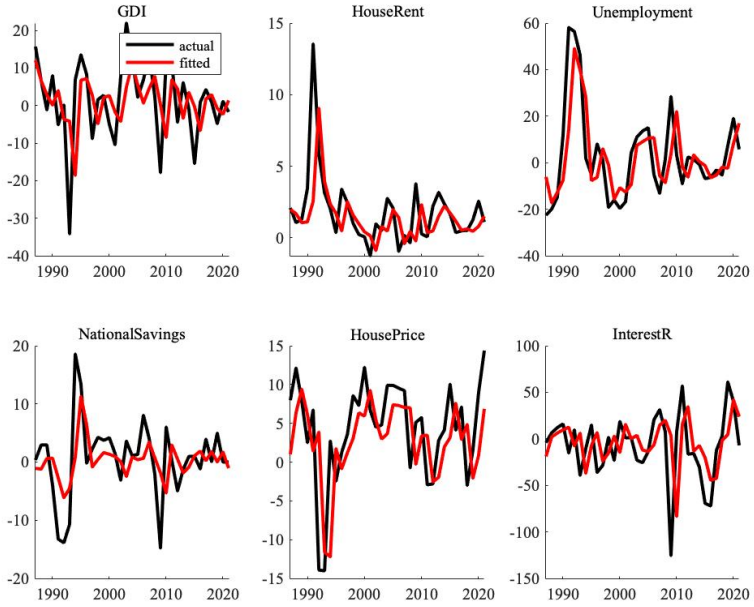


Figure 9: Normal-diffuse: Model estimation

Figure 10: Normal-diffuse: Model estimation