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## **IMPACT OF THE INCOME TAX RELIEF FOR HOUSING ON HOUSEHOLD INDEBTEDNESS IN EU, 2004-2013**

### **Abstract:**

It is common that governments favour home ownership also via personal income taxation. Particularly deductibility of mortgage interest payments can stimulate households to borrow to acquire their dwellings. On the one hand the tax advantage can be effective at achieving social objectives, but on the other hand there is agreement that the housing taxation creates substantial distortion that may increase house prices and household leverage which may have adverse consequences on both micro- and macroeconomic levels. Our aim is to explore whether there is a relation between the advantageous tax treatment of housing and household indebtedness. We employ the multiple regression and pooled cross-sectional data for the former 15 EU member countries (except Greece) for the period 2004-2013. Our analysis reveals that the variable representing the extent of the tax relief on debt financing of the owner-occupied housing affected the variable reflecting indebtedness of European households between 2004 and 2013 positively.

### **Keywords:**

Household indebtedness, Housing taxation, Mortgage interest deductibility

**JEL Classification:** G21, H24

## 1 Introduction

Tax systems of developed countries contain provisions that give preferred status to housing and homeownership. The significant relief is provided especially by the combination of the non-taxation of imputed rental income and the mortgage interest payments deductibility. The real user cost of owner-occupied housing are reduced (Poterba and Sinai, 2008) and thus a bias in favour of homeownership is created when households are encouraged to buy rather than to rent their dwellings. Although there is a property tax, that is levied to tax the imputed rent, the relief for the mortgage interest payments can be so generous that it mitigates its effect (Crowe et al., 2011). The fact is that the property tax in many countries is not high enough to be a perfect substitute for the imputed rent taxation (Hemmelgarn and Nicodéme, 2010). Furthermore, home ownership is more attractive when capital gains are not taxed in a neutral manner. And profits from home sales are not usually taxed. The housing-related tax allowances are one of main tax expenditure items in the EU countries (see EC, 2013).

The pro-homeownership tax policy is justified by market failures and a desire to enhance the housing opportunities available to citizens (Andrews, Caldera Sanchez and Johansson, 2011). However it seems that for the time being economists rather conclude that the tax advantages provided to homeowners are not very efficient at achieving given objectives. A general goal in practice is to boost homeownership or to increase the housing demand and consumption. Cecchetti, Mohanty and Zampolli (2011) claim that generous tax relief for mortgage interest payments could have played a role in expanding home ownership in some countries. However according to Andrews, Caldera Sanchez and Johansson (2011) there is no clear cross-country relationship between the extent of the mortgage interest deductibility and the ownership rates. Nevertheless they admit that households preference for homeownership can be influenced also by tax policy. Bourassa and Grigsby (2000) or Glaeser and Shapiro (2002) based on empirical evidence on U.S. situation concluded that impact of the mortgage interest deductibility on the homeownership rate was minimal. And Crowe et al. (2011) even assert that the homeownership rates are negatively related to the extent of advantageous tax treatment of homeownership.

An argument in favour of higher rate of homeownership is the existence of positive externalities, e. g. enjoyment of neighbours and passersby generating through home maintenance and gardening, better outcomes for children, and long-term prospects of the community (Bourassa and Grigsby (2000) or Glaeser and Shapiro (2002)). Glaeser and Shapiro (2002) think that evidence on externalities is weak but suggestive. But Hilber and Turner (2013) believe that the homeownership generate few or no positive externalities. Moreover, there could be negative externalities related to housing consumption, e. g. leaving small city apartments for larger places on the fringe of the city, increasing segregation by income or envy incited by fancy homes (Glaeser and Shapiro,

2002). A lower labour mobility and higher unemployment among owner-occupants in comparison with the mobility and unemployment of renters can be harmful effect of the homeownership as well (Andrews, Caldera Sanchez and Johansson, 2011). Finally, the homeowners could utilize their political power to cut off new house construction in order to raise their house prices (Glaeser and Shapiro, 2002). As O'Sullivan and Gibb (2012) summed it up, homeownership does not generate economic benefits for the macro-economy or specific households which would justify a general programme of tax concessions to homeowners.

As an argument supporting the owner-occupation we could present that accumulated housing wealth could serve as means of private insurance (Ansell, 2013) or that home equity could provide an additional source of retirement income beyond pensions, i. e. reverse mortgages (Toussaint, 2013). However we are not familiar so far with any evidence that the owner-occupation serves well as an instrument of pension security. On the other hand, what is already subject of examination is correlation between the mortgage interest deductibility and growth of house prices or increased house prices volatility. OECD (2009) or Andrews, Caldera Sanchez and Johansson (2011) offer some evidence of the positive correlation between the tax relief on mortgage interest and variability in house prices. Keen, Klemm and Perry (2010), André (2010), Sutherland et al. (2012) or further authors pointed out that the tax subsidy is likely, depending on the price elasticity of housing supply, to be capitalised into house prices. In addition the tax incentive for debt-financing over other sources of financing of own dwellings could result in overinvestment in housing and misallocation of capital stock with negative effects on long-term economic growth (see e. g. Saarimaa, 2009 or André, 2010 or Hemmelgarn and Nicodeme, 2010 or Ventry, 2010). Finally, there is agreement among authors that the housing tax reliefs are regressive, i. e. they favours rich households. The higher-income households benefit from the advantageous tax treatment of housing, namely from the mortgage interest deductibility, more than the lower-income households because they have higher rates of homeownership, they buy more expensive houses, and their marginal tax rates are higher (see Bourassa and Grigsby (2000), Andre (2010), Keen, Klemm and Perry (2010), Matsaganis (2014), Ventry (2010) or Andrews, Caldera Sanchez and Johansson (2011)).

There is another important reason why the housing taxation, especially the mortgage interest deductibility, attract attention of economists. It is because it might support debt creation. Jorda, Schularick and Taylor (2014) found that household leverage ratios have increased substantially in many countries over the 20th century; about two thirds of bank lending today consists of the loans to the household sector for the purchase of real estate.<sup>1</sup> Furthermore, Jorda, Schularick and Taylor (2014) showed that contemporary

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<sup>1</sup> According to ECB (2014) the majority of the European household borrowing is comprised by loans for house purchase.

business cycles seem to be increasingly shaped by the dynamics of the mortgage credit and that the mortgage credit became a specific source of financial instability in advanced economies after the Second World War. And Jorda, Schularick and Taylor (2015) demonstrated that the credit-financed housing price bubbles are more dangerous for financial sector and real economy than the unleveraged bubbles. How indebtedness can affect macroeconomic performance and households, see Sutherland et al. (2012) or McGowan (2013). The household indebtedness impact on economic growth have been analysed by Izák (2012).

A question raises whether the taxation, and the presupposed debt bias embedded in it, does affect the households indebtedness, and whether the negative consequences of high levels of debt could be, partly, extra cost of the taxation favouring housing. Hemmelgarn and Nicodeme (2010), Keen, Klemm and Perry (2010), Bernardi (2011), Cecchetti, Mohanty and Zampolli (2011), Hemmelgarn, Nicodeme and Zangari (2011), Sutherland et al. (2012) or Garnier et al. (2013) suggest that the tax treatment of owner-occupied housing may have played a role. Households have been probably encouraged by the mortgage interest relief to prefer borrowing. As a result the households debt may be higher than it would be otherwise. Wolswijk's (2005) simple graphical analysis shows that the lower the financing costs, decreased by the tax subsidy, the higher the debt-GDP ratio. Keen, Klemm and Perry (2010) affirm that countries offering more favourable tax treatment for home ownership have higher ratios of mortgage debt. On the other hand Crowe et al. (2011) do not see a significant relation between the tax treatment of housing and the ratio of mortgage debt to GDP. It is necessary to be careful, e. g. Ellis (2006, p. 11) warns that it is not easy to prove a correlation between the tax advantages for homeownership and the household debt since "the tax regime interacts with other aspects of the housing-finance system in sometimes complex ways." OECD (2009) points out that home-equity loans and real house prices have risen in many countries despite the fact that tax incentives vary considerably. It suggests that other factors affect these phenomenons. However OECD (2009) also admits that high tax relief on mortgage interest correlates with high variability in house prices which can lead to serious household credit problems.

Deeper insight into the relationship between the tax incentive and households debt can be provided by studies concerning individual countries. Dunsky and Follain (2000) or Munroe (2014) analysed the United States data and found out that the demand for home mortgage debt responds to the mortgage interest deduction. Hendershott, Pryce and White (2002) revealed that the homeowner leverage in the United Kingdom was sensitive to the deductibility of mortgage interest. Alan and Leth-Petersen (2006) examined the 1987 tax reform in Denmark which made the holding of debt less attractive. Rouwendal (2007) identified the tax incentive for financing homeownership with a mortgage as important driving force behind the increase in frequency of mortgage use in the Netherlands. According to Sommervoll (2007) Norwegian households reduced their

debt as a response to less generous interest deductions after the tax reform. Finally, Saarimaa's (2009) results from the study of the impact of the tax reform in Finland indicate that high income households with high marginal tax rates responded to the tax incentive reduction by clearly decreasing their mortgage borrowing. On the other hand Jappelli and Pistaferri (2004) found no evidence that the tax treatment shaped the demand for mortgage debt in Italy. They explain their finding by lack of financial information in general and awareness of the specific changes in tax incentives in the mortgage market in particular. It is possible to sum up that tax reforms, that reduced value of mortgage interest deductibility (which is affected also by a marginal tax rate) and thus weakened the incentive to borrow in order to own home, mostly led to lower household leverage. This could prove the role of the tax incentive favouring debt-financed homeownership (see the European Commission taxation papers about tax reforms published in 2011 – 2014). After all, the European Commission recommends to the EU Member States to reduce the debt bias in their housing taxation and subsequently maps changes in taxation rules in the member countries, see e. g. (EC, 2014). Garnier et al. (2013) confirm that major changes in housing taxation in many countries concerned the debt bias and focused on limiting the deductibility of mortgage interest. Nevertheless Sommervoll (2007) points out that effects of tax reforms on housing markets can be offset by other factors in the economy.

Of course, the taxation is not the only factor influencing household demand for mortgage. On the contrary, the tax incentive for debt-financed homeownership does not often occur in models or analyses explaining the debt trends. For example Leece (2006), who analysed the mortgage demand in the United Kingdom, started with the mortgage demand model which includes also assumption that a difference between borrowing and lending interest rates is caused by different tax treatments of the mortgage interest rate and the rate of return on the appropriate savings vehicle. These are interest rates, financing conditions (i. e. financial deregulation and innovation on financial market), income and demography what have been identified in both theoretical and empirical studies as important determinants of household indebtedness. In addition, factors characterising housing market, especially house prices, should be taken into consideration - see e. g. Debelle (2004), Jacobsen and Naug (2004), Girouard, Kennedy and André (2006), Dynan and Kohn (2007), ECB (2009), André (2010) or Bokhari, Torous and Wheaton (2013).

Aim of our research was to explore whether there is a relation between the income tax incentive for homeowners, i. e. the mortgage interest deductibility and exempted imputed rent income, and the household indebtedness. To the contrary to studies mentioned above we conducted a cross-country study like Wolswijk (2005) who analysed impact of housing taxation on mortgage debt growth in EU countries on assumption that the taxation may have a potentially large role in affecting the household leverage. The remainder of the paper is divided into two sections and a conclusion. In the next section

we describe our methodology and data. First we focus on the construction of the variable representing the tax treatment of owner-occupied housing which is supposed to be debt encouraging. Then we describe briefly the other explanatory variables we worked with and our empirical method. Section 3 reports estimates obtained with a multiple regression analysis. Section 4 concludes.

## 2 Methodology and data

### 2.1 Construction of the home-owner tax relief variable (tax wedge)

In our research we followed Wolswijk's (2005) work. Wolswijk applied a regression analysis in order to measure the effect of fiscal instruments on mortgage debt growth in the EU countries. The fiscal instruments were represented by the after-tax interest rate capital costs variable which captured the deductibility of mortgage interest payments. He constructed relevant tax rates which reflected whether the interests were deductible from the income tax and whether were deductible fully, or with a limit. The capital costs were expressed as a percentage of a house price. We decided to construct our variable representing the income tax treatment of housing as a tax wedge which is used as an indicator of the extent of the tax relief on debt financing of the owner-occupied housing (see e. g. Andrews, 2010).

The tax wedge is a difference between the pre-tax interest rate capital costs ( $CC_0$ ) and the after-tax interest rate capital costs ( $CC_1$ ). We modelled the capital costs of a taxpayer who might represent the population taking out mortgages. We were inspired by characteristics of the model taxpayer which Keen, Klemm and Perry (2010) used for the calculation of effective average tax rates on owner-occupied housing.<sup>2</sup> The model taxpayer is an unmarried person in the top income tax bracket who purchased a property (her / his primary dwelling) for the price ( $V$ ), financed 80% with a mortgage ( $M$ ). We choose the top income taxpayer because the most indebted households are those with the highest incomes (see Girouard, Kennedy and André, 2006). The top income was defined as double the average wage which is the threshold of the top-bracket in the most EU-15 countries. The house price was estimated as 5-multiple of the top income. The mortgage interest rate ( $r$ ) was approximated by the annual average of representative interest rates on new residential loans provided by the HYPOSTAT 2014 published by the European Mortgage Federation.<sup>3</sup> The pre-tax capital costs were calculated as follows:

$$CC_0 = \frac{rM}{V} \quad (1)$$

The after-tax capital costs were calculated as follows:

<sup>2</sup> Our procedure is adjusted version of the IMF methodology, see Hemmelgarn, Nicodeme and Zangari (2011).

<sup>3</sup> See the website [www.hypo.org](http://www.hypo.org).

$$CC_1 = \frac{(rM) - T}{V}, \quad (2)$$

where  $T$  is savings on a tax liability.

If the tax treatment of the mortgage interest rate is in favour of homeownership a result is the savings on the tax liability reducing the capital costs. The financing cost of owner-occupied home has been calculated already by van den Noord (2003). He took into account the mortgage interest deductibility as well as taxation of imputed rent. Furthermore he explicitly distinguished different tax elements used in income tax codes to favour the owner-occupied housing and dealt with limits on the deductible period or the deductible amount more exactly than Wolswijk (2005) did.

Like Wolswijk (2005) we wanted to include the former 15 EU member states into our analysis but due to a lack of data our country sample does not contain Greece. We covered the period from 2004 to 2013, i. e. we started when Wolswijk ended. We estimated the tax savings that result from the deductibility of mortgage interest, and subsequently the tax wedges for every country and each year using effective income tax law provisions related to the imputed rent and mortgage interest (or mortgage repayments) just as van den Noord (2003) did.

There were different forms of the tax relief on the mortgage interest. Austria, Belgium, Denmark, Luxembourg and the Netherlands applied a deduction from income or tax base. In addition, Belgium, Luxembourg and the Netherlands taxed the imputed rent (then the interests were deductible first against this income). When the deduction is used the amount, which taxpayers could save due to the tax relief, depends also on a tax rate. A credit lowering a tax liability was applied in Finland, France, Ireland, Italy, Portugal, Spain and Sweden. There was no tax relief in Germany and the United Kingdom in this period. There were various limits on the amounts of the deductions or credits. The amounts were usually derived from the mortgage interest as a certain percentage and they were mostly capped with a ceiling which somewhere depended on taxpayer's income, marital status or number of children. The imputed rent, if necessary, was set either as a fraction of the house price (i. e. for the Netherlands, according to the European Commission taxation papers) or as a percentage of household income (i. e. for Belgium and Luxembourg, according to Eurostat (2013)).

The tax savings should be equal to the sum of annual amounts saved during the period of repaying a mortgage. However since our model taxpayers in all the countries were assumed to repay a mortgage for the same time we could simplify the calculation. The savings on the tax liability were estimated as the amount saved in the first year of the repayment period. Moreover we assumed that the tax treatment of the mortgage interest and imputed rent would be stable over the whole repayment period. In fact, the tax

treatment of owner-occupied housing significantly changed in Belgium, France, Ireland, Portugal or Spain during the period 2004 – 2013.

Precision of our tax savings estimates was influenced by quality of available data. We had to rely on information provided by secondary sources. We compiled information from the Taxes in Europe database, the OECD Taxing Wages publications and the European Commission taxation papers about tax reforms published in 2011 – 2014.<sup>4</sup> Quality of the data differed across countries: some countries did not provide so much details, sometimes different sources did not provide the same data about the same countries.

Neither van den Nord (2003) nor Wolswijk (2005) included property tax of the home owner into their after-tax capital costs calculations. We also ignored this tax on the assumption that there is no difference in the user costs between own and rented housing since the property tax burden is assumed to be fully borne by the individual using the house (i. e. an owner or a tenant). Finally, Wolswijk (2005) used a modified fiscal instruments variable, which included taxation of expected capital gains from the house sale, in another specification of his regression model but with no satisfactory results. We ignored the capital gain taxation (the capital gain is usually tax-exempt) as well as transaction taxes on assumption that the model taxpayer does not consider selling her / his house in future. After all the mortgage interest deductibility combined with the non-taxation of imputed rent is the tax provision that is assumed to tilt households to borrowing the most.

## 2.2 The other variables and the regression analysis method

To control for effects of the other influential factors of household debt we employed the multiple regression analysis. The dependent variable was the household leverage measured by the ratio of total outstanding residential loans (on lender's books at the end of the year, in EUR million) to household gross disposable income (in EUR million). The data on both loans and income were provided by the HYPOSTAT 2014.

Considering literature and data availability we proposed a number of the other variables which might explain the housing debt. Important factors related to private loans are GDP and interest rates (Calza, Gartner and Sousa, 2001). On assumption that wealthier households are able to borrow money in order to buy houses we used several variables based on GDP and variables representing households wealth. Mortgage interest rates or interest payments as portion of household income constituted variables representing costs of borrowing in our analysis. Further underlying drivers of housing debt are house prices and demographic trends (ECB, 2009). We constructed some variables based on house prices statistics provided by the HYPOSTAT 2014 as well as we used a consumer

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<sup>4</sup> The Taxes in Europe database is available on [http://ec.europa.eu/taxation\\_customs/taxation/gen\\_info/info\\_docs/tax\\_inventory/index\\_en.htm](http://ec.europa.eu/taxation_customs/taxation/gen_info/info_docs/tax_inventory/index_en.htm). Taxing Wages publications are available on [http://www.oecd-ilibrary.org/taxation/taxing-wages-2014\\_tax\\_wages-2014-en](http://www.oecd-ilibrary.org/taxation/taxing-wages-2014_tax_wages-2014-en)



price index from the OECD statistics. To capture the influence of changes in demography structure of population we worked with a set of different variables commonly used in demography analysis. The unemployment variable was added as well. Since the household debt might be affected also by supply factors we included the variable reflecting investment in housing. Finally, variables representing tax systems were taken into account. Data for these independent variables were obtained from various sources, i. e. from the HYPOSTAT 2014, the OECD statistics and the ILO statistics.

We estimated the model of the household mortgage leverage with pooled cross-sectional data employing the OLS method. To tackle the problem of heteroskedasticity we used robust standard errors, variant HC1 (Cottrell, 2003). The multicollinearity was controlled by the Variance Inflation Factors (VIF) method (Adkins, 2012). We used the standard significance levels and the test for normality of residuals based on the Jarque – Bera procedure. The final model, presented in the Table 1 in the next section, passed all the tests.

### **3 Results**

Table 1 reports our most suitable model describing the dependency of the household mortgage leverage on the tax wedge and the other variables. The model was chosen on the basis of common model selection statistics (the Akaike Information Criterion and AIC and Schwarz's Bayesian Information Criterion) as well as on the basis of the plausibility of regression coefficients.

**Table 1: Regression results**

Explanatory variables	Coefficients
const.	-0.82*** (0.29)
Tax wedge	0.72*** (0.15)
GDP per capita	6.11e <sup>-6</sup> * (3.37e <sup>-6</sup> )
Mortgage interest payments to household disposable income ratio	-0.8** (0.38)
Investment in housing (annual % change)	-0.007* (0.004)
Demography (working people to the retired ratio)	0.23*** (0.06)
Dummy to control for time series breaks	0.43*** (0.11)
Adj. R-squared	0.36
Number of observations	140

Test of normality (H0 – normality of residuals) passed - error is normally distributed with p-value = 0.4.

Standard errors in parentheses.

\* indicates statistical significance at the 10% level, \*\* indicates significance at the 5% level and \*\*\* indicates significance at the 1% level.

*Source: Authors' calculations*

As expected the tax wedge had a positive impact: a larger gap between the pre-tax interest rate capital costs and the after-tax interest rate capital costs, induced by the mortgage interest tax relief, should stimulate households to borrow more. The GDP and demography are significantly positive. The higher mortgage leverage was more probable in wealthier countries. Like Wolswijk (2005) we also tried to include household disposable income as an independent variable but our coefficient was not statistically significant (even Wolswijk considered his evidence ambiguous). Furthermore if there was a higher share of people in productive age, who are assumed to be willing to secure their housing, the leverage increased.

On the other hand the mortgage interest payments and investment in housing affected the mortgage leverage negatively. The sign on mortgage interest payments is consistent with theory on the relationship between the interest as a price and the amount of a loan. However the negative relation between the leverage and the investment in housing, the

variable used as the proxy for the supply on the housing market, is not so easy to interpret. Finally, the dummy variable, controlling for drawbacks in data, was added into the model because it increased its appropriateness.

## 4 Conclusion

Our analysis revealed that the income tax systems contributed to the household indebtedness in the former EU-15 countries in the 2004 – 2013 period. Particularly deductibility of mortgage interest payments in combination with imputed rent exempted from the income tax could stimulate households to borrow to acquire housing. Our result corresponds with Wolswijk's regression analysis result that reduction of the after-tax mortgage interest rates increased the debt. It is also consistent with the findings of some studies that the demand for home mortgage debt or the homeowner leverage are sensitive to the mortgage interest deductibility. Nevertheless our analysis does not allow to infer that this income tax incentive encourages households to borrow for housing more than it would be optimal.

Furthermore it is necessary to take some limitations of our analysis into consideration. When we constructed our tax variable we ignored taxation of capital gains related to a potential house sale and property taxation which can compensate for the imputed rent exemption. Moreover, tax wedges were modelled for taxpayers with certain characteristics. In addition, information we worked with were not perfect.

Finally, the tax wedge variable showed the significant effect if certain other factors have been taken into account. While GDP and demography affected the household mortgage leverage positively, mortgage interest payments and investment in housing had a negative impact. It is however plausible that there are variables that would be more suitable and would improve our model.

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