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Distribution of household assets in Croatia

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Abstract

This paper analyses the main components and distribution of household net assets in Croatia on the basis of the data from the Household Finance and Consumption Survey (HFCS) by taking into account different socio-demographic characteristics of households. The main results indicate that real assets are widely distributed among households, whereby 85% of households own the household main residence. Financial assets and liabilities account for larger share among wealthier households. The analysis of the main determinants establishing the position of an individual household in distribution of assets has additionally highlighted the importance of the household main residence (HMR). Households with inherited HMR are less likely to be positioned in the lowest net asset quintile. In addition, households with HMR in the city of Zagreb or on the Adriatic Coast are more likely to be in higher asset quintile groups. The survey has also found that the level of household income, educational attainment, labour market status and age of the household reference person affect the probability of positioning a household in a certain net asset quintile.

Keywords: survey data, Household Finance and Consumption Survey (HFCS), net household assets, household inequality, intergenerational transfers, Croatia

1 INTRODUCTION

Potential inequality in distribution of different types of assets among households should be considered when designing public policies, such as monetary, macroprudential and other public policies (tax, demographic, social and regional policy). In that sense, monetary policy may have a reallocation effect on households depending on initial distribution of income, assets and liabilities among households and their exposure to the interest rates channel (Auclert, 2017; Tzamourani, 2019). Macroprudential policy contributing to maintaining stability of financial system at the same time may also affect distribution of assets among households (Carpantier, Olivera and Van Kerm, 2017). For these reasons, implementation of monetary policy and design of macroprudential measures to maintain financial stability should be accompanied by the analysis of inequality in distribution of household assets.

Inequality among households in Croatia has previously been analysed on the basis of income data only (e.g. Nestić, 2005; Rubil, 2013; Rubil, Stubbs and Zrinščak, 2018). The following paper builds upon the existing literature on inequality in distribution of household income and provides an analysis of distribution of household assets in Croatia. The analysis is based on the data collected in the Household Finance and Consumption Survey (HFCS) that the Croatian National Bank (CNB) first carried out on a sample of households in Croatia in mid 2017. The survey covered detailed data on household real and financial assets, liabilities, income, consumption and other socio-demographic characteristics of households.[1]

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[1] The Household Finance and Consumption Survey (HFCS) was carried out in coordination with the European Central Bank. The European Central Bank has already coordinated two previous HFCS waves, the first one in the 2008-2010 period and the second in 2013. Since Croatia entered the EU in July 2013, the CNB joined the survey in the third wave.

This paper brings new insights into distribution of different components of household net assets and the main determinants that establish relative position of an individual household in terms of distribution of net assets. Prior to the survey, the analysis of household assets in Croatia completely depended on aggregate data sources such as financial accounts that contained the data on total financial assets and liabilities, but did not include information on distribution of assets and liabilities and inequality among households. In addition, researchers did not have adequate data source for analysis of household real assets.

Apart from detailed analysis of distribution of household assets, the paper analyses the main determinants establishing the position of a household in the distribution of net assets by using *the generalized ordered probit model*. To the author's knowledge, the analysis of determinants affecting the position of a household in the distribution of net assets has not yet been carried out in Croatia. On the other hand, this has been a subject of extensive literature for the euro area counties (e.g. Du Caju, 2016; Sierminska and Medgyesi, 2013; Kontbay-Busun and Peichl, 2015; Leitner, 2015; Fessler and Schürz, 2015; Arrondel, Roger and Savignac, 2014) on the basis of the HFCS data from the two previous survey waves.

The analysis has found inequality in distribution of certain asset categories among Croatian households. Real assets account for a large share of household total assets, much more than in other EU countries, given that 85% of households own the household main residence (HMR).[2] The median value of the main residence amounts to 66 thousand euros and it makes up the bulk of total net household assets. Significant inequality was observed in terms of financial assets because only a certain portion of households own substantial financial assets. The median value of household financial assets stands at 500 euros. The results of descriptive analysis have pointed to variation in distribution of total net household assets, depending on different socio-demographic characteristics, income, real asset ownership and geographic location.

With regard to the determinants establishing the position of a household in the distribution of net assets, results of the generalized ordered probit model indicate a correlation between a household position in distribution of income and assets, but its statistical significance and intensity varies depending on the position of a household in the income distribution. This result is robust for different specifications of household income. The way the HMR was acquired helps to explain the probability of having a certain household in a certain asset quintile in case of lower asset levels, but it is not significant for determining the probability of positioning a household in higher net asset quintiles.

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[2] By comparing the data with those collected in the EU in the second survey wave (2013), one can observe higher participation rate of the household main residence in Croatia compared to other EU countries (where an average of 62% of households owned the HMR the median value of which stood at 165 thousand euros (ECB, 2016)).

The analysis has also emphasised the importance of geographical location of the HMR, whereby, all other factors being equal, households with the main residence in the City of Zagreb or on the Adriatic Coast are much more likely to be in higher net asset quintiles compared with households with the main residence in Eastern Croatia. In addition, educational attainment, labour market status and age very much affect the probability of positioning a household in a certain net asset quintile. In that respect, households with more educated and older reference persons and households with self-employed reference person are more likely to be wealthier.

The structure of the paper is as follows: the second chapter includes basic information on the technical implementation of the survey and survey design. The third chapter covers detailed information about the main components of net assets: real and financial assets and liabilities, their distribution among households and values. Inequality in distribution of net assets among households, taking into account different socio-demographic characteristics of households, is discussed in the fourth chapter, whereas the fifth chapter includes the econometric model to establish which household characteristics affect the probability of having a household in a certain net asset quintile. Finally, the sixth chapter gives an overview of the main survey conclusions.

2 IMPLEMENTATION OF THE SURVEY
The Croatian National Bank ordered the Household Finance and Consumption Survey (HFCS) and it was implemented by the Ipsos market research agency in cooperation with the Croatian Bureau of Statistics (CBS). The survey questionnaire was designed within the ECB research network and it was harmonized across EU member states. The survey, covering 2016, was carried out in Croatia from March to June 2017.

The stratification of private households from the population to the gross sample was carried out in two stages.[3] The first stage included stratification of segments according to occupied dwellings in spatial units of the country (belonging to the same municipality (city) or neighbourhood in the case of the City of Zagreb, in accordance with the enumeration areas from the 2011 Population Census). The segments were then divided into two groups depending on the size of the dwelling (up to 120m² and over 120m²). In the second stage of sample stratification, the segments were divided according to the geographical location as follows: Adriatic Coast, Eastern Croatian and Central Croatia and according to the types of administrative units (city or municipality). Cities of Zagreb, Split and Rijeka formed separate strata. In this way, 16 different strata were obtained. After obtaining the strata, a certain number of segments proportional to their size were selected within each stratum. In this way, households had equal probability of selection, irrespective of the stratum they were assigned to. All in all, 16 strata contained 800 segments from 552 settlements. Finally, five occupied dwellings were randomly

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[3] According to the HFCS methodology prescribed by the ECB, the survey did not cover institutional households.

selected from each segment and this corresponds to the sample of 4000 occupied dwellings of 4070 households (according to the 2011 Census) that were included in the survey gross sample.

Vermeulen (2014; 2016) has shown that non-response due to wealth status may lead to underestimation of total assets estimated by the survey. To reduce the problem of non-response among wealthier households, Vermulen (2016) suggests oversampling of richer households by using some kind of measurement of household wealth as a selection criterion. In case of the HFCS for Croatia, for the purposes of the survey sampling process, the size of the dwelling (in square meters) was used as a measurement of household assets.

Households with dwellings over 120m² were thus represented in higher numbers, accounting for 25% of the gross sample. At the same time, they make up 10% of the overall population. In addition, households from the City of Zagreb, Split and Rijeka were also overrepresented in the gross sample (35% of the gross sample compared with 25% of the population) since, according to results from previous surveys, these cities were known for their low response rates. These methods were used to minimize underrepresentation of richer households in the sample.[4]

The *Computer Assisted Personal Interview – CAPI* method was employed in the survey. A total of 1357 households from the gross sample took part in the survey so the response rate amounted to 33%. Given the relatively high unit non response and heterogeneity of response rate in different population segments (see Table 1), the net sample was weighted[5]. The calculation of weight takes into account the probability of selection of households and heterogeneity of responses among different segments of population. Furthermore, all weights were additionally weighted to reflect age and sex distribution of population according to the 2011 Census.

Stochastic multiple imputation was used to compensate for the item non response that may be registered in the net sample of households. According to the ECB recommendations, the missing data within the net sample were imputed by using the €MIR methodology that implies that responses are missing at random so the missing data are replaced by several different values obtained by the estimates from the stochastic model[6]. This methodology allows for several different final survey versions, the only difference being imputed values of the missing data. The sampling, weighting and imputing processes as described in the text above were carried out by the CBS in accordance with the guidelines of the ECB's Household Finance and Consumption Network (HFCN). A total of five imputed survey versions with the

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[4] Recent studies (e.g. Blanchet, Flores and Morgan, 2018) indicate that the combination of survey and tax data represent the most detailed adjustment in case of underrepresentation of richer households in wealth surveys. The authors propose a statistical procedure that combines survey income microdata and tax data on the number of taxpayers by income brackets, which gives a new adjusted dataset with new weights and observations with adjusted income values. At the same time, all the other survey data remain consistent.

[5] To take into account unequal probability of participation in the sample among households.

[6] Models for estimation of missing values for particular variables are pre-defined within the HFCN.

TABLE 1

Structure of households in gross and net sample and in the overall population

Strata	Gross sample		Net sample		Population	
	Number of randomly selected occupied dwellings in the strata*	% share	Number of respondent households in HFCS	% share	Number of occupied dwellings in population	% share
Central Croatia, city, HMR < 120 square meters	220	6	74	5	124,958	8
Central Croatia, municipality, HMR < 120 square meters	150	4	59	4	96,573	6
City of Zagreb, HMR < 120 square meters	830	21	133	10	279,420	19
Eastern Croatia, city, HMR < 120 square meters	485	12	229	17	230,580	15
Eastern Croatia, municipality, HMR < 120 square meters	225	6	128	9	140,397	9
Adriatic Coast, city, HMR < 120 square meters	480	12	158	12	232,817	16
Adriatic Coast, municipality, HMR < 120 square meters	230	6	64	5	128,137	9
Cities of Split and Rijeka, HMR < 120 square meters	380	10	103	8	111,113	7
Central Croatia, city, HMR > 120 square meters	155	4	63	5	26,420	2
Central Croatia, municipality, HMR > 120 square meters	100	3	52	4	19,602	1
City of Zagreb, HMR > 120 square meters	195	5	60	4	20,557	1
Eastern Croatia, city, HMR > 120 square meters	225	6	125	9	33,039	2
Eastern Croatia, municipality, HMR > 120 square meters	95	2	50	4	18,635	1
Adriatic Coast, city, HMR >120 square meters	115	3	28	2	17,641	1

Strata	Gross sample		Net sample		Population	
	Number of randomly selected occupied dwellings in the strata*	% share	Number of respondent households in HFCS	% share	Number of occupied dwellings in population	% share
Adriatic Coast, municipality, HMR > 120 square meters	85	2	21	2	14,064	1
Cities of Split and Rijeka, HMR > 120 square meters	30	1	10	1	2,605	0,2
TOTAL	4,000	100	1357	100	1,496,558	100

Note: Geographical location "Adriatic Coast" includes the following counties: Primorje-Gorski Kotar, Lika-Senj, Zadar, Šibenik-Knin, Split-Dalmatia, Istria and Dubrovnik-Neretva. Geographical location "Eastern Croatia" includes the following counties: Sisak-Moslavina, Karlovac, Bjelovar-Bilogora, Virovitica-Podravina, Požega-Slavonia, Brod-Posavina, Osijek-Baranja and Vukovar-Srijem. Geographical location "Central Croatia" includes the following counties: Zagreb, Krapina-Zagorje, Varaždin, Koprivnica-Križevci and Međimurje.

Source: ECB and author's calculations.

accompanying weights were submitted to the CNB. Detailed information about the sample selection, survey implementation, questionnaire design and imputation and weighting of the results will be available in Jemrić and Vrbanc 2019. Additional information on the net sample is presented in the Appendix in Table A4.

The results presented in the paper underwent a statistical process as described in Boes (2006), designed for processing of multiple imputed data in Stata. In addition, the estimated weights were used in the descriptive analysis, but they were not applied in the estimation of the econometric model.[7]

3 MAIN COMPONENTS OF HOUSEHOLD ASSETS AND LIABILITIES[8]
The Table 2 shows the main components of household real and financial assets and liabilities. For each category of assets and liabilities under consideration, the data on the share of households with a certain category of assets/liabilities in the overall population are given, as well as their mean and median values. In addition, the Table 2 shows participation rate of each particular component in the total value of assets/liabilities, reflecting the relative importance of different categories of assets and liabilities for households. The presented values of all components of assets and liabilities reflect households' subjective estimates that may not match real market values.

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[7] A similar approach was applied in Arrondel, Roger and Savignac (2014) and Georgokoponus (2019). Weights are based on the data on geographic distribution of households and respondents' age and sex. Controlling for these variables in the model is achieved by their direct inclusion in the regression.
[8] The selected parts of the Chapter were presented in CNB (2019).

The figures shown in the Table 2 indicate that 98% of Croatian households own some kind of assets (real or financial) with the median value of 67 thousand euros. Of this, real assets account for 97% of the total asset value and financial assets for the remaining 3%. On the other hand, when interpreting these figures, it is important to note that the survey strongly underestimates the value of financial assets, because, according to financial accounts, the value of household-owned financial assets is approximately seven times higher. Yet, other data collected by the survey that allow for comparison with other data sources (e.g. the socio-demographic characteristics of households, the total income value and the share of household main residence ownership) are in line with the figures recorded in alternative data sources (Jemrić and Vrbanc, 2019).

Real assets portfolio includes different types of household-owned real estate, vehicles and other valuables (valuable jewellery, artwork, antiques etc.). A detailed analysis of components of real assets shows that, in terms of value, the HMR accounts for the largest share, i.e. 75% of the value of total real assets. In general terms, 85 % of households own the household main residence. The median value of the HMR amounts to 66 thousand euros. By comparing the data with those collected in the EU in the second survey wave (2013), one can observe higher participation rate of the household main residence in Croatia compared to other EU countries (where an average of 62% of households owned the HMR the median value of which stood at 165 thousand euros). On the other hand, similarly high share of HMR can be observed in other countries that implemented privatization of socially owned housing stock in the 1990s (Estonia, Slovenia, Slovakia – ECB, 2016).

More detailed analysis of HMR ownership data for Croatia shows that, of 85% of households with the main residence, 77% own the whole residence and the remaining 8% own some part of it. Also, renters account for 6% of households, whereas 9% use the HMR though they are not real owners. Substantial differences were observed among households in terms of how the HMR was acquired. In that respect, 36% of households built it, 34% inherited it or received it as a gift, 28% purchased it and the remaining 2% acquired it through a combination of these options.

TABLE 2

Components of Household Assets and Liabilities

Components of net assets	Share of households	Median	Mean	Share in total value of assets/ liabilities
	in %	in EUR thousands		% EUR thousands
(1) Real assets	**94**	**70**	**114**	**97**
Main residence (85%)	85	66	94	73
Other real estate	23	20	54	11
Vehicles	69	4	6	4
Other valuables	4	2	6	0
Self-employment business assets*	5	25	209	9
(2) Financial assets	**82**	**0,5**	**5**	**3**
Sight accounts	80	0,2	9	1
Savings accounts	14	5	13	2
Voluntary pension funds/ whole life insurance	6	5	6	0
Mutual funds	1,4	3	4	0
Money owed to household	3	2	6	0
Shares	5	2	4	0
Bonds	0,4	0,1	69	0
Other types of financial assets	0,7	0	0,2	0
(3) Liabilities	**41**	**2**	**10**	**-**
Mortgage debt	9	20	30	66
for main residence	9	20	30	63
for other real estate	0,4	16	26	3
Non-mortgage debt	36	2	4	34
Credit lines/overdrafts	27	1	1	9
Credit card debt	6	0,4	0,8	1
Other non-mortgage loans	13	5	8	24
(1+2) Gross assets	**98**	**67**	**111**	**-**
((1+2)-3) Net assets	**100**	**61**	**107**	**-**

*Note: *Self-employment business assets means any household-owned component of real assets (real estates, vehicles or valuables) used in running a self-employment business.*

Gross assets are calculated as the sum of real and financial assets. Net assets equal the amount of gross assets net of household liabilities. Since the survey has been harmonised across EU member states, its values are expressed in euros. Median and means are calculated for the households that own a certain category of assets.

Source: ECB and author's calculations.

In respect of other components of household real assets, the survey results show that 23% of households own other real estate property whose median value was significantly lower compared with the HMR and stood at 20 thousand euros. Also, 69% of households owned vehicles whose median value amounted to 4 thousand euros per household. In terms of self-employment business assets, 5% of households reported it. Its median value was 25 thousand euros, compared to the substantially higher mean value of 209 thousand euros, which means that self-employment business assets significantly contribute to the overall inequality.

Household financial assets are very homogeneous, in line with the results of the previous HFCS waves that found lack of diversification of financial assets in countries below the euro area average, such as Estonia, Slovakia, Slovenia, Portugal, Malta and Greece (Merikull and Room, 2016: 4). According to the survey results for Croatia, the median value of financial assets is 500 euros per household. Deposits account for the largest share (reported by 81% of households) with the median value of 300 euros. Highest participation rates were observed for sight account deposits (80%), compared with those for savings account deposits (14 % of households own it). Apart from deposits, other most important components of household-owned financial assets include shares in voluntary pension funds and whole life insurance (6%) and publicly traded shares (5%). Very low participation rates were observed for bonds, mutual funds, money owed to the household and other types of financial assets. Yet, these results should be interpreted with caution, since the aggregated values of financial assets from the HFCS point to seven times lower values compared with those registered in financial accounts.

The survey also collected detailed data on the liabilities of Croatian households.[9] In that sense, 41% of households are in some way indebted. Mortgage debt (66% of the total debt) is the most significant component of household debt, compared with non-mortgage debt (34%). Despite its high total value, the mortgage debt was not significantly distributed among households since only 9% of households reported it. The median value of the mortgage debt stood at 20 thousand euros. Low share of mortgage debt and high HMR ownership rates may be attributed to the transition process that the Croatian economy went through in 1990s. Back then, the vast majority of population (the elderly of today) acquired the household main residence through privatisation of socially owned housing stock.[10] Non-mortgage debt was reported by 36% of households. This type of debt mostly covers credit lines/overdrafts (reported by 27% of households) and other non-mortgage loans, with the median value of 2 thousand euros.

Net assets equal the amount of gross assets net of household liabilities. According to the survey results, the median value of household net assets stands at 61 thousand euros. The mean value stands at 107 thousand euros. The Figure 1A shows the distribution of net assets in percentiles, indicating that 5% of the poorest households have almost no assets. The value of net assets gradually increases above the 5th percentile up to the 75th percentile. Above the 75th percentile, the increase becomes more rapid, especially at the distribution tail above the 90th percentile. The Figure 1B shows the topology of most important types of

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[9] Details on household liabilities collected in the HFCS are described in the CNB (2019) and Rosan and Zauder (2019). Household debt distribution in Croatia had previously been analysed by Herceg & Šošić (2011) and Herceg and Nestić (2014). However, these analyses were based on the Household Consumption Survey of the CBS. The survey included micro debt data and the main socio-demographic characteristics of households. On the other hand, the data on assets (real or financial) were not available.

[10] Privatization of the socially owned housing stock was implemented in accordance with the Act on the Sale of Apartments with Tenancy Rights (Zakon o prodaji stanova nad kojima postoji stanarsko pravo, NN 27/91).

household assets. It indicates that some households own several types of assets, e.g. the household main residence, other real estate and time deposits. However, these households represent a relatively small fraction (6%).

FIGURE 1A
Distribution of net assets, in EUR thousands
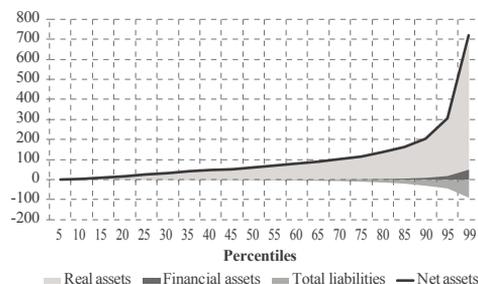
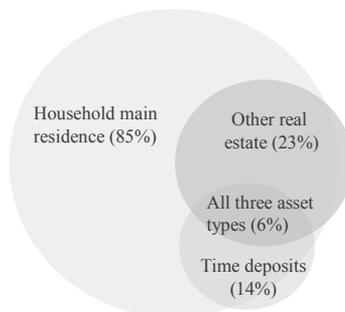**FIGURE 1B**
Topology of household assets (most important components), share of households

Source: ECB and author's calculations.

4 INEQUALITY IN THE DISTRIBUTION OF HOUSEHOLD NET ASSETS

Inequality in the distribution of household net assets is presented by using the Lorenz curve and Gini coefficient. In addition, since the existing literature on household inequality in Croatia is based on inequalities due to household income, the paper also presents the Lorenz curve of income on the basis of the data collected by the HFCS. The Lorenz curve is a graphical representation of inequality whereby the horizontal axis represents cumulative share of households and vertical axis cumulative share of household assets. In case of equal distribution of assets, the Lorenz curve would match the diagonal of the square (the so-called line of perfect equality). The lower the level of inequality, the closer the Lorenz curve is to the diagonal line, and *vice versa*, the higher the level, the farther away the curve is from the baseline. The Gini coefficient is a ratio of the area between the Lorenz curve and the diagonal of the square and the total triangle area below the diagonal line.

The Gini coefficient for total household net assets stands at 0.61, which indicates lower inequality in distribution of net assets among Croatian households compared with the euro average since the Gini coefficient for net household assets in the euro area amounts to 0.69, according to the results from the second HFCS wave from 2013 (ECB, 2016).

The Figure 2 shows more pronounced inequality in the distribution of financial assets (Gini coefficient of 0.88) compared with inequality in the distribution of real assets (Gini coefficient of 0.59). This is typical of countries with a high share of household main residence ownership (in case of Croatia, 85% according to survey results) that adds to significant prevalence of real assets among house-

holds.[11] Evident inequality in the distribution of financial assets is consistent with the results presented in CNB (2016), in which the Lorenz curve shows savings of natural persons in the Republic of Croatia in 2014.

The Gini coefficient for individual subcomponents of real and financial assets is presented in the Appendix in Table A5.

In terms of income, comparison of the distribution of assets and gross income among households suggests less pronounced inequality in the distribution of gross income compared with inequality in the distribution of real or financial assets (Gini coefficient of 0.51 for income).[12] Even though the concept of net income is mostly used in analyses on inequality and welfare, the HFCS collects the data on gross income only, i.e. including taxes and social insurance contributions, so the inequality in gross income is analysed in the remainder of the text. In that respect, the HFCS probably overestimates inequality in the distribution of gross income because a significant number of households reported no income and their annual gross income was zero (7%), whereas, at the same time, some of them possessed valuable assets. Since the total annual gross income includes employment income, rent, income from financial assets, pensions, social transfers or any other sources of income, this result indicates that the actual value of data presented in the responses was deliberately omitted. For this reason, the Gini coefficient for gross income was also estimated for the households whose annual gross income exceeds EUR 1,300 (the selected amount reflects the fact that a single-person household received a monthly minimum of HRK 800, i.e. the amount of the guaranteed minimum benefit (Zakon o socijalnoj skrbi, NN 152/14). The coefficient stands at 0.44.

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[11] Austria is is an interesting example in that sense where inequality in the distribution of financial assets is lower than inequality in the distribution of real assets, given the low share of main residence ownership (45%). For more details, see Fessler, Linder and Schurz (2019).

[12] The data from the CBS Statistics on Income and Living Conditions (SILC) for 2016 point to somewhat lower income inequality in Croatia, but in case of the CBS SILC, the Gini coefficient is significantly lower and stands at 0.3 (CBS, 2017). The results are not completely comparable because the Gini coefficient from CBS SILC covers net income, whereas all the data collected in the HFCS relate to gross amounts, i.e. including taxes and social insurance contributions.

FIGURE 2
Lorenz curve for real, financial and net assets and income
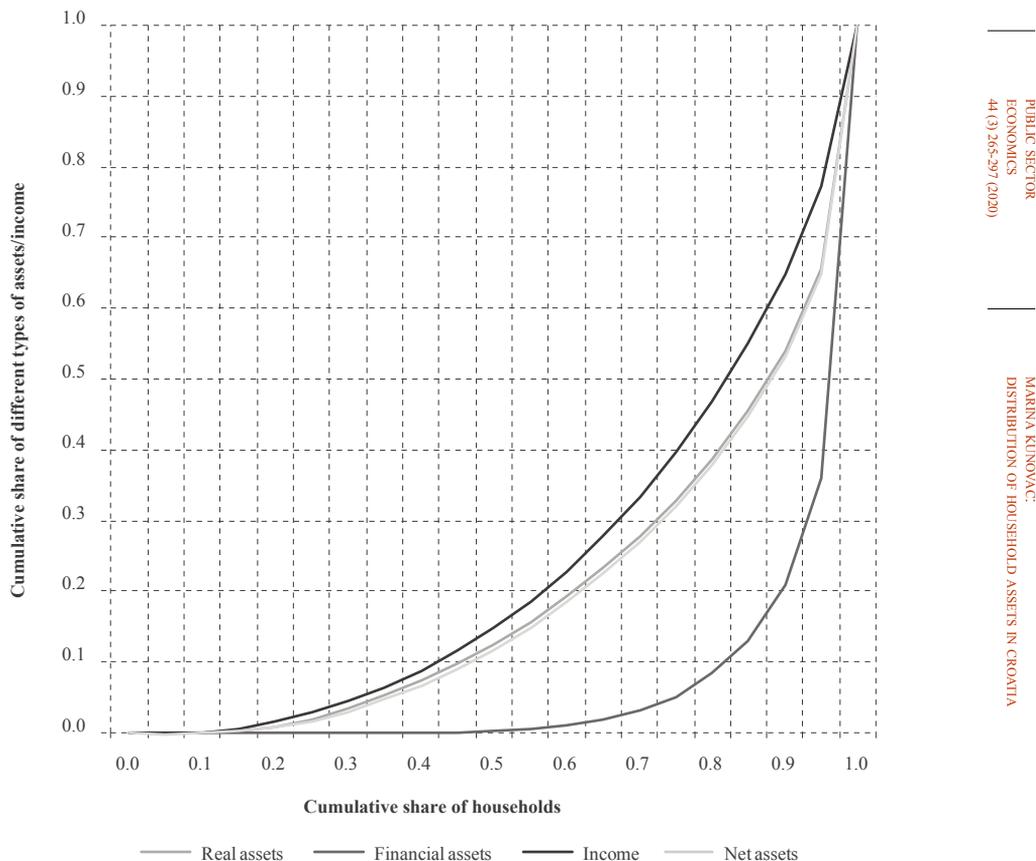
Source: ECB and author's calculations.

The availability of detailed survey data provides additional evaluation of interconnection between inequality in the distribution of net assets and different household characteristics. The analysis of the main socio-demographic characteristics of the household reference person[13], such as sex, educational attainment, age or labour market status, presented in the Figure 3, shows that the educational attainment can be related to the value of net assets and that households with highly educated reference persons have the largest share (30%) of persons with net asset value in the highest, fifth quintile. The share of persons in the highest asset quintile increases in proportion with the reference person's age and slightly decreases once the reference person retires. In terms of labour market status, self-employed persons stand out given their largest share in the highest asset quintile (over 50% of the self-employed classified in the fifth net asset quintile). On the other hand, relatively poor households make up the majority among the households with non-active

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[13] The reference person is the one chosen by household members as the person most informed about household finances.

reference persons. In that sense, over 50% of these households are in the lowest net asset quintile.

FIGURE 3

Socio-demographic characteristics of households and quintiles of net assets, in %
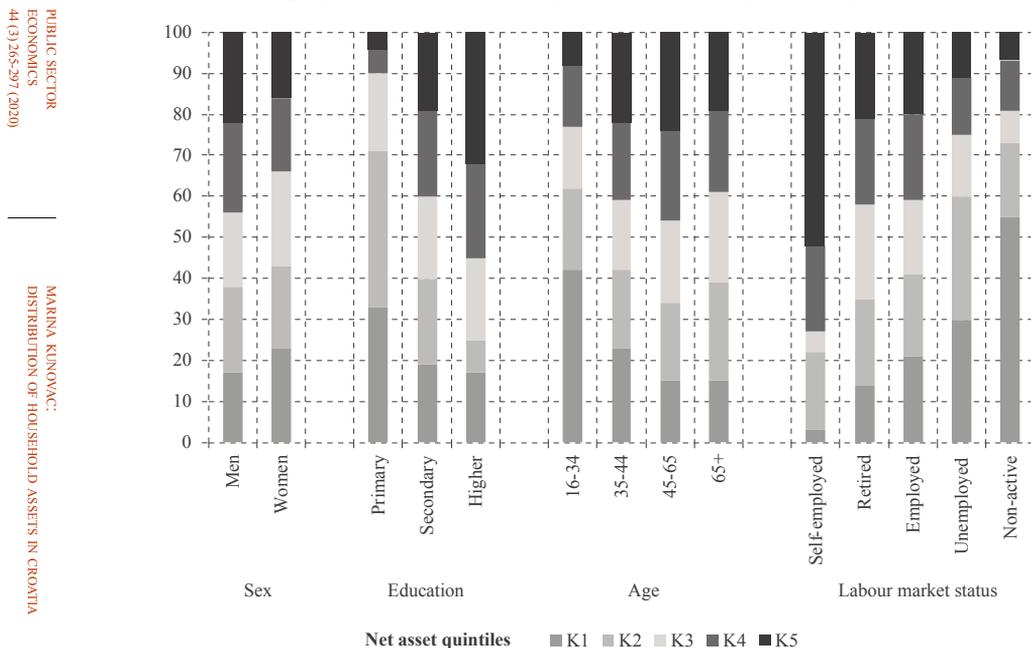
Source: ECB and author's calculations.

The educational attainment, labour market status and age are also connected with the level of household income, this income being a determinant of the value of net assets, which can be approximated by the savings from current income accumulated through time and increased by intergenerational transfers and gifts (for a detailed discussion, see Du Caju, 2016). The interconnection between income level and inequality in the distribution of net assets among households is shown in the Figure 4A. Top earning households (in the highest income quintile) are also among the wealthiest (40% of them are positioned in highest net asset quintile). Households in the lowest income quintile usually own low-value net assets, yet some of them have assets of high value (17% of households are both in the lowest income quintile and the highest asset quintile). Even though the literature offers several explanations of why some households are in the lowest income quintiles and the highest asset quintiles (such as a high proportion of pensioners in the first income quintile, who, despite having low current incomes, have accumulated a considerable amount of assets, or a potential impact of intergenerational transfers that are not related to the income level), a detailed decomposition of data has shown that these explanations do not apply to Croatian households. As previously explained, in the survey carried out in Croatia, quite a large number of households responded that they did not have income of any kind (7%), and, since, in line with

the survey definition, annual gross income includes employment income, rent, income from financial assets, pensions, social transfers or any other sources of income, this result indicates that the actual value of data presented in the responses was deliberately omitted during the interview.[14] The Figure 4B therefore shows the distribution of assets and incomes for the households whose annual gross income exceeds EUR 1,300 (the amount of the guaranteed minimum benefit). However, even when households with annual gross income lower than EUR 1,300 are excluded from the sample, one can still observe households with very low incomes and high net asset values. This is why other factors that may affect inequality in the distribution of net assets are also examined.

FIGURE 4

Joint distribution of income and net assets
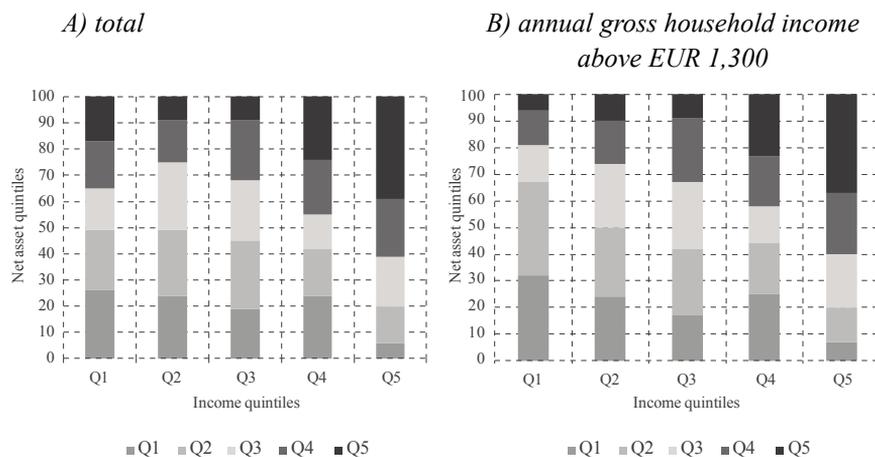
Source: ECB and author's calculations.

Recent research (Piketty, 2011; Zucman and Piketty, 2015) suggests that, irrespective of income, intergenerational transfers may substantially affect inequality in the distribution of net assets. In that sense, inherited household residence may play a pivotal role. The interconnection between the tenure status in terms of the HMR and the way the main residence, as the most important component of net assets, was acquired, including the total household net asset value, is shown in the Figures 5A i 5B. The Figure 5A shows that households that rent or freely use the main residence are among the poorest. On the other hand, the share of households that own the HMR increases from 5% among households with the lowest net assets to 95% among households whose net assets are the highest. In terms of ways of acquiring the household main residence, the Figure 5B shows that, among households in the lowest deciles of net assets, the largest proportion does not have the HMR, which comes as no surprise since this is the most valuable asset determinant. In the first decile of net assets, only 3% of households inherited the HMR.

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[14] Income components included in the definition of the annual gross income and components of all the other variables whose values are collected in the survey are available in CNB (2019a).

In other deciles, the share of these households remains relatively the same and amounts to 30% on average.

FIGURE 5A
Household main residence – tenure status and deciles of net assets, in %

FIGURE 5B
Way of acquiring the household main residence and deciles of net assets, in %

■ Own whole ■ Own in part ■ Rent ■ Free use

■ No real estate ■ Acquired by purchase / built
■ Acquired through inheritance / as a gift ■ Other
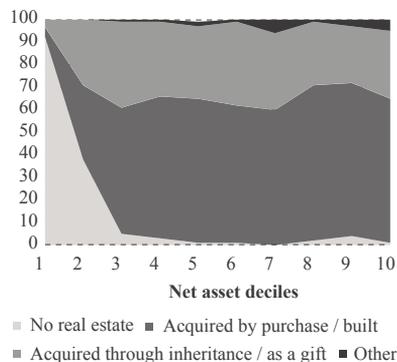
Source: ECB and author's calculations.

Given the importance of the HMR value in total value of net assets, apart from the tenure status and the way of acquiring the HMR, the geographic location of main residence also has a significant effect on the value of total net household assets. The Croatian real estate market is known for pronounced regional heterogeneity and significant price differences depending on the geographic location of real estate (for more information see Tkalec, Vizek and Žilić, 2018 and CNB, 2019). Other economic trends[15] also reflect regional disparities, so the remainder of the paper provides an analysis of household net asset value depending on the geographic location of a particular household.

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[15] For more details see Christiaensen et al. (2019).

FIGURE 6A

*Regional heterogeneity of households
with regard to the value of net assets*
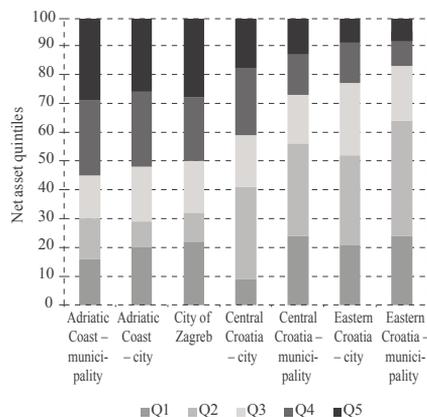
FIGURE 6B

*Comparison of net asset percentiles
for a household in the region and at
the level of Croatia*
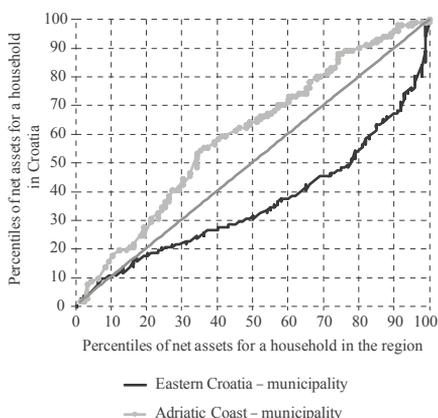
Note: Geographical location "Adriatic Coast" includes the following counties: Primorje-
Gorski Kotar, Lika-Senj, Zadar, Šibenik-Knin, Split-Dalmatia, Istria and Dubrovnik-Neretva.
Geographical location "Eastern Croatia" includes the following counties: Sisak-Moslavina,
Karlovac, Bjelovar-Bilogora, Virovitica-Podravina, Požega-Slavonia, Brod-Posavina, Osijek-
Baranja and Vukovar-Srijem. Geographical location "Central Croatia" includes the following
counties: Zagreb, Krapina-Zagorje, Varaždin, Koprivnica-Križevci and Međimurje.

Source: ECB and author's calculations.

The Figure 6A shows that, on the Adriatic Coast and in the City of Zagreb, over
50% of households can be grouped among the 40% of the wealthiest, while the
share of such households in Eastern Croatia is lower than 20%. In that sense, the
poorest municipalities in Eastern Croatia stand out. These municipalities have
over 60% of households classified among 40% of those with the lowest value of
net assets at the level of Croatia. More detailed breakdown of inequality among
various geographical locations in Croatia is shown in the Figure 5B, whereby the
areas below the slope of 45 degrees in each observed percentile of assets have net
asset values lower than those in the sample of the entire country. For instance, a
household in the 50th percentile in terms of the net asset value in the municipali-
ties of Eastern Croatia is also in the 30th percentile in terms of the net asset value
at the level of Croatia. In other words, an average household in a municipality of
Eastern Croatia is much poorer than the Croatian average. On the other hand, a
household in the 50th percentile in terms of the net asset value in a geographical
area comprising municipalities on the Adriatic Coast is in the 65th percentile in
terms of the net asset value at the level of Croatia. One can draw a conclusion that
an average household in a municipality on the Adriatic Coast is much wealthier
than the Croatian average. These results point to marked regional heterogeneity in
terms of the net asset value among households.

Descriptive statistics used in this chapter show that the value of total net household assets significantly varies among households, depending on the socio-demographic characteristics and household income, real estate ownership and geographic location of a particular household. However, a descriptive analysis alone cannot give us a more detailed insight into relative significance of different household characteristics and their impact on distribution of net assets among households. This is why an econometric model is used in the next chapter in order to examine in more detail the impact of different household characteristics on inequalities in the distribution of net household assets.

5 ANALYSIS OF THE MAIN DETERMINANTS OF INEQUALITIES IN DISTRIBUTION OF NET ASSETS

The purpose of this chapter is to establish the basic determinants of inequality in the distribution of net household assets.[16] In line with the descriptive analysis carried out in the previous chapter, the dependent variable used for measuring inequality in the distribution of net assets is a quintile group for net assets that the household is assigned to with a value of 1 to 5.

Explanatory variables are divided into several main categories:

The impact of a household relative position in the *income distribution* on inequality in the distribution of net assets is taken into account by using a set of five dummy variables that take on value 1 if a household is positioned in a certain income quintile. By using the sample of countries that took part in the second HFCS wave, Arrondel, Roger and Savignac (2014) have shown that there was no unique link between income and asset distribution. In that respect, in some countries a rise in income implies a rise in household net assets, whereas in others, this link between income and asset distribution changes depending on the household relative position in the asset distribution.

Given the importance of HMR value for the total net asset value, as discussed in the previous chapter, the remainder of the analysis includes more detailed *information on household main residence*. Piketty (2011), Zucman and Piketty (2015), among others, think that inheritance is crucial for establishing value of household net assets. In addition, the data collected in the two previous HFCS waves (ECB, 2013; 2016) also emphasise the important role of inheritance in establishing value of net assets. This is why the analysis also includes a dummy variable that takes on value 1 if a household reported that they *inherited* the main residence or received it as a gift. In addition, given the heterogeneity in terms of HMR value among different geographic locations in Croatia, a set of four dummy variables is created, designating the *geographic location of household main residence* and the household (Adriatic Coast, Central Croatia, Eastern Croatia and the City of Zagreb). Mathä,

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[16] Selection of dependent variables and methodological approach is similar to those presented in Arrondel, Roger and Savignac (2014), Martinez and Uribe (2018) and Georgokoponus (2019).

Porpiglia and Ziegelmeyer (2014) use the Oaxaca – Blinder decomposition and show that differences in property prices across euro area countries are the most important factor for explaining differences in household net asset values. *Socio-demographic characteristics of households* are based on the data on the reference person chosen by household members as the person most informed about household finances. The analysis includes a set of dummy variables for reference person's *age* (age groups: 16-34, 35-45, 45-64 and over 65). Hammer (2015) has analysed age-specific household balance sheet depending on the reference person's age and has shown that household assets increase in proportion with the reference person's age and slightly decreases once the reference person retires.[17] Another element used in the analysis is the reference person's *sex*. A dummy variable that takes on value 1 if the reference person is male was thus created. Previous research (Sierminska, Frick and Grabka, 2017) has shown that households whose reference person is a man may have higher net asset value. The effect of the reference person's *education* was examined by using three dummy variables classifying reference persons into three groups: persons with primary education or with no education, those with secondary education and those with higher education. The effect of the reference person's *labour market status* on inequality in the distribution of net assets is measured by using a set of dummy variables assigning reference persons into one of the following categories: self-employed, employed, retired and unemployed or non-active. Lise (2011) points to the fact that inequality in distribution of assets is affected by the labour market status, with unemployed and non-active individuals in a significantly disadvantaged position.

Socio-demographic characteristics of households include dummy variables that describe *household structure*, such as total *number of household members* and *number of dependent children*, because we expect positive correlation between the total number of household members and the net asset value and negative correlation in terms of number of dependent children in the household. Fessler, Linder and Segalla (2014) show that appropriate analysis of net assets should include variables to control for household structure.

In addition, the analysis includes other household characteristics, such as the *dummy variable measuring household willingness to take risks* (that takes on value 1 if a household reported willingness to take substantial or significant financial risks when making savings or investment decisions) and the dummy variable that equals 1 if a household *receives some kind of social benefits*. Fessler and Schürz (2015) and Jappelli (1995) show that social services provided by the state are substitutes for private wealth accumulation and households that receive some kind of social benefits have substantially lower net asset values compared with other households.

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[17] In line with the *life-cycle hypothesis* according to Modigliani and Brumberg (1954).

Finally, two dummy variables were used to examine the role of debt in accumulation of net assets for households with mortgage loans collateralised with the household main residence (HMR) and households with consumer debt.[18]

Apart from the above-mentioned variables, the Appendix Tables A6, A7 and A8 shows the results of the robustness analysis with alternative selection of variables. Since households whose annual income did not exceed EUR 1,300 (Chapter 3) accounted for a relatively high share in the sample, the paper presents the estimates of the model without households with income below EUR 1,300. By using the new sample, the cut-off values were estimated to position each household in the corresponding income and net assets quintiles. The additional robustness analysis was carried out by using an alternative specification of household income adjusted for the number of household members according to the OECD equivalence scale (OECD, 2011). The results of the robustness analysis are in line with the main results of the model. The text below explains the construction of the model used to estimate the effects of the above-mentioned set of explanatory variables on a household position in distribution of net assets.

5.1 METHODOLOGY – THE GENERALIZED ORDERED PROBIT MODEL
We use the generalized ordered probit model in the econometric estimation. The model is based on a latent dependent variable I_i^* defined as:

$$I_i^* = X_i \beta_j + \varepsilon_i \tag{1}$$

where $i = 1,...,n$ indexes the households in the sample and $j \in \{1,2,...,J\}$ indexes the categories of the probit model.

Observable variable I_i can assume the values defined within the set $\{1,2,...,J\}$ where $J = 5$. The observable variable is defined as follows:

$$I_i = 1 \quad \text{if } I_i^* \leq K_1$$

$$I_i = j \quad \text{if } K_{j-1} \leq I_i^* \leq K_j \quad \text{for } j = \{2,...,J-1\} \tag{2}$$

$$I_i = J \quad \text{if } I_i^* \geq K_{j-1}$$

where K_j represents estimated cut-off values that position each household in the corresponding net asset quintile.

In that respect, the probability that a household i is positioned in one of the J categories reflecting net asset quintile is defined as follows:

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[18] For the discussion on the effect of debt and different types of social benefits on inequality in the distribution of assets, see Maestri, Bogliacino and Salverda (2014).

$$\Pr(I_i = 1) = F(X_i \beta_1)$$

$$\Pr(I_i = j) = F(X_i \beta_j) - F(X_i \beta_{j-1}) \quad \text{for} \quad j = \{2,...,J-1\} \tag{3}$$

$$\Pr(I_i = J) = 1 - F(X_i \beta_{j-1})$$

where F equals a normal cumulative distribution function.

The generalized ordered probit model is selected as opposed to the ordered probit model as a preferred model specification because it allows for heterogeneous effect of the independent variables on the dependent subject to different categories of dependent variable (Williams, 2006; Green and Hensher, 2010). This is why in the generalized model the estimated parameters β_j vary between j categories of the dependent variable (net asset quintiles for households). If we want to have estimated coefficients β_j equal for each of j values of the dependent variable categories, the end result would be the ordered probit model. The ordered probit model would assume linear effect of all independent variables on the dependent variable. For instance, the income effect would be equal to establish the probability of positioning a household in both the second and fifth net asset quintile. Since the Wald test of the *parallel line assumption* rejects the homogeneity assumption for the estimated parameters, it is more appropriate to use the generalized ordered probit model as opposed to the ordered probit model in the analysis (test results shown in the Appendix in Tables A6, A7 and A8). Also, the same tables presents the results of the least squares method estimate with net asset value (log) as the dependent variable. On the other hand, the use of linear regression also assumes linear effect of all independent variables on the dependent variable, but the previous univariate analysis has shown that the structure of relevant household characteristics substantially changes depending on the household position in the distribution of net assets. For these reasons, the generalized ordered probit model was selected as the primary methodological tool because it allows for non-linear effect of independent variable depending on different categories of the dependent variable.

5.2 MAIN RESULTS
The text below presents the main results of the estimate of the generalized ordered probit model as defined in the equation (3). Since the regression coefficients cannot be interpreted as marginal effects within the probit model, the Table 3 presents the marginal effects that show the effect of the unit change of the explanatory variables on the probability of positioning a household in a particular net asset quintile. Given that the marginal effect may differ for different values of explanatory variables, the marginal effect in accordance with the mean value of explanatory variables is thus presented.

TABLE 3

Probability of positioning a household in a certain net asset quintile*

		Net asset quntiles				
		1	**2**	**3**	**4**	**5**
Income per quintiles	1	**0.14*****	**0.14*****	-0.04	-0.05	**-0.20*****
	2	**0.16*****	**0.13*****	0.05	-0.06	**-0.28*****
	3	**0.10*****	**0.11*****	0.01	0.00	**-0.22*****
	4	**0.11*****	0.05	-0.05	-0.03	**-0.08****
HMR charac-teristics (inheritance and location)	Inheritance_HMR	**-0.11*****	**0.07*****	**0.05***	0.01	-0.02
	HMR_City of Zagreb	0.00	**-0.21*****	-0.05	**0.07***	**0.19*****
	HMR_Primorje	0.02	**-0.24*****	**-0.06****	**0.09*****	**0.18*****
	HMR_Central Croatia	0.00	-0.03	**-0.08*****	0.03	**0.08*****
Socio-demo-graphic char-acteristics of reference person	Sex (male)	-0.02	**0.04***	-0.03	-0.02	0.02
	Retirement	-0.01	**-0.09****	0.02	0.00	**0.09*****
	Unemployed/ non-active	0.05	0.02	-0.06	-0.01	0.00
	Self-employed	**-0.24*****	0.06	-0.14	0.08	**0.24*****
	Secondary education	**-0.14*****	-0.06	0.03	0.06	**0.12***
	Higher education	**-0.19*****	**0.13****	0.05	0.08	**0.20*****
	35-45 age group	**-0.13*****	-0.01	0.04	0.05	0.05
	45-64 age group	**-0.18*****	0.00	0.07	0.01	**0.11****
	65+ age group	**-0.27*****	0.07	0.04	0.05	**0.12****
Household characteris-tics	Number of chil-dren in household	**0.05*****	0.02	0.00	**-0.05*****	-0.01
	Number of household members	**-0.03*****	**-0.02***	0.00	**0.03****	**0.02***
Indicators of debt burden	Mortgage for HMR	**-0.08****	**0.11****	0.04	-0.02	-0.05
	Consumer debt	**0.07*****	-0.03	-0.03	0.03	-0.03
Other charac-teristics	Social benefits recipients	**0.07****	0.02	-0.05	0.04	**-0.08***
	Willingness to take risks	0.01	-0.08	-0.06	0.02	**0.10****

* Generalized ordered probit model, marginal effects

Note: Symbols ***, ** and * indicate statistical significance of 99%, 95% and 90% respectively.

Reference categories: for income – Income_5quintile group for the HMR location – _HMR loca-tion Eastern Croatia; for labour market status – Employed; for educational attainment – Primary education or no education, for age – Up to 34 years of age.

Source: ECB and author's calculations.

The main results are presented in the text below.

The empirical analysis has confirmed the link between a household position in the distribution of income and net assets. The estimated marginal effects for income

mostly have the expected sign. Low income households are more likely to be in lower and less likely to be in higher net asset quintiles. For instance, a household in the first income quintile is 14% more likely to be positioned in the first net asset quintile as well and 20% less likely to be in the fifth (highest) net asset quintile, in comparison with a household in the fifth income quintile. Regardless of a certain connection between income and net asset value, statistical significance and link intensity vary, depending on a household position in terms of the distribution of assets. This leads us to conclude that inequality in distribution of assets can only partially be attributed to the income levels among households and that some other factors, apart from income, may have a relevant impact on a household position in the distribution of net assets.[19]

The results of the estimated model show that information on the household main residence (HMR) remains significant when establishing a household position in the distribution of net assets. In that respect, inherited HMR decreases the likelihood of positioning the household in the lowest net asset quintile (by 11%) and increases the likelihood of positioning it in somewhat higher net asset quintiles (second and third net asset quintile). On the other hand, the inherited main residence does not affect the likelihood of having a household in the wealthiest quintiles because the results for the fourth and fifth net asset quintile are not statistically significant for this variable.

The location of HMR is extremely important to establish a household position in the distribution of net assets. All other factors being constant, households with the household main residence on the Adriatic Coast or in the City of Zagreb are much less likely to be in lower net asset quintiles (second and third quintiles) and more likely to be in higher net asset quintiles (fourth and fifth quintiles) compared with households in Eastern Croatia that make up the reference category. It should be noted, however, that, irrespective of the important effect of geographic location of the HMR on a household position in the distribution of net assets, a location does not have a significant effect on the likelihood of positioning a household in the poorest (first) net assets quintile. This is in line with the previous descriptive analysis that has shown that the majority of households in the lowest net asset quintile do not even own the HMR.

In terms of socio-demographic characteristics, the labour market status only partially affects the probability of positioning a household in a certain net asset quintile. For instance, households with self-employed persons are 24% less likely to be in the poorest quintile and 23% more likely to be in the wealthiest net asset quintile compared with households with an employed reference person. This is in line with the findings of the descriptive analysis that point to high values of self-employment business assets and inequality of its distribution among households. In terms of other categories of labour market status, the results have the expected

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[19] Other research has also backed this result (e.g. Arrondel, Roger and Savignac, 2014; Leitner, 2015).

sign but they are not statistically significant. The only exception are households with a retired reference person that are 9% more likely to be in the highest net asset quintile in comparison with households with an employed reference person.

Households with higher educational attainment and older age of the reference persons are more likely to be positioned in higher asset quintile. For example, highly educated reference persons and those with secondary education are (19% and 14% respectively) less likely to be in the poorest quintile and (20% and 12% respectively) more likely to be in the highest net asset quintile compared with reference persons with primary education or no education. Households with older reference persons (+65) are much less likely to be in the poorest net asset quintile and more likely to be in the wealthiest net asset quintile in comparison with households whose reference person is below 35. A similar effect, though somewhat more moderate, was also observed for households with middle aged reference person (45-64 age group). The analysis has also emphasised the importance of household characteristics for its position in the distribution of net assets with households with more children and fewer household members more likely to be in poorer net asset quintiles and *vice versa*.

Finally, the results have shown that households that reported perceived willingness to take financial risks are more likely to be in the highest net asset quintile whereas households that receive social benefits and indebted households are more likely to be in poorer net asset quintiles (whereby households with consumer debt are more likely to be in the lowest net asset quintile).

6 CONCLUSION

The household finance and consumption survey (HFCS) was used in this paper to analyse the distribution of household net assets and its main components. The results reveal moderate inequality in the distribution of net assets among Croatian households. Inequality in possession of financial assets measured by the Gini coefficient is more pronounced than in case of real assets because only a certain portion of households own substantial financial assets. The median value of households' financial assets stands at EUR 500. Real assets account for a large share of households' total assets and 85% of households own the household main residence (HMR) that makes up the bulk of households' total net assets with 66 thousand euros in median value. The value of total net household assets considerably varies among households depending on their different social and demographic characteristics, income, real asset ownership and geographic location.

The results of the econometric model indicate that interaction of numerous factors affects a household position in the distribution of net assets. In that sense, the importance of HMR stands out. The main residence represents the most significant component of value of net assets, especially in terms of the way it was acquired and geographic location. Households with inherited HMR are less likely to be positioned in the lowest net asset quintile. In addition, households with HMR

in the City of Zagreb or on the Adriatic Coast are more likely to be in higher asset quintile groups.

Households with higher income and educational attainment and older age of the reference persons are more likely to be positioned in highest net asset quintiles. The same effect was found for financial risk taking and self-businesses (self-employment) because these characteristics were linked to the likelihood of having a household in highest net asset quintiles. On the other hand, households with more children, those that receive social benefits and those with poorly educated and younger reference person are most likely to be in the poorest net asset quintiles.

In that sense, this paper represents the first attempt to estimate inequality in the distribution of assets in Croatia and the accompanying factors affecting it. As a follow-up, it is crucial to compare the collected data with other survey and administrative data sources (tax administration, CBS) and continue with systematic collection of assets data and further research in terms of inequality in the distribution of assets given that there are currently few analyses of this type in Croatia.

Disclosure statement
No potential conflict of interest was reported by the author.

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TABLE A4

Comparison of socio-demographic characteristics of households*

Information on the reference person		HFCS	EU SILC
Education	Primary	24	26
	Secondary	59	57
	Higher	16	17
Age	Under 24	25	26
	25-54	37	41
	55-64	17	14
	65+	21	19
Labour market status	Employed	45	38
	Self-employed	3	4
	Retirement	42	31
	Non-active/unemployed	9	27
Average household size (no. of individuals)		2.8	2.8
Information on main residence			
	Owners	85	90
	Renters	15	10

* Comparison of the Household Finance and Consumption Survey (HFCS) and the EU Statistics on Income and Living Conditions (EU SILC) for 2016.

Note: Information on the reference person for the HFCS was calculated by using the estimated weights and all five versions of data imputations. Information on the reference persons for the EU-SILC was taken from the Eurostat data.

Source: ECB and Eurostat (EU SILC).

TABLE **A5**

Gini coefficient for subcomponents of real and financial assets

Components of net assets	Gini coefficient
Real assets	**0.59**
Main residence	0.56
Other real estate	0.93
Vehicles	0.69
Other valuables	0.99
Self-employment business assets	0.99
Financial assets	**0.88**
Current accounts	0.83
Savings accounts	0.96
Voluntary pension/life insurance	0.99
Mutual funds	0.99
Money owed to household	0.99
Shares	0.98
Bonds	0.99
Other types of financial assets	0.96
Liabilities	**0.90**
Mortgage debt	0.96
Non-mortgage debt	0.89
Total annual gross income	0.51
Gross assets	**0.59**
Net assets	**0.61**

Source: ECB and author's calculations.

TABLE A6

Probability of positioning a household in a certain net asset quintile*

		Net asset quintiles				
		1	**2**	**3**	**4**	**5**
Income per quintiles (OECD)	1	**0.13*****	**0.13*****	-0.01	-0.06	**-0.18*****
	2	**0.16*****	**0.12*****	0.01	**-0.07***	**-0.22*****
	3	**0.10*****	**0.10****	0.03	-0.05	**-0.18*****
	4	0.06	0.05	0.03	-0.05	**-0.10*****
HMR characteristics (inheritance and location)	Inheritance_HMR	**-0.11*****	**0.08*****	**0.04***	0.01	-0.02
	HMR_City of Zagreb	0.00	**-0.22*****	-0.04	**0.06***	**0.21*****
	HMR_Primorje	0.03	**-0.24*****	**-0.07*****	**0.09*****	**0.18*****
	HMR_Central Croatia	0.00	-0.03	**-0.08****	0.02	**0.08*****
Socio-demographic characteristics of reference person	Sex (male)	-0.01	**0.04***	-0.03	-0.02	0.02
	Retirement	-0.02	**-0.08***	0.02	0.01	**0.08****
	Unemployed/non-active	0.04	0.03	-0.05	-0.01	-0.01
	Self-employed	**-0.26*****	0.06	-0.11	0.08	**0.23*****
	Secondary education	**-0.14*****	-0.06	0.03	0.06	0.10
	Higher education	**-0.17*****	**-0.11****	0.03	0.07	**0.18*****
	35-45 age group	**-0.13*****	-0.02	0.04	0.05	0.06
	45-64 age group	**-0.18*****	-0.01	0.06	0.01	**0.12****
	65+ age group	**-0.27*****	0.06	0.04	0.05	**0.13****
Household characteristics	Number of children in household	**0.05*****	0.03	-0.01	**-0.05*****	-0.02
	Number of household members	**-0.04*****	**-0.03*****	0.00	**0.03*****	**0.05*****
Indicators of debt burden	Mortgage for HMR	**-0.08***	**0.10****	0.05	-0.03	-0.06
	Consumer debt	**0.07*****	-0.02	**-0.04***	0.03	-0.03
Other characteristics	Social benefits recipients	**0.07****	0.02	-0.05	0.03	**-0.07***
	Willingness to take risks	0.02	-0.07	-0.05	0.01	**0.09***

* Generalized ordered probit model, marginal effects, income quintiles adjusted for the number of household members according to the OECD equivalence scale

Note: Symbols ***, ** and * indicate statistical significance of 99%, 95% and 90% respectively.

Reference categories: for income – Income_5quintile group for the HMR location – _HMR location Eastern Croatia; for labour market status – Employed; for educational attainment – Primary education or no education, for age – Up to 34 years of age.

Source: ECB and author's calculations.

TABLE A7

Probability of positioning a household in a certain net asset quintile*

		Net asset quintiles				
		1	**2**	**3**	**4**	**5**
Income per quintiles > EUR 1,300	1	**0.28*****	0.07	-0.01	-0.08	**-0.26*****
	2	**0.18*****	0.06	-0.03	-0.03	**-0.25*****
	3	**0.14*****	**0.09****	-0.01	-0.04	**-0.18*****
	4	**0.13*****	0.02	-0.05	-0.02	**-0.09***
HMR characteristics (inheritance and location)	Inheritance_HMR	**-0.15*****	**0.12*****	0.04	0.00	-0.02
	HMR_City of Zagreb	0.05	**-0.25*****	-0.06	**0.06***	**0.20*****
	HMR_Primorje	0.04	**-0.27*****	**-0.06***	**0.11*****	**0.18*****
	HMR_Central Croatia	0.00	-0.04	**-0.08****	**0.06***	**0.06****
Socio-demographic characteristics of reference person	Sex (male)	-0.01	0.04	-0.03	-0.03	0.02
	Retirement	-0.02	-0.03	-0.01	-0.01	**0.08****
	Unemployed/non-active	0.01	0.02	-0.01	0.00	-0.01
	Self-employed	-0.97	0.79	-0.11	0.04	**0.25*****
	Secondary education	**-0.13*****	-0.08	0.05	0.01	0.15
	Higher education	**-0.12****	**-0.20*****	0.08	0.02	**0.22***
	35-45 age group	**-0.16*****	0.06	0.00	0.04	0.06
	45-64 age group	**-0.20*****	0.02	0.04	0.03	**0.12****
	65+ age group	**-0.32*****	**0.11***	0.03	0.05	**0.13****
Household characteristics	Number of children in household	**0.04****	**0.04***	-0.01	**-0.05****	-0.02
	Number of household members	-0.02	**-0.04****	0.00	**0.03****	**0.02***
Indicators of debt burden	Mortgage for HMR	**-0.07***	**0.14*****	0.03	-0.04	-0.06
	Consumer debt	**0.08*****	-0.04	-0.03	0.02	-0.03
Other characteristics	Social benefits recipients	**0.07****	0.03	**-0.08***	0.05	-0.07
	Willingness to take risks	-0.04	-0.07	-0.03	0.06	0.08

* Generalized ordered probit model, marginal effects, sample excludes the households that reported annual gross income lower than EUR 1,300 and the accompanying income and net asset quintiles modified accordingly

Note: Symbols ***, ** and * indicate statistical significance of 99%, 95% and 90% respectively.

Reference categories: for income – Income_5quintile group for the HMR location – _HMR location Eastern Croatia; for labour market status – Employed; for educational attainment – Primary education or no education, for age – Up to 34 years of age.

Source: ECB and author's calculations.

TABLE A8

Least squares estimator (Models 1 and 2) and ordered probit

		OLS (Model 1)	OLS (Model 2)	Ordered probit model (Model 3)
Income per quintiles (OECD)	1	-0.78***		-0.71***
	2	-1.16***		-0.88***
	3	-0.69***		-0.64***
	4	-0.41**		-0.39***
	log (annual gross income)		-0.39***	
	log (annual gross income)^2		0.04***	
HMR characteristics (inheritance and location)	Inheritance_HMR	0.55***	0.55***	0.15**
	HMR_City of Zagreb	0.50**	0.54***	0.61***
	HMR_Primorje	0.38**	0.40**	0.53***
	HMR_Central Croatia	0.23	0.24	0.15*
Socio-demographic characteristics of reference person	Sex (male)	0.06	0.07	0.03
	Retirement	0.48**	0.23	0.29***
	Unemployed/non-active	-0.45**	-0.42*	-0.12
	Self-employed	1.03***	1.02***	0.97***
	Secondary education	0.59**	0.77***	0.50***
	Higher education	0.81**	1.03***	0.75***
	35-45 age group	0.75***		0.48***
	45-64 age group	0.97***		0.69***
	65+ age group	1.06***		0.81***
	log (age)		1.21***	
Household characteristics	Number of children in household	-0.27**	-0.25**	-0.18***
	Number of household members	0.33***	0.26***	0.22***
Indicators of debt burden	Mortgage for HMR	0.24	0.24	0.02
	Consumer debt	0.15	0.18	-0.17**
Other characteristics	Social benefits recipients	-0.57**	-0.52**	-0.23**
	Willingness to take risks	0.37	0.54*	0.16
	Constant	8.44	3.96	
Wald thest for homogeneity of coefficients	chi2			219.84
	Prob>chi2			0.000

Note: The Model 2 of the least squares estimator includes the income square due to the non-linear effect of income. The Model 3 is an ordered probit model (homogeneous coefficient for different categories of the dependent variable). The results of the Model 3 show the estimated model coefficients rather than marginal effects. The Table also shows the results of the Wald test that rejects the homogeneity assumption (parallel line assumption test).

Source: ECB and author's calculations.

Penny wise and pound foolish: capital gains tax and trading volume on the Zagreb Stock Exchange

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Abstract

This paper analyses the effects of a recently introduced capital gains tax on the trading volume on the Zagreb Stock Exchange. Using three different methodological approaches – event study methodology, regression discontinuity design and panel regressions – we offer evidence that the introduction of the capital gains tax in January 2016 created abnormally high trading volume patterns shortly before the tax came into force and abnormally low volume patterns after the fact, further decreasing the liquidity of an already poorly liquid market. The negative effects are significant in both the short and the longer term, as our difference-in-differences estimations suggest that the average trading volume in the three post-tax years decreased by 23% vis-à-vis the pre-tax period. Given that the revenues collected from this tax are almost negligible, but create considerable negative externalities, our main policy recommendation for countries with underdeveloped and not very liquid stock markets is to use less restrictive tax policies to encourage investment and attract as many new investors as possible.

Keywords: capital gains tax, event study, regression discontinuity, stock market, trading volume

1 INTRODUCTION

Earning capital gains is one of the most important drivers of investing. One of the striking findings of recent empirical research in the field of finance was that individual investors tend to sell appreciating stocks too soon and hold on to depreciating stocks for too long (Lei, Zhou and Zhu, 2013; Frazzini, 2006). Tax considerations, however, can significantly impact investors' behaviour and may alter the aforementioned findings. The literature recognizes two hypotheses that explain why the trading volume significantly changes around specific announcement dates (Karpoff, 1986; Varian, 1989; He and Wang, 1995). The differential interpretation hypothesis states that investors disagree on the distribution of uncertainty after the announcement. On the other hand, the pre-announcement disagreement hypothesis is based upon trading activity induced by disagreement prior to the announcement. The announcement and the implementation of a new tax that affects investment on the stock market is one such event.

A key tax that impacts the behaviour of investors on stock markets is the capital gains tax. Researchers have shown that income tax considerations are a major factor in the creation of abnormal trading volumes on the stock market. For instance, Dyl (1977) found significant abnormal year-end trading volumes in the United States, especially with stocks that had substantially appreciated or depreciated during the year. This serves as evidence for the existence of tax lock-in strategies utilized by investors to avoid paying capital gains tax, and tax-loss selling strategies to decrease their overall tax burden, respectively.

This paper analyses whether the introduction of a capital gains tax[1] in Croatia affected the trading volume on the Zagreb Stock Exchange (ZSE) before and after the tax came into force on 1 January 2016. Most of the existing literature has focused on analysis of the behaviour of investors at the end of calendar years in which a capital gains tax was already in force. Their aim was to test for evidence of tax lock-in and tax-loss strategies, depending on whether certain stocks significantly appreciated or depreciated throughout the calendar year (see e.g. Agostini and Siravegna, 2014; Dyl, 1997; Reese Jr., 1998). Very few researchers, however, have dealt with how the introduction of a capital gains tax affects the overall trading volume on the stock market in countries that have not previously imposed such a tax.

This paper aims to fill this gap and offers innovative insights into the effects of a capital gains tax on investor behaviour before and after the new tax comes into force. We examine the implications of the introduction of new tax policies on trading volume, using both stock-level and country-level data. Utilizing three different methodological approaches – event study methodology (ESM), regression discontinuity design and panel regressions (including difference-in-differences estimations) – we test the hypothesis that the introduction of the capital gains tax created abnormally high trading volume patterns shortly before the tax came into force (to build-up a portfolio of tax-free securities) and abnormally low volume patterns after the fact (because of the new tax burden on newly acquired securities). We hypothesize that the negative effect post-tax is not only short-term, but that it hurt the liquidity of an already poorly liquid market in the longer term as well.

It is important to be aware of the illiquidity of the Croatian stock market (see related literature: Vidović, 2013; Minović, 2012; Vidović, Poklepović and Aljinović, 2014) and how important the liquidity of a market is to (international) investors. Stock market liquidity is an important driver of expected returns in markets such as the Croatian (Bekaert, Harvey and Lundblad, 2007). Any great illiquidity and its unpredictability is a source of market risk (Benić and Franić, 2008). Furthermore, illiquidity discourages investor interest in a market (Chuhan, 1994). Better liquidity of a stock market enables prompt transactions with a minimal impact on prices (Bernstein, 1987), and it is agreed among professionals that alongside transaction costs, liquidity represents an important factor in determining stock prices (Amihud and Mendelson, 1986; Datar, Naik and Radcliffe, 1998; Pástor and Stambaugh, 2003). Finally, Fernandez (1999) explains that liquidity is the "lifeblood" of financial markets, as it enables the smooth operation of economies, while erosion of liquidity can disrupt not only a single market, but also other connected markets worldwide.

Studies to date have been rather silent on this specific topic, so we utilize the recent tax reform in Croatia as a case study to contribute to the literature in this

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[1] The taxation of income from capital gains in Croatia was introduced not as a new tax form, but rather as part of the income tax reform contained in the changes in the Law on income tax (NN 115/16). However, for the sake of clarity, convenience, and compatibility with the existing literature, we will refer to the taxation of income from capital gains in Croatia as the "capital gains tax" throughout this paper.

field. This is, to our knowledge, the first empirical study to analyse the impact of the newly introduced capital gains tax on the Croatian stock market, which makes it relevant to policy makers, investors, boards of listed companies and all other stakeholders in the country and abroad.

In Croatia, the capital gains tax, which includes security trading, came into force on 1 January 2016. Gains are taxed at the rate of 12% plus city surtax, which ranges between 0% and 18%. However, gains from the sales of shares (or other financial assets) acquired before 1 January 2016 and/or owned for more than two years are exempt.[2] This means that all gains from the shares acquired on 1 January 2016 or later will be taxed if they are sold within two years of their purchase. We hypothesize that such a policy created incentives for short-term investors to build up their portfolio with stocks bought prior to 1 January 2016 because they would not have been subject to taxation even if sold quickly, increasing trading volume near the end of 2015. Similarly, we hypothesize that the new tax created incentives not to trade (buy or sell) once the tax came into force because gains from such transactions became taxable, decreasing the volume of trade immediately after the introduction of the tax, but also in the longer term.

Our results are robust across various methodologies and model specifications. Results of the event study based on daily data confirmed our hypotheses. We find abnormally high trading volume patterns shortly before the tax came into force and abnormally low volume patterns after the fact. Our estimations based on monthly data point to the same conclusions. Regression discontinuity models confirmed a statistically significant break in the slope of the regression line precisely at the cut-off point when the tax was introduced, providing further evidence that the trading volume was increasing in the pre-tax period and then sizeably dropped when the tax entered into force. In addition, panel regression estimations suggested that the tax introduction resulted in a 45 percent below-average growth in trading volume the month the tax entered into force, and 16 percent above-average growth in trading volume in the last month before the tax was introduced. Finally, difference-in-differences estimations suggest that the average trading volume in the three post-tax years decreased by 23 percent from the pre-tax period, indicating that the consequences of introducing this tax are not only short-term, but also of a longer-term nature, creating important policy implications.

The paper is structured as follows. Section 2 presents a review of literature on the link between taxation and stock market trading volume. Section 3 describes the details of the methodology and data utilized in the analysis, while Section 4 reports the results. Section 5 deals with extensive robustness checks to test the validity of the results. The final section states the main conclusions of the analysis and offers policy recommendations.

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[2] Initially, the exemption was granted only to gains from the sales of shares owned for more than three years, but that period was subsequently cut to two years.

2 LITERATURE REVIEW

The literature usually observes reactions of volumes and return series with respect to tax introductions or changes. Thus, the first group of papers in this review section consists of research that focuses on such reactions. Changes in capital gains tax rates are found to affect the trading volume on the stock market. As shown by Slemrod (1982), tax cuts were connected to increases in trading volume and turnover rates on the New York Stock Exchange. However, no effect on the volume of trading was found after the capital gains tax increase in 1987 (Henderson, 1990). Japan was one of the advanced economies that introduced a capital gains tax fairly late (in 1989) and subsequently underwent a tax cut reform. Hayashida and Ono (2010) analysed the effects of these policy changes and found that the introduction of the capital gains tax negatively influenced individual trading, while the 2003 tax cut worked in the opposite direction. Gary et al. (2016) found similar results in a study based on US data, focusing on the effects of changes in various types of tax rates on the volume of intercorporate stock market investment.

Other authors found that stocks approaching the date of long-term tax qualification, i.e. the date after which their owner cannot be taxed on capital gains, have abnormal trading volumes around the date of qualification. For instance, Reese Jr. (1998) found that stocks that appreciated prior to long-term tax qualification exhibit increased trading volume just after their qualification date, while stocks that depreciated prior to long-term qualification exhibit these effects just prior to their qualification, because these strategies enable the sellers to decrease their tax burden and increase after-tax returns.

Some countries have implemented capital gains tax cut and tax exemption policies to increase participation, depth and liquidity in the domestic stock market. Agostini and Siravegna (2014) took Chile and its 2001 tax reform as a case study and found that the introduction of such policies led to a stock price decrease in the magnitude of 15%, due to the tax lock-in effect. Other types of taxation, such as transaction tax, have also been found to affect the stock market, but only with respect to the stock price, while no significant effect was found on market volatility and market turnover (Hu, 1998). There have also been studies suggesting that the impact of the tax rate changes may be overstated. Covering 50 years of investment data on US stock markets, Akindayomi (2013) found that it is not the changes in capital gains tax rates, but rather the possibility of realizing capital gains, or the lack thereof, that impacts stock market investments and investors' behaviour.

In the literature on the methodology for testing abnormal trading volume, the common approach is to use the event study methodology (ESM). Seminal studies by Ajinkya and Jain (1989) and Cready and Ramanan (1991) extended the use of ESM to the analysis of stock returns and trading volume. Widely used test-statistics are those developed by Campbell and Wasley (1996) who imparted greater power to the tests. Yadav (1992) explains that trading volume is a useful variable to use in event study methodology. This is due to this volume reflecting the the different

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TOMISLAV GLOBAN, TIHANA ŠKRINJARIĆ: PENNY WISE AND POUND FOOLISH: CAPITAL GAINS TAX AND TRADING VOLUME ON THE ZAGREB STOCK EXCHANGE

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impacts new information arriving on the market makes. Individual investors are affected by new information differently due to different expectations on the market, clientele adjustments to taxes, information asymmetry, etc. Thus, the trading volume indicates the lack of a consensus when new information is interpreted.

Using the ESM approach, several studies found that the trading volume increases around the event day with respect to other announcements, such as changes of market index structure and dividend announcements. This group of papers is the second group within this literature overview, which utilizes the ESM approach, but does not focus on tax issues. For instance, Lakonishok and Vermaelen (1986) focused on the trading volume around ex-dividend days, by dividing the sample into subsamples for taxable distributions and non-taxable ones. Stocks of the CRISPR Therapeutics company were analysed in the period 1970-1981, with more than 2500 ex-dates for stock splits and stock dividends. Authors found significant increases of volume before and after the ex-dividend days. Bajaj and Vijh (1995) found not only the increase in volume around dividend announcement day (due to tax trading), but in volatility and returns as well. Other studies focus more on dividend announcements, mergers and acquisitions; stock market index composition changes, etc. (see Xu, Rui and Kim, 2002; Gregoriou, 2011; or Chaudary and Mirza, 2017). Some authors empirically evaluate the effects on stock returns and investor demand for stocks when capital gains taxes are put in place or are changed over time (Shackefold, 2000; Blouin, Raedy and Shackefold, 2000).

The existing literature allows several conclusions to be drawn. Firstly, the introduction of taxes hurts the trading volume and affects returns and volatilities on the majority of stock markets (see Akindayomi, 2013; Blouin, Raedy and Shackefold, 2003; Amoaku-Adu, Rashid and Stebbins, 1992; Dai, Shackelford and Zhang, 2013). Secondly, there is no clear consensus on how to solve the problem of taxation, in terms of completely abolishing taxes or finding some combination of tax brackets according to the type of investor and other classifications[3]. This debate has been ongoing for a long time (see Fenberg and Summers, 1989).

Finally, we briefly mention the idea of speculative investing because one of the ideas of a capital gains tax could be to discourage such behaviour. The idea of speculative behaviour is not new (Miller, 1977; Harrison and Kreps, 1978), but the topic is still interesting (Janssen, Füllbrunn and Weitzel, 2019). Some of the main explanations include the heterogeneous beliefs of investors (Scheinkman and Xiong, 2003; Hong, Scheinkman and Xiong, 2006). In his long study on stabilizing the stock market, Repetti (1989) concludes that if the primary purpose for re-enactment of preferences for long-term capital gains is to curb speculation, it is not advisable to do so as it would decrease societal welfare.

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[3] See, for example Jin (2006) – it cannot be argued that increasing capital gains tax rates will slow down trading on a stock market; whereas Auten (1999) states that lower and middle income taxpayers are losers in the long run. Other literature on pros and cons with respect to the amount of tax rates, their introduction or suspension can be found in Akindayomi (2013).

3 DATA AND METHODOLOGY

3.1 DATA DESCRIPTION

For the purpose of empirical analysis, daily trading volume data for 45 stocks have been collected from the ZSE (2019) website. The full list of stocks included is reported in the Appendix in Table A1. The most liquid stocks in terms of total turnover and number of transactions in 2018 have been selected for the analysis. The time span and data frequency used in this study differ depending upon the methodology used. Specifically, the first part of the analysis utilizes the daily data for the event study methodology. Here, we used the time span from 2 January 2015 until 1 February 2016.

We also employ two additional estimation methods – regression discontinuity design and panel regressions, which include the difference-in-differences estimations. These estimations are based on monthly data to further test whether the introduction of the tax had also longer-term consequences on trading volume than those implied by the ESM results. Thus, the estimation period covers a longer time period pre- and post-tax and runs from 2013:M01 to 2019:M01, making the pre- and post-event periods of similar size.

The pre-event window for the event study estimation of the market model of trading volumes is chosen to be from 2 January 2015 until 10 December 2015, with 236 daily observations for every volume series. MacKinlay (1997) recommends around 250 days for the pre-event window estimation, depending upon data availability and the topic of interest. The event-window length is usually short. Thus, we select the length of 21days, with 10 days prior and 10 days after the event day.

In later stages of our analysis, we focus on the regression discontinuity methodology and panel regressions. Here, we transformed the daily data to monthly frequencies, with the time span from 2013:M01 to 2019:M01. Detailed descriptive statistics both for monthly and daily frequencies are shown in the Appendix in Table A2.

Since the beginning of the Croatian stock market in 1997, several sub-periods can be distinguished. Firstly, the market was in a stagnant phase until 2003, which saw the start of the trend of an increasing growth of the official stock market index CROBEX, as well as of the number of transactions. That all ended with the crisis of 2008. The fast pre-crisis growth was due to the IPOs of several big companies such as HT, Ina, Atlantic Group, Ingra, Magma and Optima. The market recovery was very limited, and ended in 2010. Ever since, the whole market has been, broadly speaking, in a stagnant phase, with low trading volume and stagnating market index values (see Graphs 1 and 2).

GRAPH 1

Market index value (right axis) and return series (left axis) on ZSE
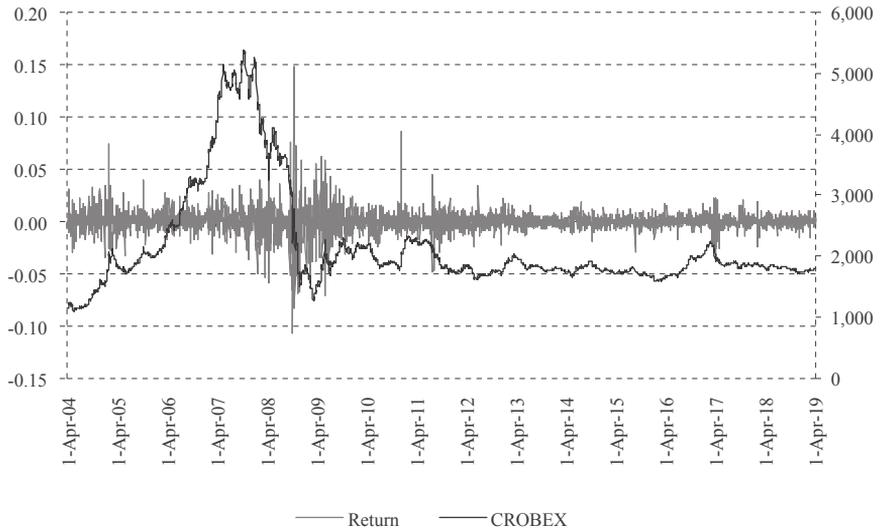
Source: ZSE.

Legislative analysis regarding the trading on ZSE is detailed in Grubišić Šeba (2017), who argues that the legislation in Croatia did not enhance the development of ZSE, but instead resulted in the crowding out of small shareholders from the market.[4] Liquidity is one of the greatest problems on ZSE today (see Vidović, 2013; or Škrinjarić, 2018 for details), which is also evident from Graph 2.

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[4] For a more detailed discussion on the link between legislation and the composition of investors on ZSE see Grubišić Seba (2017).

GRAPH 2
Total trading volume on ZSE, in mil HRK
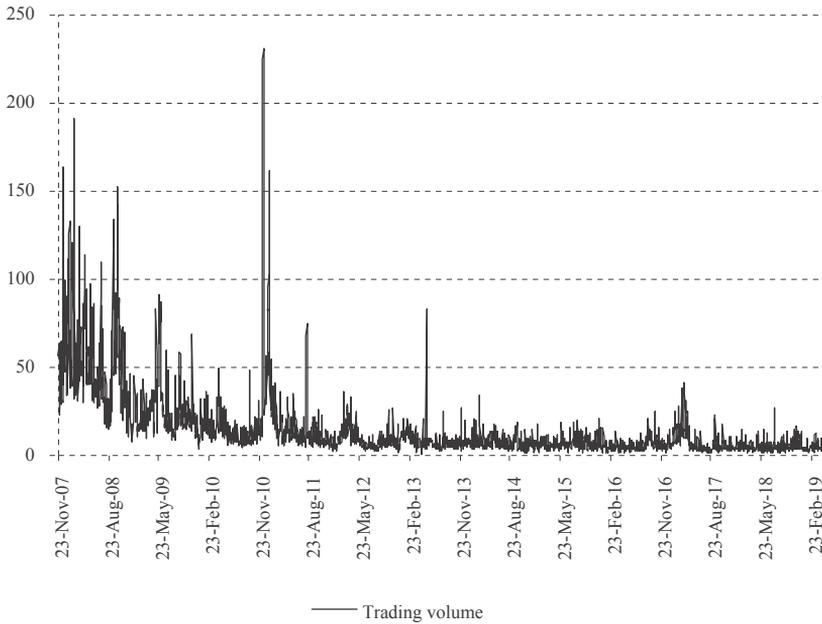
Source: ZSE.

Graph 3 reports the yearly trading volume on ZSE, which shows a 15.1 percent decline in 2016 with respect to the previous year. Our hypothesis is that the introduction of the capital gains tax from 1 January 2016 played a role in this decline, which we test in the following sections. Graph 3 also indicates that the trading volume in 2017 bounced back strongly with a yearly growth rate of over 30 percent. However, this was primarily the result of a major fire sale of stocks of companies connected to the large food concern Agrokor, which had fallen into a major financial crisis that escalated in the first half of 2017.

Before formally testing our hypotheses, we compared average daily volumes in the 10 days prior to the event day with the average in the 10 days after. It turned out that 34 out of 45 stocks marked a decline in average trading volume. Moreover, the average monthly volumes in January 2016 were lower than in December 2015 for 36 stocks, while the cumulative monthly volume decreased for 37 stocks in the same period. Descriptive analysis suggests that the tax may have influenced the trading volumes on ZSE, which we test more formally in the following sections.

GRAPH 3

Yearly total trading volume on ZSE (left axis, in billions), percentage change (right axis, in %)
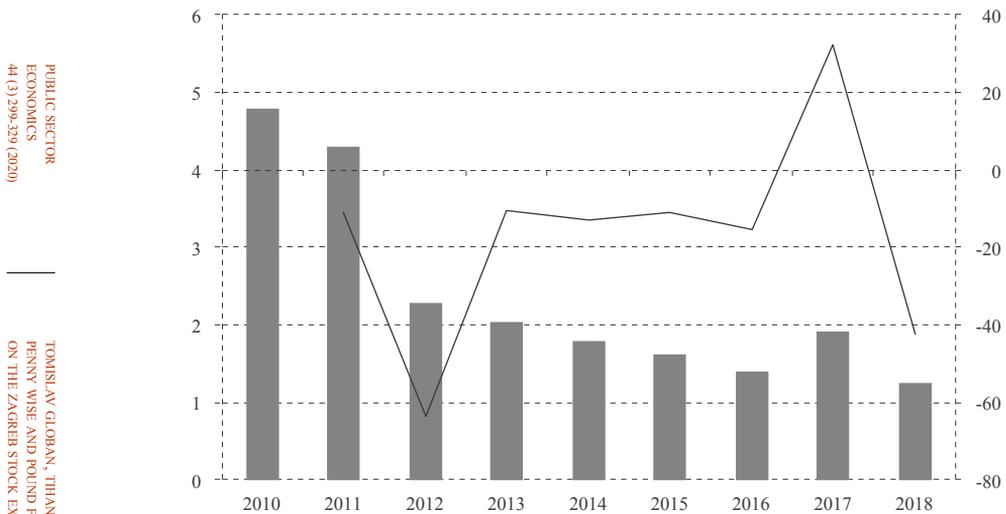
Source: ZSE.

3.2 EVENT STUDY METHODOLOGY

Since the event study methodology is well established in literature, we give only a brief overview following MacKinlay (1997), Bartholdy, Olson and Peare (2007), and Campbell and Wasley (1996). ESM is usually used to show how stock return, volatility and trading volume reacted to different economic, political, social or other events. Moreover, ESM is usually applied over short-term horizons (several days prior to and after the event). The basic idea is to compare the actual returns, volatilities or volumes to those that would have occurred in the absence of the event.

The null hypothesis is that the event did not have a significant effect on the trading volume. Campbell and Wasley (1996) define the log-transformed relative volume for stock i at date t as:

$$V_{i,t} = \log \left(\frac{n_{i,t} + 0.000255}{S_{i,t}} 100 \right) \tag{1}$$

where $n_{i,t}$ denotes the number of shares traded at date t of stock i, $S_{i,t}$ the outstanding shares of the i-th stock at date t. Value of 0.000255 is added so that the value under the log is not zero if in some days there was no trading, as suggested by Campbell and Wasley (1996). The market model of abnormal trading volume (trading volume conditioned to the information set I_t) is estimated as follows:

$$E(V_{i,t}|I_t) = E(a_i + b_i V_{M,t} + \varepsilon_{i,t}) \tag{2}$$

where $V_{M,t}$ is the market volume measure, $V_{M,t} = \frac{1}{M}\sum_{i=1}^{M}V_{i,t}$, calculated as the average trading volume of stocks contained in the market index. The estimation of (2) is done in the pre-event window ($t \in \{1, 2, ..., \tau_{start}-1\}$) to avoid any effects of the event itself on the results. The usual assumption of $\varepsilon_i \sim N(0, \sigma_i^2)$ holds. It is assumed that the volume variable would behave as in (2) in the absence of the event. Next, it is assumed that parameters in (2) would define the expected volume in the event window as well, thus forecasts are made with model (2). These forecasts are used to calculate the abnormal volume, $\bar{v}_\tau$, in the event window, defined as:

$$\bar{v}_\tau = V_\tau - E(V_\tau|I_\tau) \tag{3}$$

where $\tau \in \{\tau_{start}, ... \tau_{event}, ... , \tau_{end}\}$ is the index referring to the time span of the event window. The test statistic is the ratio of the average abnormal volume and the standard deviation, $\dfrac{\overline{v}_\tau}{\sqrt{var(\overline{v}_\tau)}} \sim N(0,1)$, under the null hypothesis.

Another approach to testing the null hypothesis is to use a nonparametric test, in which the ratio of the mean deviation of the stocks' rank from the expected rank (regarding the size of the volume) is divided by the standard deviation of the portfolio mean abnormal rank:

$$\frac{\frac{1}{N}\sum_{i=1}^{N}(k_i - E(k_i))}{s(k)} \sim N(0,1) \tag{4}$$

where k_i is the rank of the i-th stock, and $s(k)$ is the standard deviation of the portfolio mean abnormal rank. Corrado (1989), and Campbell and Wasley (1996) have shown that nonparametric tests are more powerful for detecting abnormal performance. Another advantage of these tests is that they do not depend upon the normality assumption. However, as the number of stocks in the test grows, the test statistic in (4) converges to a normal unit distribution. Other nonparametric tests include the binomial sign test, the Wilcoxon signed rank test, etc. (for more details see Sheskin, 1997).

3.3 REGRESSION DISCONTINUITY DESIGN

We estimate the regression discontinuity (RD) model, designing the data in the potential outcomes framework (Rubin, 1974). The objective is to find the causal effect (C_i) of the treatment (the introduction of the capital gains tax), represented by the binary indicator $T_i \in \{0,1\}$, on unit i. We estimate the RD model with the sharp design, which means that the assignment of T_i is a deterministic function of the running time variable t, so that:

$$T_i = \begin{cases} 1 & if\ t \geq c \\ 0 & if\ t < c \end{cases} \tag{5}$$

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where c is the cut-off point set at January 2016 – the month in which the capital gains tax was introduced. Trading volumes of all stocks recorded in January 2016 or later are considered as the treatment group, while the volumes of the same stocks in the period before January 2016 are put in the control group.

The causal effect is defined as:

$$C_i = Z_i(1) - Z_i(0) \qquad (6)$$

where $Z_i(1)$ denotes the potential outcome (trading volume) of unit i under treatment ($T_i = 1$) and $Z_i(0)$ the potential outcome (trading volume) under control ($T_i = 0$). With the RD design, we estimate the average causal effect of treatment at the cut-off point, $t = c$:

$$C_i = E[Z_i(1) - Z_i(0)|t=c] = \lim_{t\downarrow c} E[Z_i(1)|t=c] - \lim_{t-c} E[Z_i(0)|t=c] \qquad (7)$$

We use monthly growth rates in average daily trading volume for each month (from 2013:M01 to 2019:M01) for the same 45 company stocks listed on the Zagreb Stock Exchange and denoted in Table A1 in the Appendix.

3.4 PANEL REGRESSIONS

Our third methodological approach utilizes panel regressions. We estimate a dynamic panel model with cross-section fixed effects:

$$\begin{aligned} volume_{i,t} = &\ \alpha + \beta_1 volume_{i,t-1} + \beta_2 tax_{i,t} + \beta_3 pretax_{i,t} + \beta_4 aftertax_{i,t} + \\ &+ \beta_5' X_{i,t} + \delta_i + e_{i,t} \end{aligned} \qquad (8)$$

where $volume_{i,t}$ is the average trade volume of stock i in period t, $tax_{i,t}$ is the dummy variable for the month when the capital gains tax was introduced (equals 1 for 2016:M01, 0 otherwise), $pretax_{i,t}$ is the dummy variable for the last month before the introduction of the capital gains tax (equals 1 for 2015:M12, 0 otherwise), $aftertax_{i,t}$ is the dummy variable that splits the sample into the period before and after the introduction of the tax (equals 1 for the period after 2016:M01, 0 otherwise), δ_i represents the cross-section fixed effects, and $e_{i,t}$ is the error term.

The vector of control variables, $X_{i,t}$, consists of the following variables: $stdev_{i,t}$ to control for the volatility of stock prices as an important determinant of trading volume on the stock market, measured as the monthly standard deviation of daily stock prices; $return_{i,t}$ to control for the monthly return of each stock; and the dummy variable $january_{i,t}$ (equals 1 for each January, 0 otherwise) to control for the possible existence of the so-called January effect on the Zagreb Stock Exchange (see, e.g. Stoica and Diaconasu, 2011 for the analysis of calendar anomalies on emerging Central and Eastern European stock markets).

As in RD design, we use monthly data for average daily trading volume for each month from 2013:M01 to 2019:M01, for the same 45 company stocks as before.

4 RESULTS

4.1 ESTIMATIONS WITH DAILY DATA

We first estimate the event study model with the pre-event window spanning the period from 2 January 2015 to 10 December 2015 to estimate equation (2). Next, we calculate the abnormal volumes, $\bar{v}_\tau$, with the respective confidence intervals (CI) at the 95% confidence level. The results are shown in Graph 4, where day 0 on the *x*-axis corresponds to 31 December 2015 (the last trading day before the capital gains tax entered into force[5]).

It can be seen that the abnormal trading volume began before the event day, which indicates that investors increased their trading in the last few days of 2015. The abnormally high trading volume is statistically significant. We interpret this as evidence that the introduction of the tax had a significant effect on investors' behaviour and trading on ZSE, because investors had incentives to accumulate as many tax-free securities in their portfolio as possible, with respect to their investing strategies.

Graph 4

Abnormal volume (full line) with 95% CIs (dashed lines), classic inference
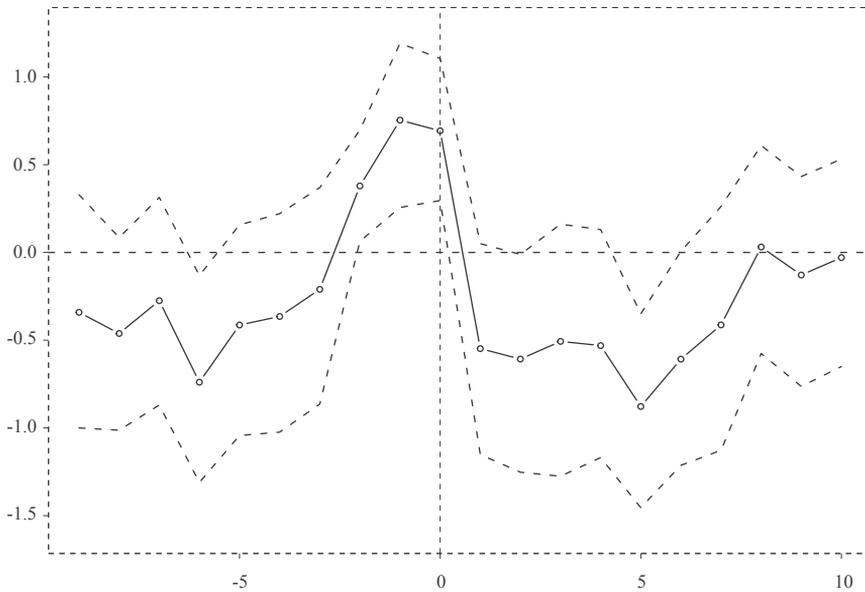
Source: Authors' estimations.

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[5] The "0" day remains 31 Dec 2015, as stocks bought from 1 Jan 2016 were subjected to taxation (if they were sold within 3 years after purchase). Thus, the zero day is the last "neutral" day when compared to +1 day which is now in Jan 2016.

In addition, we observe a strong negative response of the trading volume in the post-event period, with statistically negative responses on days two[6] and five. This suggests that the introduction of the tax created disincentives to trading because all capital gains from securities acquired after 1 January 2016 were subject to taxation, hurting the liquidity of the market.

In addition to the results reported on Graph 4, which were estimated with the classic *T*-inference for the event study estimator, we re-estimated equation (2) with the bootstrap approach for the same estimator. Graph 5 shows the result of the bootstrap approach, with 1000 replications and sampling with replacement done within the units of observation. This approach is chosen because it corrects for possible biases in the results due to the possible non-normal distribution of the data and serial correlation (see Hein and Westfall, 2014 for details). The results indicate the same conclusions with respect to the trading volume in the pre- and post-event period.

GRAPH 5
Abnormal volume (full line) with 95% CIs (dashed lines), bootstrap inference
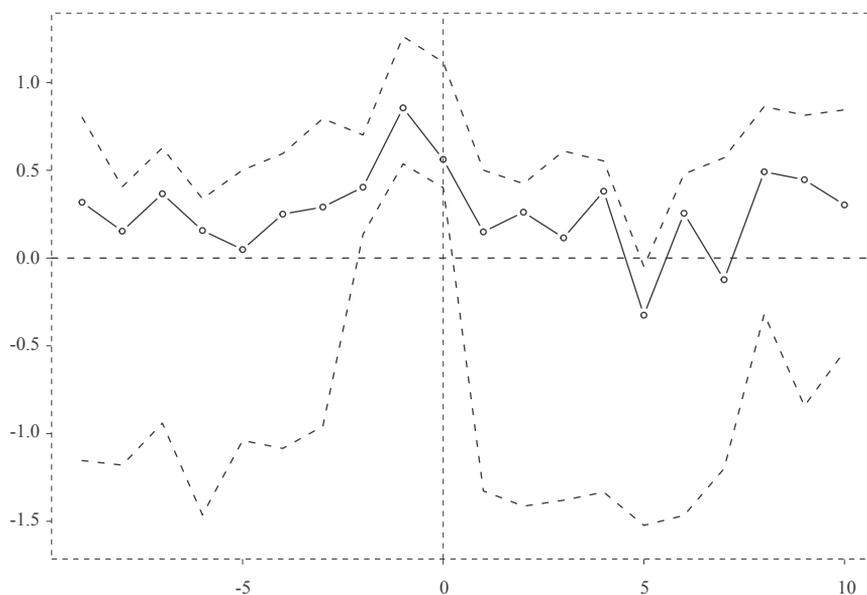
Source: Authors' estimations.

Finally, equation (2) was estimated using the nonparametric Wilcoxon sign test (Graph 6). Although the CIs in this case are wide when compared to the previous ones, the conclusions regarding several days before the event day and the fifth day post-event are the same: we detect statistically significant abnormal trading

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[6] Although it seems that on day two the zero value is included in the confidence intervals, the upper interval value is -0.004, which excludes the zero value.

volume on ZSE. The greatest effects were found on the day before the event and on day 0 (Graphs 4, 5 and 6).

GRAPH 6

Abnormal volume (full line) with 95% CIs (dashed lines), Wilcoxon inference
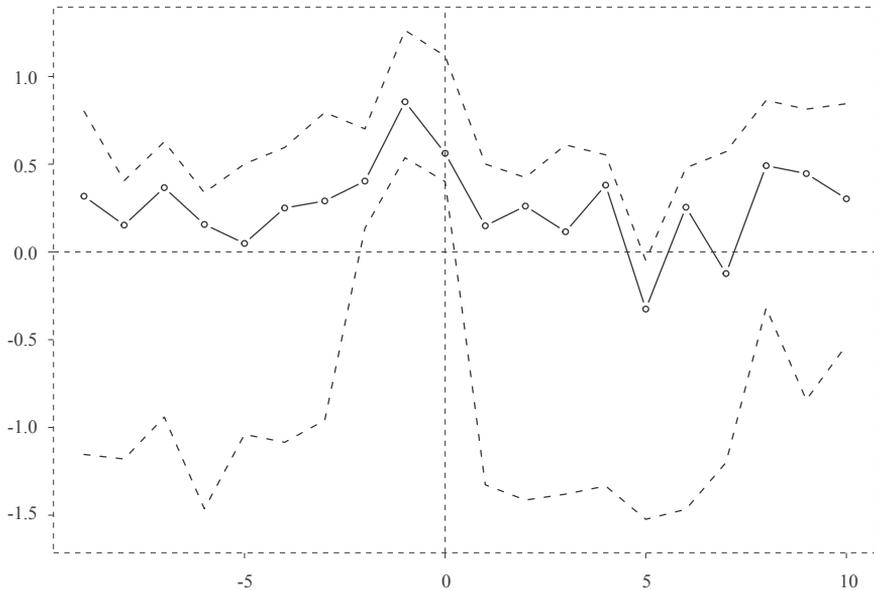
Source: Authors' estimations.

Two additional nonparametric tests were performed, the results of which are reported in Table 1. The sign tests with the respective assumptions of the normal and exact binomial distribution were performed for every day in the event period. Since these tests are useful for detecting changes in the value of a variable before and after the treatment, we additionally conduct this test by comparing the abnormal volume stocks' rank with the median rank. Results indicate significant effects of the tax introduction both before and after day 0, which is also evidence in favour of our research hypothesis. It is important to note that these particular tests do not answer the question whether the impact on the trading volume is positive or negative. The test values are all positive because their construction is based upon sample proportions.

TABLE 1
Nonparametric tests results

Day	Sign test			
	Normal approximation		Exact binomial	
-10	1.17	(0.243)	28	(0.243)
-9	1.75*	(0.080)	30*	(0.079)
-8	2.63***	(0.009)	33***	(0.008)
-7	2.33**	(0.020)	32**	(0.019)
-6	2.33**	(0.020)	32**	(0.019)
-5	3.21***	(0.001)	35***	(0.001)
-4	2.63***	(0.009)	33***	(0.008)
-3	2.33**	(0.020)	32**	(0.019)
-2	2.63***	(0.009)	33***	(0.008)
-1	2.63***	(0.009)	33***	(0.008)
0	2.33**	(0.020)	32**	(0.019)
1	3.21***	(0.001)	35***	(0.001)
2	2.63***	(0.009)	33***	(0.008)
3	1.46	(0.145)	29	(0.144)
4	2.63***	(0.009)	33***	(0.008)
5	1.75*	(0.080)	30*	(0.079)
6	2.63***	(0.009)	33***	(0.008)
7	2.63***	(0.009)	33***	(0.008)
8	2.04**	(0.041)	31**	(0.040)
9	2.04**	(0.041)	31**	(0.040)
10	1.75*	(0.080)	30*	(0.079)

Note: ***p<0.01, **p<0.05, *p<0.1. p-values in parentheses.
Source: Authors' estimations.

The results indicating the increase of the trading volume on ZSE shortly before the introduction of the capital gains tax, and the decrease right after its coming into force, are in line with the findings in Lakonishok and Vermaelen (1986), Bajaj and Vijh (1995), and Xu, Rui and Kim (2002). They are also in line with the theory in Karpoff (1986), Varian (1989), and He and Wang (1995), i.e. the pre-announcement disagreement hypothesis, because the abnormal trading volume patterns were found prior to the event day. This hypothesis says that, although investors can agree upon the implications of an announcement (in this case the introduction of a tax), the pre-event uncertainty is sometimes too high, so that the disagreement causes the increase in the trading volume. However, nonparametric tests provide evidence in favour of a differential interpretation hypothesis (significant results after the event day) as well, but, as Kim and Verrecchia (1991a; 1991b) state, the two hypotheses are not mutually exclusive, due to the information asymmetry before the event day.

4.2 ESTIMATIONS WITH MONTHLY DATA
4.2.1 REGRESSION DISCONTINUITY DESIGN

Graph 7 plots the regression function fits of polynomials of various orders, with the cut-off date set at January 2016, when the tax was first introduced. The default type of estimation in Stata 15 software is the polynomial fit of order 4 (panel a of Graph 7), which shows a significant break in the slope of the regression line precisely at the cut-off point. It confirms that the trading volume increased in the pre-tax period and then sizably dropped when the tax entered into force. This probably reflects the increased incentives for the accumulation of non-taxable securities in the pre-tax period, and then the lack of incentives to trade once the tax was introduced. Other panels of Graph 7, showing various polynomial orders, confirm the same narrative.

GRAPH 7

Regression function fits of polynomials of various orders from the regression discontinuity model (2013:M01 – 2019:M01)
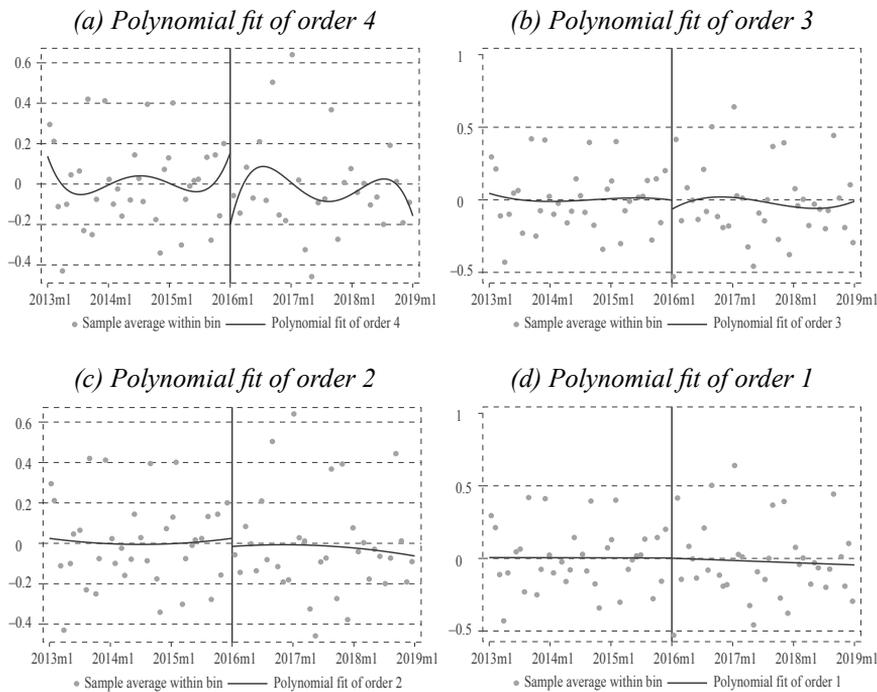
Source: Authors' estimations.

Table 2 reports the tests for the statistical significance of these estimations. The discontinuity in the trading volume is confirmed across all polynomial orders using the bias-corrected local polynomial estimator, and for all polynomial orders other than order 1 using the robust standard-error estimator. Right after the cut-off point (the introduction of the tax), there was a reduction in the trading volume growth rate of between 41% and 72%, depending on the polynomial order. This is

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measured by taking a difference in the mean values to the left of the cut-off point (before January 2016) and the mean values to the right of the cut-off point (after January 2016). This neighbourhood, called the bandwidth, includes approximately 750 observations on each side of the cut-off point.

TABLE 2

Sharp regression discontinuity estimated coefficients using local polynomial regression

	(1)	**(2)**	**(3)**	**(4)**
Polynomial order	p=4	p=3	p=2	p=1
Estimator				
Conventional	-0.667**	-0.505**	-0.362*	-0.251
	(0.320)	(0.249)	(0.219)	(0.169)
Bias-corrected	-0.719**	-0.536**	-0.411*	-0.309*
	(0.320)	(0.249)	(0.219)	(0.169)
Robust std. errors	-0.719**	-0.536*	-0.411*	-0.309
	(0.350)	(0.276)	(0.248)	(0.196)
Number of obs.				
Total	3,096	3,096	3,096	3,096
Left of the cut-off	1,574	1,574	1,574	1,574
Right of the cut-off	1,522	1,522	1,522	1,522

*Note: ***p<0.01, **p<0.05, *p<0.1. Standard errors in parentheses.*
Source: Authors' estimations.

4.2.2 PANEL REGRESSIONS

We estimated the models using panel EGLS estimator with cross-section weights (models 1-3 in Table 3), but also the models without the weights (models 4-6 in Table 3). We estimated various iterations of models where $volume_{i,t}$ represents monthly growth rates of the average trading volume, as well as the logarithm of the trading volume, and non-transformed trading volume in Croatian kunas (HRK), respectively.

TABLE 3
Results of panel regression estimations (2013:M01-2019:M01)

Dependent variable (volume)	(1)	(2)	(3)	(4)	(5)	(6)
	Panel EGLS (cross-section weights)			Panel least squares (no weights)		
	growth rate	log	in HRK	growth rate	log	in HRK
volume(-1)	-0.437***	0.443***	0.284***	-0.442***	0.444***	0.069*
	(0.018)	(0.024)	(0.029)	(0.022)	(0.024)	(0.037)
tax	-0.446***	-0.458***	-27,961.4***	-0.497***	-0.489***	-26,445.0
	(0.097)	(0.113)	(8,468.0)	(0.094)	(0.113)	(20,793.4)
pretax	0.164***	0.188***	5,987.7***	0.139***	0.160***	-32,576.2*
	(0.038)	(0.033)	(2,244.3)	(0.040)	(0.033)	(17,940.9)
aftertax	-0.001	-0.078	232.0	0.009	-0.063	34,853.7
	(0.053)	(0.049)	(3,390.7)	(0.055)	(0.049)	(36,126.9)
stdev	0.032***	0.004	313.56	0.018*	-0.006	-3,060.3
	(0.011)	(0.113)	(574.83)	(0.011)	(0.010)	(5,914.17)
return	0.061***	0.049***	1,252.41	0.054**	0.039**	11,519.3
	(0.021)	(0.019)	(813.42)	(0.022)	(0.018)	(7,654.1)
january	0.102*	0.073	12,781.6	0.144	0.104	-19,739.5
	(0.104)	(0.122)	(8,840.2)	(0.102)	(0.122)	(23,000.9)
constant	-0.062	6.386***	220,956***	-0.063	6.395***	281,382***
	(0.047)	(0.276)	(8,692.0)	(0.047)	(0.281)	(25,462.2)
R-squared	0.204	0.774	0.443	0.206	0.713	0.262
Adj. R-sq.	0.190	0.770	0.434	0.192	0.708	0.249
No. of observ.	3,005	3,019	3,019	3,005	3,019	3,019

*Notes: ***p<0.01, **p<0.05, *p<0.1. Standard errors in parentheses.*
Source: Authors' estimations.

The results reported in Table 3 suggest a statistically significant negative effect of the introduction of the tax on trading volume in January 2016 (variable tax) and a significant positive effect in December 2015, the last month before the tax entered into force (variable pretax). Results hold across almost all specifications.

After controlling for all other variables, the benchmark model (1) suggests that the tax introduction resulted in a 45 percent average decrease in the trading volume growth rate per stock per trading day that month. Results also suggest a 16 percent increase in the trading volume growth rate in December 2015, likely reflecting the incentives for investors to accumulate tax-free securities in their portfolios. These findings confirm the results of the event study methodology and the regression discontinuity model presented earlier.

The monetary effect of the tax on the trading volume is not negligible. According to model (3), the trading volume decreased on average by HRK 27,961 per stock per trading day in January 2016. There were 19 trading days in January 2016, which, multiplied by 45 stocks, suggests an average negative effect of the tax in the amount of HRK 24 million in trading volume that month alone.

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We also estimate panel regressions in a difference-in-differences framework using country-level instead of stock-level data to find causal effects of the tax on the trading volume with a longer-term perspective. We first estimate a naïve difference-in-differences parameter using data on the overall trading volume on the Croatian stock market as the treated group, and the period from 2016:M01 onwards as the post-treatment period. Our control group consists of other non-eurozone EU members from Central and Eastern Europe – Bulgaria, Czech Republic, Hungary, Poland, and Romania. The results are reported in Table 4, model (1). As can be seen, the naïve difference-in-differences parameter is negative and statistically significant for the Croatian trading volume in the three years following December 2015, confirming the negative effect of the tax.

To get a better sense of the size of the negative causal effects, we also estimated a conditional difference-in-differences model including cross-country control variables such as the stock market returns and volatility, interest rates, growth in money supply, and exchange rate volatility (model 2 in Table 4). The difference-in-differences parameter is that on the interaction between an indicator for Croatia and an indicator for the period post-December 2015. Model (3) is the same as (2), but excludes the period after 2016:M12 to exclude the possibility of the Agrokor crisis affecting the results.

TABLE 4

Difference-in-Differences estimation results

VARIABLE (volume)	(1)	(2)	(3)
Croatia post-2015:M12	-0.663*	-0.233**	-0.270*
	(0.343)	(0.110)	(0.161)
Stock market return		0.201*	0.356**
		(0.111)	(0.147)
Stock market volatility		0.345***	0.407***
		(0.090)	(0.123)
Interest rate		0.012	0.045
		(0.026)	(0.035)
Growth in money supply		-0.021	-0.011
		(0.042)	(0.052)
Exchange rate volatility		0.009	0.032
		(0.069)	(0.091)
Constant		17.683***	17.513***
		(0.099)	(0.141)
R-squared	0.110	0.277	0.218

*Notes: Treated observations are trading volumes of Croatian stocks after the capital gains tax was introduced. Control group consists of Bulgaria, Czech Republic, Hungary, Poland, and Romania. Model (3) excludes the period after 2016:M12 to exclude the effect of the Agrokor crisis. Standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1*

Source: Authors' estimations.

Both model (2) and model (3) indicate a statistically significant negative long-term effect of the tax on the trading volume. Results suggest that the average trading volume in the three post-tax years decreased by 23 percent (model 2) when compared to the pre-tax period, and decreased 27 percent in the first year following the tax (model 3), respectively. This indicates that the consequences of introducing this tax on the trading volume on ZSE are not only short-term (captured in days before and after the tax coming into force), but also of a longer-term nature, which carries important policy implications.

5 ROBUSTNESS CHECKS

Our robustness check focuses mainly on the possibility that the Agrokor crisis, which started in the first half of 2017, could have affected the results. Thus, we estimated the same RD model but with the data ending in 2016:M12. Graph 8 confirms that the main conclusions remain robust even when we change the period of analysis, with statistically significant breaks in the slope of the regression line right at the cut-off point.

GRAPH 8

Regression function fits of polynomials of various orders from the regression discontinuity model (2013:M01 – 2016:M12)

Source: Authors' estimations.

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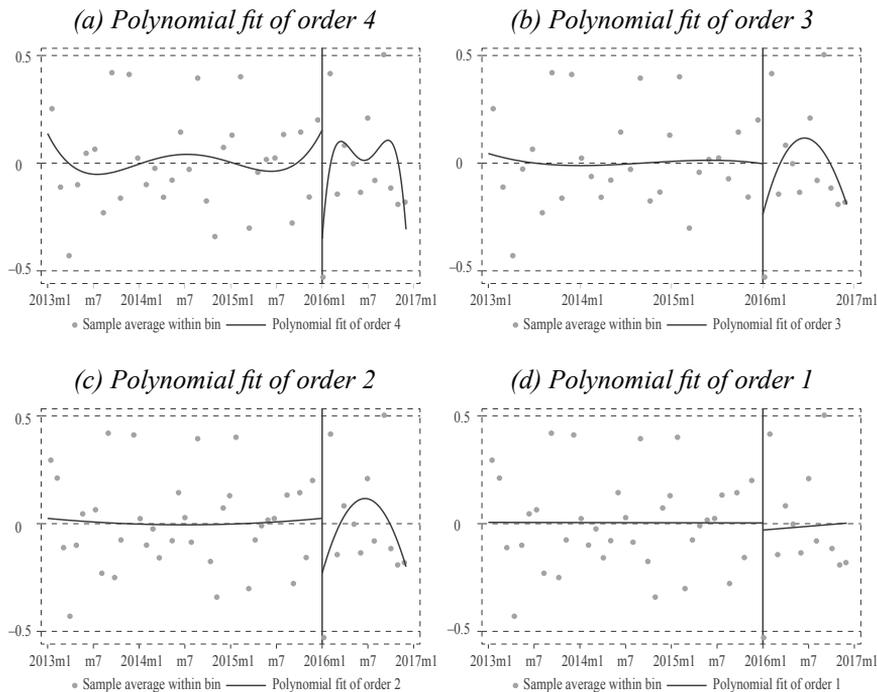
We also estimated panel regression models with the sample period ending in 2016:M12 (models 7-12) to test for the possibility that the Agrokor crisis affected the results. Table 5 confirms the negative tax effect in January 2016 and a positive one in December 2015 across various specifications.

TABLE 5

Results of panel regression estimations (2013:M01-2016:M12)

	(7)	(8)	(9)	(10)	(11)	(12)
	Panel EGLS (cross-section weights)			Panel least squares (no weights)		
Dependent variable (volume)	growth rate	log	in HRK	growth rate	log	in HRK
Volume (-1)	-0.444***	0.372***	0.221***	-0.453***	0.377***	0.089*
	(0.021)	(0.025)	(0.026)	(0.024)	(0.027)	(0.047)
tax	-0.490***	-0.451***	-32,218.6***	-0.554***	-0.510***	-34,607.8**
	(0.054)	(0.061)	(5,794.3)	(0.028)	(0.059)	(16,564.0)
pretax	0.169***	0.182***	7,020.49**	0.150***	0.156***	-36,844.9*
	(0.040)	(0.033)	(2,847.7)	(0.041)	(0.033)	(19,617.5)
aftertax	0.056	-0.028	2,165.3	0.082	0.037	60,357.4
	(0.067)	(0.059)	(4,069.4)	(0.072)	(0.061)	(65,500.3)
stdev	0.095***	0.057***	3,699.25***	0.066***	0.032**	3,059.2
	(0.017)	(0.016)	(1,175.51)	(0.017)	(0.016)	(13,840.0)
return	0.084***	0.078***	3,847.8***	0.058**	0.045**	32,604.4**
	(0.026)	(0.022)	(1,386.9)	(0.024)	(0.021)	(13,406.9)
january	0.176***	0.101	13,091.4**	0.205***	0.122*	-13,823.8
	(0.065)	(0.068)	(6,238.3)	(0.047)	(0.066)	(23,534.1)
constant	-0.239***	7.084***	237,926***	-0.176***	7.069***	268,943***
	(0.058)	(0.292)	(8,616.2)	(0.058)	(0.314)	(44,069.2)
R-squared	0.229	0.797	0.487	0.226	0.717	0.268
Adj. R-squared	0.210	0.792	0.474	0.206	0.710	0.249
No. of observ.	2,060	2,065	2,065	2,060	2,065	2,065

*Notes: ***p<0.01, **p<0.05, *p<0.1. Standard errors in parentheses.*
Source: Authors' estimations.

The benchmark model (7) suggests a 49 percent average decrease in the trading volume growth rate in January 2016, with the negative monetary effect of HRK 27 million on the trading volume in that month alone.

Positive values of the *january* dummy variable are in line with Lakonishok and Smidt (1984), Ajinkya, Atiase and Gift (1991), Atiase and Bamber (1994) and Bamber, Barron and Stober (1997; 1999) who find greater trading volume in January, which affects stock prices as well.

The Agrokor crisis not affecting the results was also confirmed in our difference-in-differences estimations also confirmed that the Agrokor crisis did not affect the results, as already shown in Table 4.

6 CONCLUSION AND POLICY IMPLICATIONS

Building on the literature on the effects of taxation on stock market dynamics, this paper analysed the effects of the recently introduced capital gains tax on the trading volume on the Zagreb Stock Exchange before and after its coming into force in January 2016. We analysed the effects using three different methodological approaches – event study methodology, regression discontinuity design and panel regressions.

Results of the event study based on daily data confirmed the hypothesis that the introduction of the capital gains tax created abnormally high trading volume patterns shortly before the tax came into force and abnormally low volume patterns after the fact. Our estimations based on monthly data confirmed these findings. Regression discontinuity models indicated a statistically significant break in the slope of the regression line precisely at the cut-off point when the tax was introduced, providing further evidence that the trading volume increased in the pre-tax period and then substantially dropped when the tax entered into force. In addition, panel regression estimations suggested that the tax introduction resulted in a 45 percent decrease in the trading volume growth rate the month tax entered into force, and a 16 percent increase in the growth in trading volume in the last month before the tax was introduced. Finally, difference-in-differences estimations suggest that the average trading volume in the three post-tax years was 23 percent lower than in the pre-tax period, indicating that the consequences of introducing this tax are not only short-term, but also of a longer-term nature.

Overall, our main conclusions remain unchanged after thorough and extensive robustness checks and provide strong evidence that the announcement of the new tax created incentives for investors to build up a portfolio of tax-free securities before it came into force, as well as created disincentives to buying and selling stocks after 1 January 2016 because of the new tax burden on newly acquired securities, hurting the liquidity of an already weakly liquid market.

To our knowledge, this is the first empirical study to have analysed the impact of a newly introduced capital gains tax on the Croatian stock market. The results of this paper should thus be of interest and relevance to policy makers, investors, boards of listed companies and all other stakeholders in the country. It can also serve as a useful policy input not only to Croatian policy makers, but also to those in other countries with small, poorly developed and shallow stock markets, characterized by low levels of liquidity, which have not yet introduced this type of taxation.

Given that the taxation of capital gains in Croatia is not a separate tax form, but rather a part of a much wider income tax, the detailed statistics on how big the revenues from this type of taxation actually are, are not publicly available. However, we can approximate this amount by looking at the revenues from taxes on income from capital, which comprises not only the taxation of capital gains, but also income from dividends and interest. These revenues were HRK 146 million

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higher in 2016 than in 2015 (Ministry of Finance, 2019), which can be interpreted as a rough estimate of revenue from the capital gains tax, given that the taxation of income from dividends and interest had been introduced earlier. This would imply that the revenue from the capital gains tax constitutes only 0.36% of revenues of local government[7], suggesting that its fiscal effects are almost negligible. On the other hand, however, the effects of introducing such a tax, as our study has shown, have had serious adverse consequences on market liquidity and the participation of small investors in the stock market. In these circumstances, one can conclude that the introduction of such a tax created a large problem for only a small gain – explaining the idiom from the title of this paper.

One of the main policy recommendations of this study is that countries with underdeveloped and poorly liquid stock markets should avoid introducing taxes that can further discourage the interest of the public in participating in the market. This can incentivize individuals and companies to invest their money into other types of assets with a more preferential tax treatment (e.g. the real estate market), increasing the possibilities for dangerous asset price bubbles. Our study suggests that fiscal (tax) policy in these countries should be used in the opposite direction – to encourage investment and attract as many new investors as possible, resulting in higher liquidity and facilitating faster development of the stock market.

Future empirical work should explore which hypothesis, the pre-announcement disagreement or the differential interpretation hypothesis, is stronger on ZSE, because each hypothesis assumes different effects of trading volume on the volatility of stock returns. Another avenue for future research is examining the effects of abnormal trading volume on stock returns, volatilities and other hypotheses (such as the clientele hypothesis, see Kross, Ha and Heflin, 1994) to make clear distinctions on the (dis)agreement about the distribution of the uncertainty regarding the event of interest.

Disclosure statement
No potential conflict of interest was reported by the authors.

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[7] Revenues from the income taxes are revenues of the local government.

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APPENDIX

TABLE A1

Stocks included in the study, abbreviations and full names

Abbreviation	Full name	Abbreviation	Full name
ADPL	AD Plastik	KOEI	Končar elektroindustrija
ADRS	Adris Grupa	KRAS	Kraš
ADRS2	Adris Grupa	LEDO	Ledo
ARNT	Arenahospitality Group	LKPC	Luka Ploče
ATGR	Atlantic Grupa	LRH	Liburnia Riviera Hoteli
ATLN	Excelsa Nekretnine	MAIS	Maistra
ATPL	Atlanska Plovidba	OPTE	Ot-Optima Telekom
BD62	Badel 1862	PBZ	Privredna Banka Zagreb
DDJH	Đuro Đaković Grupa	PLAG	Plava Laguna
DLKV	Dalekovod	PODR	Podravka
ERNT	Ericsson Nikola Tesla	PTKM	Petrokemija
HIMR	Imeprial Hotelijerstvo	RIVP	Valamar Riviera
HMST	Hoteli Maestral	RIZO	Riz-Odašiljači
HT	Hrvatski Telekom	SUNH	Sunčani Hvar
HTKP	Htp Korčula	THNK	Tehnika
HUPZ	Hup Zagreb	TPNG	Tankerska Next Generation
IGH	Institut IGH	TUHO	Turisthotel
INA	Ina	ULPL	Uljanik Plovidba
INGR	Ingra	VART	Varteks
IPKK	Termes Grupa	VDKT	Viadukt
JMNC	Jamnica	VERN	Genera
JNAF	Jadranski Naftovod	ZABA	Zagrebačka Banka
KODT	Končar transformatori		

Source: ZSE (2019).

TABLE A2

Descriptive statistics of trading volume series in monthly and daily frequencies, in thousands HRK

Stock	Volume – monthly series					Volume – daily series				
	T	Mean	Max	Min	Std Dev	T	Mean	Max	Min	Std Dev
ADPL	137	267.75	1,053.45	26.89	216.88	244	123.63	1,567.48	0.29	212.86
ADRS	137	338.98	4,990.79	10.13	479.49	210	483.92	12,017.97	0.52	1,164.48
ADRS2	137	1,040.93	8,546.29	191.83	990.20	267	1,230.45	10,257.70	6.02	1,385.18
ARNT	137	116.35	999.37	3,291.37	150.59	226	72.13	697.17	0.33	88.08
ATGR	137	415.06	2,704.10	43.49	413.64	261	359.35	12,294.00	0.82	1,061.10
ATLN	137	23.16	169.46	2,291.80	19.43	160	28.79	299.33	0.09	38.92
ATPL	137	1,182.02	11,737.10	34.81	2,234.49	255	101.23	856.16	0.57	140.10
BD62	137	32.95	334.56	2,168.67	50.05	112	29.53	452.56	0.01	71.99
DDJH	137	205.45	1,707.93	11.25	223.84	267	148.16	1,127.95	0.03	199.05
DLKV	137	658.26	3,806.65	11.16	921.73	259	145.05	1,884.55	1.13	213.69
ERNT	137	730.53	8,319.04	64.62	1,141.86	265	311.94	6,703.40	4.68	567.35
HIMR	132	82.77	2,641.55	1.65	250.76	143	95.56	7,418.40	0.40	534.32
HMST	118	41.36	404.98	1.35	62.07	135	50.84	907.15	0.21	96.95
HT	137	3,458.93	16,686.34	497.06	3,247.30	267	1,428.45	7,246.07	146.63	1,211.95
HTKP	137	322.17	4,367.23	1.40	644.38	58	14.84	229.30	0.06	32.62
HUPZ	133	2,590.00	25,767.94	107.36	4,021.53	122	87.22	2,408.00	1.72	249.64
IGH	137	663.28	6,975.49	3,531.91	1,405.50	143	19.49	175.94	0.09	29.89
INA	130	1,712.24	65,483.06	15.10	6,606.88	196	134.43	6,471.87	2.66	454.71
INGR	137	507.56	4,658.47	6,427.43	830.21	222	53.62	978.09	0.03	122.86
IPKK	136	63.42	830.74	5,908.33	130.48	59	27.36	1,088.35	0.08	109.47
JMNC	113	619.07	25,080.00	31.58	2,495.54	35	705.41	11,025.00	85.50	1,363.60
JNAF	137	127.84	1,044.36	10.13	161.74	88	191.39	4,783.23	3.35	591.25
KODT	137	75.43	1,616.32	7,158.87	149.30	77	172.85	14,400.00	1.11	1,247.46
KOEI	137	436.93	4,127.71	34.76	555.59	201	259.15	14,719.90	0.67	1,159.17
KRAS	137	118.70	473.32	19.35	84.14	253	152.63	1,164.25	2.30	202.21
LEDO	116	555.80	6,570.51	36.87	778.98	164	637.45	14,962.34	7.73	1,737.54
LKPC	137	188.41	2,882.99	5.45	321.29	189	119.98	8,994.87	0.62	624.03
LRH	137	94.50	608.64	5,691.94	108.09	142	91.51	744.68	3.27	123.77
MAIS	137	56.59	400.06	2,105.70	67.25	209	61.19	401.85	0.14	73.53
OPTE	137	65.74	692.44	2,104.67	115.49	230	60.61	1,561.05	0.00	129.44
PBZ	137	163.91	2,473.85	3,197.20	290.03	129	115.87	2,073.68	0.55	302.72
PLAG	136	109.20	2,284.17	7.78	220.60	106	118.58	1,327.39	4.05	211.61
PODR	137	494.29	3,759.51	49.03	492.02	254	543.90	5,650.90	0.91	911.76
PTKM	137	309.13	3,284.68	1.22	476.12	184	41.35	1,473.83	0.07	120.80
RIVP	135	555.08	3,211.42	5,263.15	645.71	267	809.06	4,414.41	42.88	792.66
RIZO	112	32.00	750.82	0.05	79.32	205	71.63	1,498.57	0.09	159.69
SUNH	108	21.18	174.86	1.28	29.35	116	30.04	815.57	0.02	87.09
THNK	137	124.46	932.35	1,319.17	180.72	118	28.04	201.06	0.29	35.43
TPNG	52	42.90	448.85	3,452.14	83.11	213	48.60	1,448.86	0.08	170.53
TUHO	137	90.55	898.46	6,566.67	108.85	84	189.01	3,906.28	2.41	493.60
ULPL	137	252.91	4,197.33	3,355.38	575.65	211	25.80	190.28	0.25	29.09
VART	136	51.60	2,077.46	0.90	186.44	226	25.18	179.42	0.02	29.78
VDKT	119	154.39	1,449.05	7,746.58	220.92	148	72.99	1,377.11	0.23	155.84
VERN	98	98.54	4,272.85	2,028.40	459.19	178	77.02	815.82	0.14	122.96
ZABA	137	344.38	3,533.72	25.12	439.85	223	178.38	2,063.88	0.04	303.27

Note: T denotes number of observations; Std Dev denotes standard deviation.

An assessment of the relationship between public debt, government expenditure and revenue in Namibia

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Abstract

This paper investigates the relationship between government expenditure, government revenue and public debt in Namibia by employing the data of these variables for the period 1980 to 2018. An error correction model (ECM) was employed to analyse the short- run dynamics and a positive relationship between government expenditure and government revenue was found. Similarly, there is supporting evidence that an increase in public debt will stimulate government expenditure. The error correction term indicates that any disequilibrium is corrected at an annual speed of 46.4 percent. Additionally, the pair-wise Granger causality test fails to support the spend-revenue hypothesis. However, there is supporting evidence that the tax-spend hypothesis does hold for Namibia. The study recommends that policy-makers should thoroughly review government expenditure and bring it to optimal levels in order to prevent the widening of public debt.

Keywords: public debt, government expenditure government revenue, Namibia

1 INTRODUCTION

The future course of fiscal policy, the need to keep government debt under control and the sustainability of public finances have constituted one of the most widely discussed topics in economics (Neck and Sturm, 2008). Moreover, the global crisis and the expansionary government reactions in many countries have revamped the attention of policy-makers and academics to the growth effects of large public debts and budget deficits (Presbitero, 2010) and accordingly fiscal policy sustainability and public debt remain a concern to any economy, whether developed or developing. The Namibia government budget mainly consists of government expenditures and government revenues. Total government revenues refer to all tax and non-tax revenues collected by governments including grants, while total government expenditures are all operational and development expenditures incurred by the government in a particular financial period (Ministry of Finance (MOF), 2017). Imbalances between government expenditures and revenues will translate into a budget deficit or surplus.

Labonte (2012), Cottarelli and Schaechter (2010) argue that reduced budget deficits may in the short run result in increased unemployment, while persistent accumulation of public debt beyond levels deemed sustainable will cause difficulties in adjusting fiscal variables especially through their effects on gross domestic product (GDP). Since independence, Namibia has made efforts to maintain fiscal prudence with the objective of attaining overall macro-economic stability and laying the foundations for sustainable economic development (MOF, 2005). However, the continuing high incidence of unemployment and poverty has required significant levels of spending on social and economic development programmes, which has resulted in expenditure exceeding revenue and subsequently in budget deficits and build-ups of debt (MOF, 2005). Like other developing countries, such as Nigeria, that have relied substantially on debt to finance most of their expenditures (Oladokun, 2015), Namibia has experienced persistent budget deficits and increasing

borrowing requirements resulting from both operational and developmental over-expenditure. The accumulation of public debt has raised concerns about the long-term sustainability of government operations. The further implication is that the reliance on revenue alone has been inadequate to finance government expenditure in Namibia, indicating the importance of both government revenue and public debt as determinants of public expenditure. In examining the relationship between public debt, government expenditure and revenue, it is important to understand the major trends and outcomes of the economy through time as they have various implications for the interactions between these variables.

FIGURE 1

The composition of government revenue, government expenditure and public debt in Namibia 1990-2016 (in billion N$)
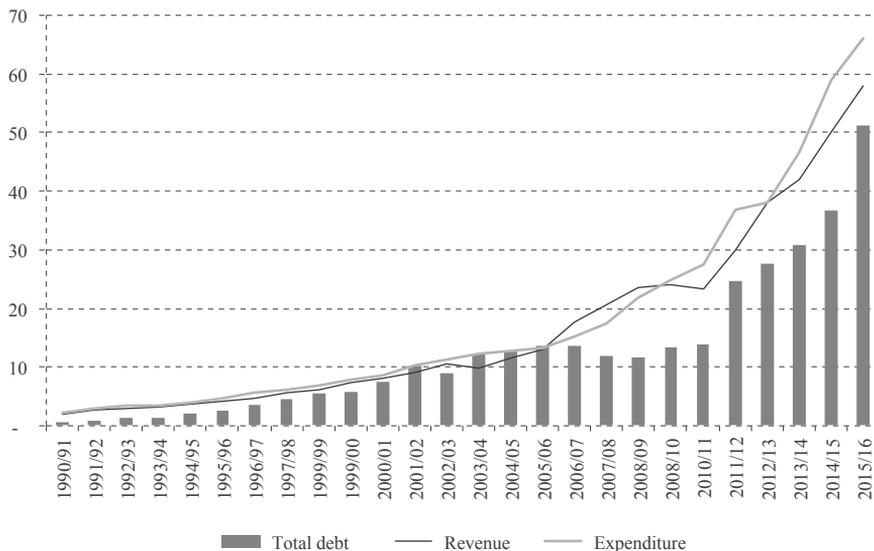
Source: Authors.

In Figure 1, a stable total debt is observed between the years 2006-2010, due to the high reliance on revenue alone to finance expenditure. Also, during the same period, the Namibian government found it essential to formulate its first sovereign debt management strategy (SDMS) in 2005 with the objective of minimising the cost of government borrowing and ensuring that sovereign debt remains affordable and low in risk in the future. Consequently, a medium term expenditure framework (MTEF) was introduced, to encourage fiscal discipline and limit additional borrowing needs. The increase in total revenues was due to the improved revenue thresholds. However, a reduction during the 2010/2011 financial year was due to a decrease in the Southern African Customs Union (SACU) revenues (Sherbourne, Nampila and du Preez, 2002).

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FIGURE 2

The composition of public debt, government expenditure and revenue in Namibia 1990-2016 (as % of GDP)

Legend: ■ Total government revenue   ■ Total expenditure   ■ Total public debt
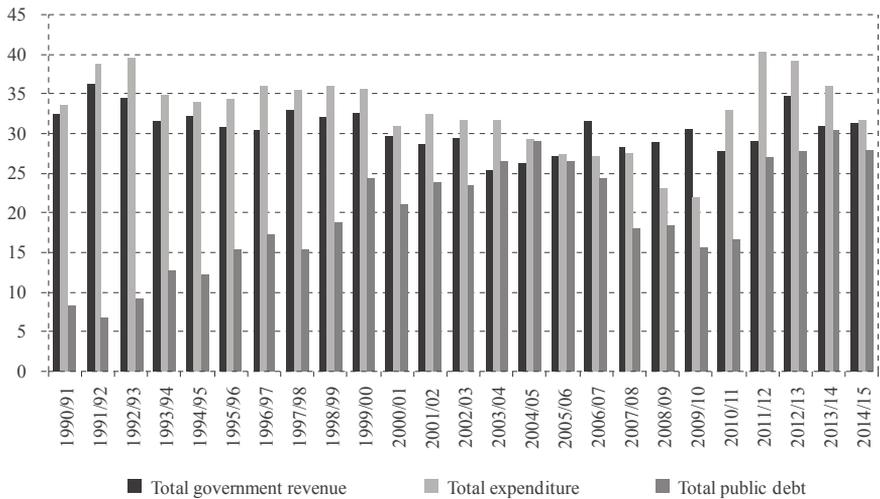
Source: Authors.

In Figure 2, it is evident that, even after the implementation of the SDMS and MTEF, the fiscal variables have been on the rise. As a result, fiscal sustainability has become an important aspect for any government, including Namibia. According to Zaaruka, Ndove and Tjipe (2004), fiscal sustainability is achieved when the expenditure for which debt has been incurred positively contributes to GDP growth, subsequently inducing an equivalent increase in government revenue to service the debt. Furthermore, fiscal sustainability is more about the urgency of policy changes and the need for new budget tools to assess governments' fiscal position than merely projecting the future (Schick, 2005). However, from the above and as supported by Balassone and Franco (2000), there is no defined unique benchmark against which to assess sustainability. Through Domar's framework, Balassone and Franco (2000) further argue that sustainability requires that the debt to GDP ratio is stable, while not any stable level is necessarily sustainable. And therefore, the interaction of public finance and the economy should be considered to assess the maximum sustainable debt level.

The increase in the country's debt raises doubts about whether the Namibian government's current fiscal policies are sustainable. As asserted by Zaaruka, Ndove and Tjipe (2004), Namibia has been experiencing an increasing level of government debt and persistent budget deficits since independence, which has raised concerns regarding the sustainability of fiscal policy in Namibia. According, to the literature, countries have adopted benchmarks for government expenditure, budget deficits and public debts to be within 40%, 5% and 35% of GDP, respectively (MOF, 2017). Despite the government's efforts to introduce the SDMS and the MTEF, Namibia has breached its own thresholds. The total expenditure,

budget deficit and public debt exceeded the targets by end of 2015/2016 while total government revenue slowed to 35%, failing to keep up with growing public spending (MOF, 2017).

To achieve fiscal sustainability, it is necessary to understand the relationship between public debt, government expenditure and revenue to obtain an insight into whether government spending leads to public debt and revenues, or whether public debts and revenue are the drivers of spending in Namibia. To our knowledge, there is currently limited research in Namibia intended to address the relationship between public debt, government expenditure and revenue. In view of the rising concerns about fiscal sustainability and the increase in debt burdens, expenditure and budget deficits above their thresholds in Namibia, it is imperative to examine and understand the underlying dynamics.

This research is aimed at addressing both the literature gap and policy-makers' concerns about fiscal sustainability by investigating the relationship between government expenditure, revenue and public debt in Namibia over the period from 1980 to 2018. To achieve this, the specific objectives of the paper are to examine the relationship between government expenditure and public debt, analyse the relationship between government expenditure and government revenue and determine the direction of causality between government expenditure and public debt as well as the direction of causality between government expenditure and government revenue.

This paper contributes to the empirical literature in three ways. Firstly, the paper will enhance understanding of government finance in small developing open economies. Secondly, the paper will further serve as an insight to help policy-makers in Namibia to improve both fiscal and debt management strategies to enhance fiscal sustainability and maintainable debt levels. Thirdly, the paper will add value and broaden the area of research in public debt, government expenditure and revenue and significantly benefit other researchers and scholars as a basis for further research and source of reference.

The paper is structured into five sections. This section gave a brief background on the area of the study in the context of the Namibian economy. The next session presents both the relevant theoretical and empirical literatures, section three presents the research methodology employed while section four presents the empirical results and interpretations. Conclusions and policy recommendations of the study are reported in the last section.

2 LITERATURE REVIEW

2.1 THEORETICAL LITERATURE

Public debt, government expenditure and government revenue are important areas of study in the field of public finance and economic policy and as such have gained momentum over time. Proponents of the *tax smoothing theory* assume that taxes are distorting to the economy due to their effect on labour supply which the

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government minimises by allocating taxes across time (Barro, 1979). Through this theory, any increase in government spending will cause governments to run budget deficits and resort to borrowing in order for them to maintain constant tax rates over time. The *positive theory of public expenditure* or *the displacement effect* argues that government expenditures do not increase continuously but rather in a displacement manner. A period of social disturbances requires an increase in government expenditures, which current revenues are unable to meet. As a result, public expenditure is displaced from the old level, resulting in tax rates also increasing in order to sustain the increasing defensive expenditure which never returns to the old level, leading to public debt accumulation. This further assumes a positive relationship between the three variables, confirming the spend-tax hypothesis (Peacock and Wiseman, 1961).

The spend-tax hypothesis through the displacement further received support from the *Ricardian equivalence theory* of Barro (1974). The theory mainly states that the use of public borrowing or the raising of taxes to meet budget deficits does not really matter. The same positive relationship between government expenditure and government revenue is expected as between government expenditure and public debt. Barro (1974) argues that taxation and public borrowing constitute essentially equivalent forms of financing public expenditures. The government is expected at some future time to redeem its debt which will usually occur through increased future taxation.

Set against the spend-revenue hypothesis is the *revenue-spend hypothesis* of Friedman (1978) and Buchanan and Wagner (1977). According to this theory, governments will first collect the money raised from taxes before spending it on government operations assuming an unidirectional causality running from government revenue to government expenditure. According to Friedman (1978), any tax increases will cause an increase in expenditures, only because governments are unable to reduce budget deficits. Similarly, Buchanan and Wagner (1977) argue that a decrease in taxes will cause government expenditures to increase due to the fiscal illusion that results from public perceptions of reduced government activities. These perceptions allow the general public to demand more from the government, increasing government expenditures and budget deficits.

Another contribution to theories on the fiscal variables is *Lerner's theory of functional finance,* mainly by Lerner (1943), which is based on the principle of judging fiscal measures based on their function in the economy, called functional finance. This theory suggests that the government should keep the spending rate on expenditure (aggregate demand) within the rate of aggregate supply to avoid inflation or unemployment. To ensure that the required total spending level is achieved, the government can implement either an expansionary or a restrictive fiscal policy.

Opposing public debt is the *classical theory of public debt* drawn from the theoretical concept of laissez-faire, which is also known as the free-market theory. This

theory is championed by the classical economists who shared a common principle with regards to public debt, expenditure and revenue, namely Adam Smith and John Stuart Mill. Smith (1937) in *The Wealth of Nations* argues that the accumulation of debt due to budget deficits is to be considered pernicious for the nation even if all of it is owed to domestic investors, and should therefore be avoided. This is supported by Mill (1979) in his *Principles*, arguing, however, that public debt might not be pernicious to a country if financed from foreign savings. This means that there is no crowding out effect when government borrowings absorb domestic savings that would either be invested unproductively or invested in foreign countries.

Contrary to the classical theory is the *Keynesian theory on public debt* by John Maynard Keynes. Keynes (1936) concurs that the growth of any economy can be stimulated by increased government expenditures and lower taxes; and that governments use fiscal policies in times of recession to improve economic activities. However, governments would cut taxes and increase expenditure to stimulate aggregate demand in times of depression. The above theories all have conflicting views in an attempt to confirm the relationship between government revenue, expenditure and public debt. Some theories assume that causality runs from revenue to spending, while others urge that government spending increases or decreases government revenue.

From the above, the Keynesian theory on public debt is expected to be one of the most interesting for a developing economy such as Namibia. This is because the government may use fiscal policies in times of recession to improve economic activities. The positive relationship expected between the variables can be further related to the positive theory of public expenditure or displacement effect as the increase in government expenditure in a developing economy may lead to insufficient existing levels of revenue, causing public debt accumulation. Lastly, in terms of causality, the revenue-spend hypothesis by Friedman (1978) is most plausible in our developing economy due to the high reliance of expenditure budgets on revenue collection.

2.2 EMPIRICAL LITERATURE
Empirical literature on the relationship between public debt, government expenditure and revenue is not without ambiguities. The positive relationship between public expenditure and public debt has been reported by Kiminyei (2014); Uguru (2016); Idenyi, Ogonna and Ifeyinwa (2016); Alawneh (2017); Mah et al. (2013). Kiminyei (2014), focused on the response of public debt to tax revenue and government expenditure in Kenya over 1960 to 2012. The study used the vector error correction model with correlation analysis as the data analysis tool. The study found a significant positive long run relationship between public debt and both tax revenue and government expenditure. Similarly, Uguru (2016) explored the relationship between public debt and government expenditure in Nigeria from 1980 to 2013 where a positive relationship between government expenditure and public debt is reported. This finding is consistent with Alawneh (2017) who examined

the impact of total government expenditure and total public debt on taxes in Jordan during the period 2001 to 2014. Although the results are in line with the theory of public expenditure, it did not establish the direction of causality. Mah et al. (2013) alternatively attempted to determine the impact of government expenditures and government income on government debt in Greece from 1976 to 2011 through the vector error correction model framework. Similarly to the study of Alawneh (2017) and Uguru (2016), the study also discovered a significant positive relationship between gross government debt and gross national expenditure but a negative relationship between gross government debt and gross national income, with causality running from gross national government expenditure and gross national income to government debt.

Conversely, Elyasi and Rahimi (2012) confirmed both the revenue-spend and spend-revenue hypotheses in Iran while Eita and Mbazima (2008) investigated the causal relationship between government revenue and government expenditure in Namibia using the Granger causality test through cointegrated vector auto regression methods for the period 1977 to 2007. Unidirectional causality from government revenue to government expenditure was found, resulting in a revenue-spend hypothesis for Namibia. Similarly, Ogujiuba and Abraham (2012) also found causality running from revenue to expenditure. Another study, this time in Nigeria, revealed contradictory results. Abdulrasheed (2017) established the existence of causality between government expenditure and government revenue with an analysis of an updated annual time series from 1986 to 2015. Cointegration statistical method tests also revealed the existence of long-run equilibrium relationships between government revenue and expenditure variables. Saungweme (2013) also found opposing results in a Zimbabwean government study over the period from 1975 to 2004. Using both bivariate and multivariate Granger causality models to test the tax-spend hypothesis, government expenditure was found to cause revenue. To tackle the problem of the fiscal deficit burden in Serbia, Luković and Grbić (2014) studied the causal relationship between government revenue and government expenditure using quarterly data from 2003 to 2012. The Toda-Yamamoto long-run non-causality method was used and the study findings also confirmed that government expenditure Granger-causes government revenue.

Oladokun (2015) empirically examined the causal relationship between public expenditure and national debt using time series data from 1981 to 2012. The Granger causality test revealed that public expenditure causes domestic debt. Okafor and Eiya (2011) aimed to ascertain the determinants of government expenditure growth through the OLS regression method from 1999 to 2008 in Nigeria. The data revealed a positive relationship between public debt and government expenditure and revenue. Ukwueze (2015) also studied the determinants of government expenditures in from 1961 to 2012 in Nigeria by employing the short-run ECM, the long-run static equation and the OLS estimation technique. The study found that the size of revenue significantly influenced the size of public expenditure, both in the short and the long run. Total debts significantly influenced

the size of government expenditure only in the short run. Both studies by Ukwueze (2015) and Okafor and Eiya (2011) are in line with the Ricardian equivalence theory implying that both taxes and borrowings constitute essential equivalent forms of financing public expenditures in Nigeria. Kanano (2006) on the other hand also examined the determinants of public expenditure growth in Kenya using the time series data analysis technique for the period 1980 to 2004 through the OLS estimation method. The findings indicated a positive relationship between internal debt and public expenditure, a negative relationship between external debt financing and public expenditure and a strong positive relationship between government revenue and public expenditure. In contrast, Achieng (2012) carried out a study to determine the relationship between budget deficit and domestic debt for twenty years from 1991 to 2010 in Kenya using the multiple regression analysis. A positive relationship between the budget deficit, government expenditure, government revenue and domestic debt was found. Although the study's methodology differed from that of Kiminyei (2014) and Kanano (2006), also in Kenya, the findings are similar. The importance of sustainability further led Elyasi and Rahimi (2012) to determine the causal relationship between government revenue and government expenditure over the period of 1963 to 2007. The results showed a bidirectional causal relationship between government expenditure and revenues in both the long and the short run, confirming the presence of both the revenue-spend and spend-revenue hypotheses in Iran. Sutherland (1997) in an attempt to determine the effect of public debt on fiscal policy found that the fiscal policy has the traditional Keynesian effects at moderate debt levels but was detrimental when debt reaches extreme values. This finding is consistent with Ighodaro and Oriakhi (2010) where the Keynesian theory is supported for Nigeria. Similarly to the theories reviewed above, studies that attempted to confirm the relationship between government revenue, expenditure and public debt have conflicting views. From the above empirical findings, the relationships between the variables remain uncertain making it difficult to generalise such relationships to Namibia. Although there have been numerous studies on the individual research variables, studies on the relationship between public debt, government expenditure and revenue remain limited globally, and most especially in Namibia. Also, most of the studies either focused on the relationship of domestic or external debt alone and on tax revenue, instead of on total government revenue. Overall, most studies mainly focused on establishing the relationship between government expenditure and revenue. As a result, this study tends to differ through its attempt to establish the relationship between the total government expenditure, total government revenue and total public debt, making it one of the very few studies in Namibia.

3 METHODOLOGY
3.1 RESEARCH DESIGN
The study employed a quantitative research design, that of a time series analysis. The approach is appropriate as it enabled the researchers to quantify the relationship between the government expenditure, revenue and public debt through a multiple regression analysis and causality testing.

3.2 MODEL SPECIFICATION

The study adapted a multiple linear regression method similar to that of Abdul-rasheed (2017) with public debt as an additional variable. This is in line with Favero and Giavazzi (2007), who emphasised the importance of public debt in policy analyses. The reliance on revenue alone being inadequate to finance government expenditure also favoured the inclusion of public debt. Further, public debt was included due to its effect on government expenditure through interest payments, debt servicing and repayments.

The basic model of this study is presented as follow:

$$GVTEX_t = f(PD_t, GVTRV_t) \tag{1}$$

Where: GVTEX = Nominal government expenditure (total operational and development expenditure); PD = Nominal total public debt (domestic and external debt) and GVTRV= Total nominal government revenue (tax revenue, non-tax revenue and grants).

To solve the problem of autocorrelation, the raw data was transformed into logarithmic forms, where lagged independent variables are used to address endogeneity issues. The multiple regression model, expressed in natural logarithms to determine the relationship between the variables, is as follows:

$$LnGVTEX_t = \alpha + LnGVTEX_{t-1} + \beta_1 LnPD_{t-1} + \beta_2 LnGVTRV_t + \varepsilon_t \tag{2}$$

In the above model, LnGVTEX is the dependent variable whereas LnPD and LnGVTRV are the independent variables. β_1 & β_2 are regression parameters, α is the constant while ε is the stochastic error term. Each β indicates how, on average, a one percent change in the independent variable affects the dependent variable. From the above, a positive relationship is expected between the government expenditure and public debt as well as between government expenditure and government revenue.

3.3 DATA SOURCES

The study sourced the government financial operations actual data on public debt, government expenditure and revenue for the period of 1990 to 2016 from the MOF annual budget reports. The study refrained from using the original source of data as all data pertaining to the study variables were readily available over the same fiscal periods.

3.4 ESTIMATION TECHNIQUES

The empirical estimation of the parameters was done within a framework of classical linear regression model (CLRM) using the OLS technique. A descriptive statistics analysis is firstly performed to describe the nature of the time series data. Time series properties (unit root and cointegration) of the data were further

examined to determine the best fitting model. Granger causality was employed to examine the direction of causality between public debt, government revenue and government expenditure. The E-views statistical software package was used to analyse the data and estimate the regression.

3.4.1 STATIONARITY TEST
A time series data is said to be stationary if the mean and variance are constant through time (Gujarati, 2004). In order to avoid spurious result problems, a stationarity test to check the existence of a unit root was firstly examined. The study made use of the Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) procedures in testing for unit roots. The null hypothesis that the series are non-stationary (i.e. have a unit root) was tested against the alternative hypothesis.

3.4.2 COINTEGRATION TEST
Once the unit root tests results confirmed the non-stationarity of variables at levels, cointegration analysis was considered, which implies the existence of long-run equilibrium relationship among the variables that have been incorporated in a model (Gujarati, 2004). The two tests used are the Engle and Granger and Johansen cointegration tests.

3.4.2.1 Johansen and Engle and Granger cointegration
The trace and maximum eigen value Johansen tests were used. The null hypothesis is rejected if the probability value (p-value) under both trace and maximum eigenvalue tests are less than 5% (0.05) significance level and the statistics for both tests are greater than the critical value at 5% level of significance, concluding that the variables are cointegrated. The optimal lag length was also determined based on the model with the lowest Akaike Information Criterion (AIC) or Schwarz Information Criterion (SC) values.

3.4.2.2 Engle and Granger cointegration
Cointegration is also confirmed by testing the stationarity of the residuals from the cointegration regression (Engle and Granger, 1987). Therefore, the residuals (Ut) obtained from OLS multiple regression between LnGVTEX, LnPD and LnGVTRV (equation 2) are saved and further tested through the ADF tests for a unit root.

3.4.3 ERROR CORRECTION MODEL
Based on the cointegration property, the ECM is estimated. The short-run ECM to estimate the speed at which the disequilibrium in the model is corrected was specified, indicating the changes in the dependent variable as a function of the disequilibrium error and the changes in the independent variables. The error correction model is specified below:

$$\Delta LnGVTEX_t = \alpha + \beta_1 \Delta LnPD_{t-1} + \beta_2 \Delta LnGVTRV_{t-1} + \beta_3 U_{t-1} + V_t \qquad (3)$$

Where α is the constant, $\Delta LnGVTEX$, $\Delta LnPD$ and $\Delta LnGVTRV$ are the differenced log variables for government expenditure, public debt and government revenue respectively. β_1 and β_2 are the short-run coefficients, while U_{t-1} is the one period lagged residual of equation 2. The coefficient of the U_{t-1} in this case β_3, measures the speed or rate at which the ECT adjusts the previous period disequilibrium and the sign of the residual lag must be negative and significant to indicate a long-run equilibrium relationship. The greater the coefficient of the ECT, the faster the speed of adjustment of the model from the short run to the long run (Granger, 1969). The V_t is the white noise error term.

3.4.4 GRANGER CAUSALITY

The Granger causality test is a technique for determining whether one time series is significant in forecasting another (Ray, 2012). Granger (1969) is of the opinion that Y "Granger causes" X if X is only best predicted by using the lag values of Y on assumptions that the future cannot cause the past, but the past can cause the present or the future; and that a cause contains unique information about an effect not available anywhere else. Based on the above, the study employs the pair-wise Granger causality test as proposed by Granger (1969) to test the causal relationship between variables. The test determines whether the causality runs from GVTEX to PD or rather from PD to GVTEX, implying a unidirectional causality; whether both the PD and GVTEX simultaneously Granger cause each other, implying a bidirectional causality; or whether causality between PD and GVTEX is non-existent. Similarly, the test also determines whether the causality runs from GVTRV to GVTEX, or rather from GVTEX to GVREV; or if both GVTEX and GVTRV mutually cause each other and lastly; whether there is no causality between GVTEX and GVTRV.

A simple Granger causality test involving the variables, government expenditure and public debt is written in equations 4 and 5, while that involving government expenditure and government revenue is written in equation 6 and 7 as:

$$LnPD_t = \sum_{i=1}^{n} \lambda_i LnPD_{t-i} + \sum_{j=0}^{n} \delta_j LnGVTEX_{t-j} + \varepsilon_{1t} \tag{4}$$

$$LnGVTEX_t = \sum_{i=0}^{n} \alpha_i LnPD_{t-i} + \sum_{j=1}^{n} \beta_j LnGVTEX_{t-j} + \varepsilon_{2t} \tag{5}$$

$$LnGVTRV_t = \sum_{i=1}^{n} \varphi_i LnGVTRV_{t-i} + \sum_{j=0}^{n} \gamma_j LnGVTEX_{t-j} + \varepsilon_{1t} \tag{6}$$

$$LnGVTEX_t = \sum_{i=0}^{n} \psi_i LnGVTRV_{t-i} + \sum_{j=1}^{n} \rho_j LnGVTEX_{t-j} + \varepsilon_{2t} \tag{7}$$

where LnGVTEX refers to government expenditure and LnPD and LnGVTRV refer to public debt and government revenue respectively. Also, ε_{1t} and ε_{2t} are the

stochastic error terms that are not correlated with each other; and α_i, β_j, λ_i, δ_j are the coefficients of the variables. From the above equations, the null hypotheses to be tested are then H_0: $\sum_{i=1}^{n} \alpha_i = 0$ for i = 1… n, which implies that LnPD does not Granger cause LnGVTEX and that LnGVTRV does not Granger cause LnGV-TEX; and $\sum_{j=1}^{n} \delta_j = 0$ for j = 1… n, implying that LnGVTEX does not Granger cause LnPD and that LnGVTEX does not Granger cause LnGVTRV. If none of the hypotheses are rejected, it means that LnPD does not Granger cause LnGV-TEX nor does LnGVTEX Granger cause LnPD. Rejecting the first hypothesis while accepting the second hypothesis shows that LnPD Granger causes LnGV-TEX, but LnGVTEX does not Granger cause LnPD. Similarly, accepting the first hypothesis while rejecting the second hypothesis indicates that the causality runs from LnGVTEX to LnPD. Lastly, if all the hypotheses in the above equations are simultaneously rejected, there is bidirectional causality between the two variables. The above interpretations will apply with regards to causality between government expenditure and government revenue.

3.4.5 DIAGNOSTIC TESTS

The heteroscedasticity test was performed under the decision criteria of rejecting the null hypothesis of no heteroscedasticity, if the calculated F-statistic is greater than the critical F-statistic. The autocorrelation test, which tests for the inconsistency of the error term used the Breusch-Godfrey serial correlation LM test to test the null hypothesis that there is no serial correlation. To ensure that the model used in the study is normally distributed, the null hypothesis of normality was tested against the alternative. A stability test to ensure the model's suitability for analysis was also confirmed.

4 EMPIRICAL RESULTS AND DISCUSSIONS

4.1 DESCRIPTIVE STATISTICS

Table 1 shows the series descriptive statistics. The descriptive statistics were performed on the raw data before log form transformation. Overall, government expenditure remains higher in magnitude than the rest of the variables, implying that the Namibia government has been experiencing a budget deficit over the years, while public debt remains lower than the other variables throughout the years. The standard deviations indicating how far the observations are from the sample mean are below their respective means for all the variables, implying a lower variance.

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TABLE 1

Descriptive statistics

	GVTEX	GVTRV	PD
Mean	18,034.03	16,583.59	12,638.15
Median	11,821.95	10,164.85	10,905.09
Maximum	65,996.03	57,844.84	51,212.00
Minimum	2,104.40	2,031.70	501.00
Std. Dev.	17,659.53	15,568.84	12,367.06
Skewness	1.41	1.24	1.54
Kurtosis	4.02	3.58	5.06
Jarque-Bera	9.78	7.12	14.98
Probability	0.01	0.02	0.00
Sum	468,884.80	431,173.40	328,592.00
Observations	37	37	37

Source: Authors' compilation.

4.2 STATIONARITY TESTING

The time series were tested at levels and at first differencing. A variable is said to be integrated of order one, or I (1), if it is stationary after differencing it once, or order two, I (2) if differenced twice. If the variable is stationary without differencing, then it is integrated of order zero, I (0). When the probability value (p-value) is less that the 5% (0.05) level of significance, the null hypothesis that there exists a unit root is rejected and vice versa. Moreover, when ADF and PP t-statistics are greater than the t-critical values, the null hypothesis is rejected. The unit root test results for the log forms of public debt, government expenditure and government revenue for the ADF and PP at levels are presented in Tables 2 whereas Table 3 depicts the ADF and PP test at first differencing.

TABLE 2

Unit root test results at levels-ADF and PP

Variables	Deterministic terms	ADF – levels			PP- levels		
		t-statistic	t-critical values 5%	P-values	t-statistic	t-critical values 5%	P-values
LNPD	*Intercept*	-2.3399	-2.9862	0.1681	-2.3899	-2.9862	0.1544
	Intercept and constant	-2.7871	-3.6032	0.2143	-2.7673	-3.6032	0.2210
LNGVTEX	*Intercept*	-0.0541	-2.9862	0.9443	-0.0277	-2.9862	0.9472
	Intercept and constant	-1.9387	-3.6032	0.6048	-2.0739	-3.6032	0.5345
LNGVTRV	*Intercept*	-0.1571	-2.9862	0.9321	-0.0339	-2.9862	0.9465
	Intercept and constant	-3.3305	-3.6121	0.0853	-3.2203	-3.6032	0.1032

Source: Authors' compilation and values from E-views 10.

At levels, under both the ADF and PP unit root tests, all the variables are found to be non-stationary as indicated in Table 2. This is because all the p- values for both tests are greater than 0.05. Also, all the absolute t-statistics under all determinist terms are less than the t-critical values. The study further tested the stationarity of the variables at first difference under both ADF and PP. As indicated in Table 3, at 5% level of significance, the variables become stationary at first difference with an intercept as well as with an intercept and constant in the ADF unit root test. This is indicated by the absolute t-statistic for all variables under both tests being greater that the critical values at 5% level of significance at all deterministic terms. Also, the probability values for the ADF and PP tests are all below 0.05, which led the researcher to reject the null hypothesis that the series for all variables contain a unit root. The tests further indicate that all the variables under investigation are all integrated of order one I(1).

TABLE 3

Unit root test results at first differencing-ADF and PP

Vari-ables	Determinis-tic terms	ADF-1st differencing			PP -1st differencing		
		t-statis-tic	t-critical values 5%	P-values	t-statis-tic	t- criti-cal val-ues 5%	P-values
ΔLNPD	*Intercept*	-4.4966	-2.9918	0.0017	-4.4975	-2.9919	0.0017
	Intercept and constant	-4.5261	-3.6121	0.0075	-4.5417	-3.6122	0.0073
ΔLNG-VTEX	*Intercept*	-5.5386	-2.9918	0.0001	-5.5386	-2.9919	0.0001
	Intercept and constant	-5.6049	-3.6121	0.0007	-5.8084	-3.6122	0.0004
ΔLNG-VTRV	*Intercept*	-5.1795	-2.9918	0.0003	-5.3697	-2.9919	0.0002
	Intercept and constant	-5.1161	-3.6121	0.0021	-5.3521	-3.6122	0.0012

Source: Authors' compilation and values from E-views 10.

4.3 COINTEGRATION TEST
4.3.1 THE JOHANSEN COINTEGRATION TEST
Based on the existence of unit root, the cointegration property, is examined using both the Johansen and Engle and Granger cointegration tests. After establishing the series optimal lag length from the AIC as 2 as indicated by Table 4, the results of the Johansen cointegration trace and maximum eigenvalue tests are shown in Table 5. The null hypothesis of no cointegration is tested against the alternative that the variables are cointegrated. In Table 5, it is notable that the Johansen cointegration test supports the cointegration property. This implies that the public debt, government expenditure and government revenue are associated and move together in the long run during the period under review.

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Lag length selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-10.8620	NA	0.0006	1.1551	1.3024	1.1942
1	85.0330	159.8252*	4.61e-07	-6.0860	-5.4970*	-5.9298*
2	94.5717	13.5131	4.60e-07*	-6.1309*	-5.1001	-5.8575

*Indicates the lag order selected by criterion, AIC.

Source: Authors.

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Johansen cointegration tests- Trace and Maximum eigenvalue

Unrestricted cointegration rank test (Trace & maximum eigenvalue)							
Hypoth-esised no. of CE(s)	Eigen-value	Trace statistics	0.05 Critical value	P-value	Max-eigen statistic	0.05 Critical value	P-value
None *	0.8274	52.5909	29.7970	0.0000	40.4171	21.1316	0.0000
At most 1	0.3302	12.1737	15.4947	0.1488	9.2196	14.2646	0.2683
At most 2	0.1205	2.9540	3.8414	0.0857	2.9540	3.8414	0.0857

Trace and Max-eigenvalue tests indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

Source: Authors.

4.3.2 ENGLE AND GRANGER COINTEGRATION TEST

The Engle and Granger cointegration approach requires an OLS regression between government expenditure as the dependent variable, and public debt and government revenue as independent variables to obtain the residual value. Residuals obtained from the model of GVTEX, PD and GVTRV log values were tested for the unit root using the ADF tests as indicated in Table 6. In Table 6, the study rejected the null hypotheses that the residual value (U_t) has a unit root. Given these cointegration tests results, the study employed the ECM to investigate both the short- and long-run dynamics among the variables.

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LnPD, LnGVTEX and LnGVTRV residuals unit root test result

Augmented Dickey-Fuller test statistic				t-Statistic	Prob.
				-2.4355	0.0171
Test levels:	critical	value	1%	-2.6607	
			5%	-1.9550	
			10%	-1.6090	

Source: Authors.

4.4 ERROR CORRECTION MODEL

Based on the cointegration property, the study estimated the ECM model. The coefficients LnPD and LnGVTRV are significant to explain LnGVTEX when the

probability values are less than 0.05. Most importantly, the sign of the ECT must be negative and significant to indicate a long-run equilibrium relationship. From the results in Table 7, the ECM indicates a statistically significant negative β_3 coefficient implying the existence of a long-run relationship and any shocks in the short run will be adjusted back to the long-run equilibrium by the ECT coefficient.

TABLE 7

ECM estimates (dependant variable: first differenced LnGVTEX)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0547	0.0170	3.2204	0.0028
D(LNGVTRV)(-1)	0.3657	0.1144	3.1949	0.0030
D(LNPD)(-1)	0.1821	0.0372	4.8880	0.0000
U(-1)	-0.4643	0.1121	-4.1383	0.0002
R-squared	0.6140	Mean dependent var		0.1382
Adjusted R-squared	0.5800	S.D. dependent var		0.0880
S.E. of regression	0.0570	Akaike info criterion		-2.7903
Sum squared resid	0.1106	Schwarz criterion		-2.6180
Log likelihood	57.0175	Hannan-Quinn criterion		-2.7290
F-statistic	18.0318	Durbin-Watson stat		1.4024
Prob(F-statistic)	0.0000			

Source: Authors.

The speed of adjustment at which the ECT corrects the disequilibrium in the model or rather, the speed at which the system corrected its previous disequilibrium period due varied shocks is 46.43% annually. A positive significant relationship between government expenditure public debt and government revenue is also confirmed. However, in terms of the magnitude, government expenditure is more responsive to government revenue (0.36%) when compared with public debt (0.18%). This implies that, a 1 percent increase in government revenue will increase government expenditure by 0.36%. Similarly, a 1 percent increase in government debt will increase government expenditure by 0.18%. The positive relationship between government expenditure and revenue will force the government to run a budget deficit (increase tax rates) when revenues are insufficient to meet the increase in expenditures (to meet the increase in expenditures). Consequently, the country will be forced to resort to borrowing, thus increasing public debt. Additionally, the estimated model's R square (0.6140) is found to be less than the Durbin Watson statistics (1.725916) concluding the absence of spurious regression.

These findings are similar to those of Ukwueze (2015) and Okafor and Eiya (2011). These findings further support the positive theory of public expenditure for Peacock and Wiseman (1961) which states that government expenditure and taxes are positively related due to the displacement effect. Additionally, the findings are also in line with the Ricardian equivalence theory which states that both taxes and borrowings constitute essential equivalent forms of financing public expenditures.

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4.5 GRANGER CAUSALITY

The study employed the pair-wise Granger causality test to test the direction of causality between public debts (LnPD), government expenditure (LnGVTEX) and government revenue (LnGVTRV). The study used 2 lags as the optimal lag length obtained by the criteria. The null hypothesis of no Granger causality is tested against the alternative of Granger causality between variables. The null hypothesis is rejected if the probability obtained is less than 5% (0.05) and fails to be rejected when the probability is greater than 0.05.

TABLE 8

Pair-wise Granger causality tests

Null Hypothesis:	F-Statistic	Prob.
LNGVTRV does not Granger Cause LNGVTEX	4.1288	0.0254
LNGVTEX does not Granger Cause LNGVTRV	1.2797	0.2920
LNPD does not Granger Cause LNGVTEX	1.4328	0.2535
LNGVTEX does not Granger Cause LNPD	8.9136	0.0008

Source: Authors.

As reported in Table 8, a unidirectional causality was found running from government revenue to government expenditure as well as from government expenditure to public debt. This implies that government expenditure can be considered a useful tool to stimulate/contain public debt in Namibia. The findings are similar to those of Mah et al. (2013), Oladokun (2015) as well as Idnyi, Ogonna and Ifeyinwa (2016). The causality between government expenditure and government revenue was tested to serve in the devising of an optimal strategy to reduce the budget deficit and further reduce public debt. The results further support the revenue – spend hypothesis theory of Friedman (1978) implying that government revenue causes government expenditure. This indicates that budget deficit could be eliminated through policy implementations that stimulate government revenue. The results are also consistent with those of Eita and Mbazima (2008) and Ogujiuba and Abraham (2012). However, the above results failed to support the Peacock and Wiseman (1961) hypothesis, which states that government expenditure causes government revenue, indicating that the spend-revenue hypothesis is absent in Namibia. Additionally, the above results are contrary to the findings of Saungweme (2013) who found causality running from government expenditure to revenue.

4.6 DIAGNOSTIC TEST

To ensure the robustness of the estimates, several diagnostic tests were performed. Table 9 shows that, the model satisfies the assumptions of no heteroscedasticity, no autocorrelation and normality. Similarly, the CUSUM that test on Figure 3 shows that the model is stable.

TABLE 9

Diagnostic tests for heteroscedasticity, autocorrelation and normality

Test	Null hypotheses	Probability
Heteroscedasticity test: Breusch-Pagan-Godfrey	No heteroscedasticity	0.9410
Breusch-Godfrey serial correlation LM Test	No autocorrelation	0.7152
Histogram normality test	There is normality	0.5467

Source: Authors.

FIGURE 3

CUSMUS stability test
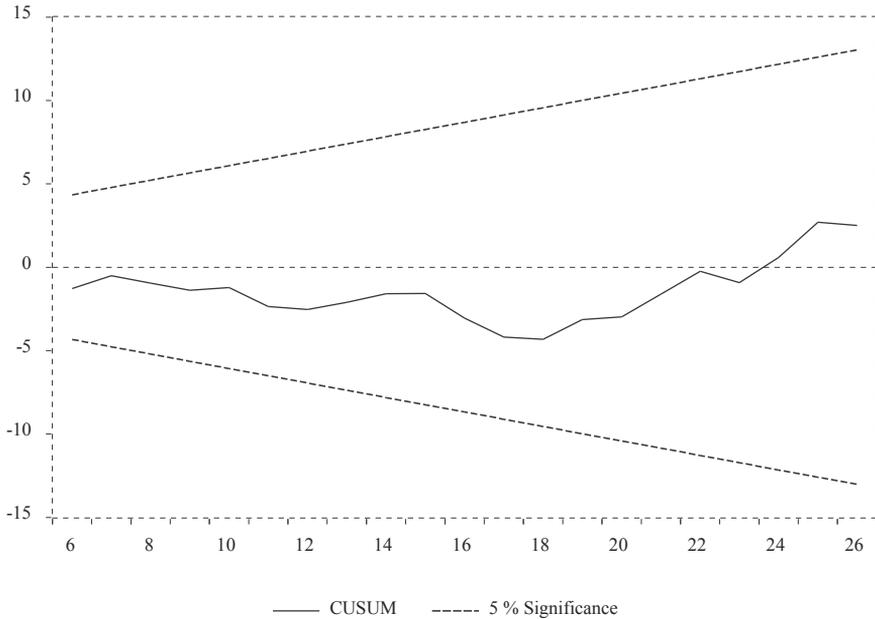
Source: Authors.

5 CONCLUSIONS AND RECCOMENDATIONS

This paper aimed to address both the literature gap and policy-makers' concerns about fiscal sustainability by investigating the relationship between the dynamics of government expenditure, revenue and public debt. The cointegration results indicated long-run relations between government expenditure, government revenue and public debt. The ECM model revealed a positive and significant relationship between government expenditure, government revenue and public debt. In addition, the ECT from the study was negative and statistically significant confirming that all previous disequilibrium in the three variables is removed in the following period and is adjusted back to the long-run equilibrium at an average speed of slightly over 46% annually. Therefore, the study confirms the existence of positive long-run relationships between government expenditure, public debt government revenue. The Granger causality testing confirmed the existence of a unidirectional causality from government expenditure to public debt. Similarly a unidirectional

causality from government revenue to government expenditure is supported. This implies that the past values of government expenditure can help predict the government debts, but public debt is not a useful tool in determining government expenditure. Such a relationship indicates that policy-makers have the ability to control the country's borrowings through government spending. The existence of the unidirectional causality from government revenue to government expenditure provides evidence that the tax-spend hypothesis is borne out in Namibia as increasing taxes lead to more government spending. There is robust evidence that the Namibian government can efficiently use fiscal variables to achieve fiscal sustainability. The study recommends policy-makers to thoroughly review fiscal policy by efficiently adopting the functional finance as suggested by the Lerner theory. This involves judging all fiscal measures according to their functions in the economy. Fiscal imbalances can also be eliminated through implementation of long-term policies that stimulate government revenue, while still attempting to mitigate their expenditures to stabilise borrowings in the short run.

The study further advises policy-makers to avoid overstating revenue and understating expenditure estimates from the inception of the budget process and to learn the art of spending within their means. Lastly, borrowed funds should be productively spent on successful capital expenditures/projects. Conversely, this might serve as a challenge to Namibia since the biggest portion of its expenditure is operational, particularly related to the administration. An expansion on the variables is suggested for further research. Since the study found unidirectional causality from government expenditure to public debt, future research, to investigate the relationship between public debt and individual operational and development expenditures is recommended in order to determine the discrete impact that expenditure has on borrowing. Finally, further research is suggested in order to improve the data once they become available.

Disclosure statement
No potential conflict of interest was reported by the authors.

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Fiscal councils' impact on promoting transparency and accountability in public finance management

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SANJA BAČIĆ:
FISCAL COUNCILS' IMPACT ON PROMOTING TRANSPARENCY AND ACCOUNTABILITY
IN PUBLIC FINANCE MANAGEMENT

Abstract

This paper addresses two main questions: (1) how far do the activities of fiscal councils in the EU countries help promote transparency and accountability in the management of public finances and (2) how could fiscal councils enhance the impact of those activities? The analysis is based on a questionnaire collected in 2016 from fiscal councils in 18 EU countries. The questionnaire looked at how the councils themselves assessed their impact on the management of public finances, and how they communicated their findings to the wider public. The councils see some benefits of their work; and their monitoring of adherence to fiscal rules and legislative regulation, as well as their warnings about excessive government spending, seem to get noticed in the media. This activity informs the public, and may in turn influence politicians' ratings, thereby helping to contribute to greater accountability in the management of public finances. The paper consequently argues that fiscal councils may promote fiscal transparency and accountability and proposes several ways to enhance the effectiveness of their influence on media.

Keywords: fiscal councils, fiscal transparency, fiscal accountability, fiscal policy communication, media influence

1 INTRODUCTION

This paper studies how fiscal councils in selected EU countries influence fiscal transparency and the accountability of politicians for the management of public finances. The question of whether fiscal councils can increase the visibility of compliance with fiscal rules through active communication with the public is important for several reasons. Media, especially digital media, can provide information that has bearing on the political ratings of the individuals and organisations in charge of managing public finances in more or less real time. Owing to competition among media outlets, that information is likely to affect the reputation of politicians responsible for government budgets.[1]

Fiscal councils are independent public institutions whose broad goal is to promote sustainable public finances. They have a mandate to assess fiscal plans, evaluate macroeconomic or budgetary forecasts of fiscal authorities, and make other analyses that may contribute to the public debate on fiscal policy and fiscal transparency (Calmfors and Wren-Lewis, 2010; IMF, 2013). To build their credibility, fiscal councils seek to establish a track record of solid analysis and effective public announcements.[2] Based on information about government activities, voters and financial markets are better able to assess government's fiscal position, present and future costs and benefits of various tax and expenditure proposals, and the longer-term consequences of fiscal policy on the economy and the society (Kopits and Craig, 1988). This can in principle enhance fiscal accountability, i.e. provide

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[1] "Fiscal councils do not directly affect fiscal policy, their influence hinges importantly on the reputational and electoral impact of their analyses on fiscal policymakers" (Debrun et al., 2013:52).

[2] *Transparency* refers to the publication of relevant, accessible, timely and accurate information on activities, rules, plans and processes in the budget process (IMF, 2014; 2016; 2019; OECD, 2002; 2013).

incentives for politicians in the executive branch to act more responsibly and face the consequences of poor decisions (OECD, 2002).

This paper uses findings from a questionnaire collected from eighteen fiscal councils in EU countries. The main research question is whether more effective communications of fiscal councils with the public helped to improve fiscal transparency and accountability. The paper finds some limited evidence to support this view.

The next sections will briefly review the literature, presents the data and research methodology, discuss the results and develop arguments for the importance of councils' improved communications with the public.

2 RELATED LITERATURE

This paper draws on the rich political economy literature studying the activities of fiscal councils (Schuknecht, 2004; Calmfors and Wren-Lewis, 2010; Wyplosz, 2012; 2015; Debrun et al., 2013; Schick, 2010; 2013). One of the recurring themes is that fiscal councils can improve democratic accountability and discourage opportunistic shifts in fiscal policy, such as pre-electoral spending sprees, by fostering transparency over the political cycle. Through independent analysis, assessments and forecasts, such bodies can raise public awareness about the consequences of certain policy paths, and thereby contribute to a culture of stability in public finances. Fiscal councils can thus raise the reputational and electoral costs of unsound policies and broken commitments. They can also provide valuable direct input in the budget process, such as independent forecasts or assessments of structural fiscal positions, thereby closing technical loopholes that allow governments to circumvent numerical fiscal rules (Debrun et al., 2013, 7-8).

Another recurring theme is that fiscal councils help enhance the transparency and accountability of public finances. By publicly commenting on fiscal policy and analysing government budgets, fiscal councils are prima facie instruments of fiscal transparency. Moreover, given the right conditions, they can generate a positive feedback loop for fiscal transparency: a wider public, better educated in fiscal policy, will demand more and better information on government budgets from public officials. The officials will likely oblige and provide such information for the sake of their own reputation; the councils will process and disseminate it; the public will evaluate their analysis, and so on. In Sweden, for instance, the fiscal council has an explicit mandate to assess the transparency of budget documents.

The more the councils are present in the media, the more they are likely to affect the fiscal policy public debate and be perceived as independent. This paper focuses on fiscal councils' media influence as a potential instrument for increasing the transparency and accountability of public finances. Although the councils may well be uniquely positioned to promote fiscal transparency and accountability, how far do they really achieve this goal in practice?

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SANJA BACHE:
FISCAL COUNCILS' IMPACT ON PROMOTING TRANSPARENCY AND ACCOUNTABILITY
IN PUBLIC FINANCE MANAGEMENT

3 DATA AND METHODOLOGY

Data for this study were collected from a questionnaire designed by the author and filled out by representatives of fiscal councils in 18 EU countries. The full questionnaire is shown in the Appendix and the councils that responded are listed in Table A1. The overall response rate was 72% (18 out of 25 fiscal councils). Responses from the fiscal councils in Croatia, Hungary, Ireland, the Netherlands, Sweden and the United Kingdom were selected for more in-depth study, and were supplemented with analysis of research papers and reports on their operation.

The questionnaire was designed and processed as anonymous in order to obtain a higher response rate and assure respondents of the confidentiality of their responses.

TABLE 1

Number and percent of answers to individual questions in the questionnaire (N = 18)

| Questions (variable)	N	%
How does your fiscal council communicate with the public?	18	100
How often does your fiscal council communicate with the public?	16	89
What is the average annual media coverage of the activities of your fiscal council?	13	72
Which of the media issues the largest number of releases on the work of your fiscal council?	16	89
How do you assess the media visibility of compliance with fiscal rules?	17	94
How do you assess the media visibility of noncompliance with fiscal rules?	16	89
Please describe the reaction of the government in relation to the assessment of noncompliance with national fiscal rules	15	83
How to increase the media visibility of compliance with the rules?	15	83
Does the higher media visibility of compliance with the rules and more effective communication of the council contribute to transparency and (politicians') accountability in the budget process?	15	83
How to increase the impact of councils on fiscal transparency and (politicians') accountability in the budget process?	11	61
How do you estimate the level of information of your citizens about the existence and activities of your fiscal council?	15	83
What has so far been the impact of your fiscal council on public information about the state of public finances and on the increase in fiscal transparency and (politicians') accountability in the budget process?	17	94
How does the public respond to the information in the media about the lack of transparency and about (politicians') responsibility in the budget process?	13	72
How do fiscal rules and fiscal councils influence transparency and (politicians') accountability in the budget process?	14	78
Do you think that fiscal rules and fiscal councils can be powerful communication tools in order to increase fiscal transparency and (politicians') accountability in the budget process?	17	94

Source: Questionnaire responses.

4 RESULTS

Graph 1 shows a comparison of the distribution of ratings for the question of how fiscal councils influence transparency and the accountability of politicians for the management of public finances. The results show that four out of 14 councils evaluate "public information disclosure" as the best way to influence the transparency and accountability of politicians in managing public finances. This was followed by "communication through the media" and "promotion of transparency and accountability". Two councils each highlighted "public disclosure of analysis, evaluation and reports" and "promoting good practice through transparency in the work of fiscal council".

GRAPH 1

Frequency of different answers to the question "How do fiscal rules and fiscal councils affect transparency and accountability of politicians for the management of public finances?"
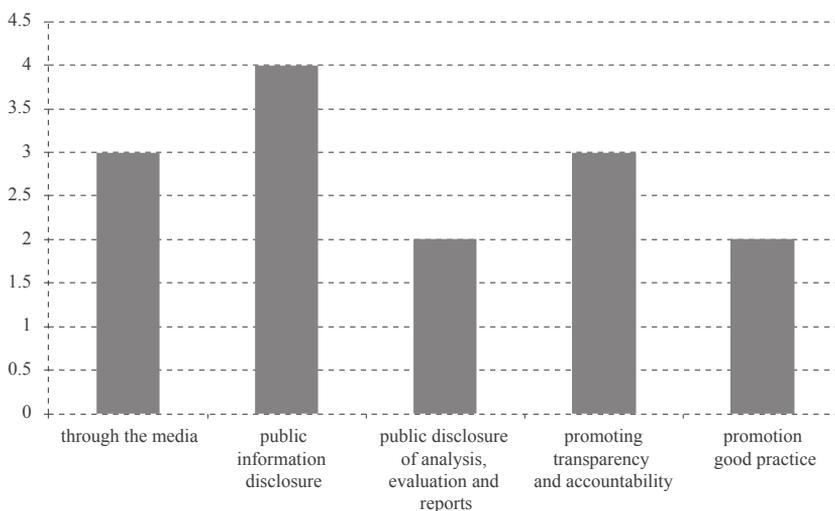
Source: Questionnaire responses.

Explanation of responses:
Through the media – general information on public finances provided to the public through the media;
Public information disclosure – by publicly disclosing information about compliance with fiscal rules and frequent communication with the media;
Public disclosure of analysis, evaluation and reports – systematic communication of analysis, evaluation and reports produced by fiscal councils;
Promoting transparency and accountability – general efforts to promote fiscal transparency and accountability;
*Promoting good practice – setting an example through the transparency of the work of the fiscal council.*

Graph 2 shows the frequency of answers to questions on the impact of fiscal councils, as assessed by respondents working for the councils. Not surprisingly, the

majority of respondents, nine out of 15, evaluated the impact of councils on the state of public finances and fiscal transparency as "good". Five respondents evaluated the impact of their councils as "sufficient", two as "very good", and one as "insufficient".

GRAPH 2

Frequency of different answers to the question "What is the impact of your fiscal council on public information on the state of public finances, and on fiscal transparency and accountability of politicians in the budget process?"
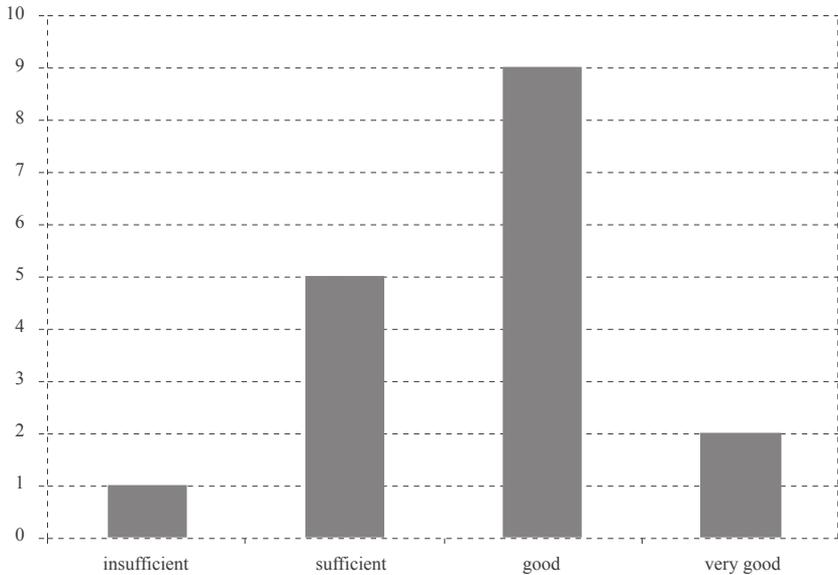
Source: Questionnaire responses.

Responses (not shown here) to related questions suggested a widespread lack of citizen awareness of the councils' existence and activities; the relatively high effectiveness of communication through the media; also, the more widespread use of disclosure of information on councils' websites rather than in the media.

Regarding channels of communication, all fiscal councils provided information on their websites (Table 2). Many also used press releases, interviews, press conferences, presence in social media groups, and briefings. Only one council (in Latvia) developed a communication strategy fully in line with OECD recommendations.[3]

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[3] The OECD principles for Independent Fiscal Institutions (IFIs) state that "IFIs should develop effective communication channels from the outset, especially with the media, civil society, and other stakeholders". (see OECD, 2020).

TABLE 2
Channels of communication with the public

Communication modes	AT	CY	DK	FR	EL	LV	LT	LU	HR	IE	HU	MT	NL	DE	PT	RO	SE	UK	∑
website	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	18
press releases	●	●	●	●	●	●	●	●		●		●	●	●	●	●	●	●	16
briefing		●				●				●			●		●			●	6
press conferences	●	●	●	●		●	●	●		●			●	●	●		●	●	13
social groups		●			●	●		●		●			●				●	●	8
interviews	●	●	●		●	●	●	●		●	●	●	●		●	●		●	14
PR or marketing agencies						●													1
other			●	●		●													
frequency	4	6	4	3	4	7	4	5	1	6	2	3	6	3	5	3	4	6	

Source: Questionnaire responses.

Answers to Question 3 on the timing of councils' communications (Table A2) suggest that this is most intense for major fiscal events (for 12 out of 18 councils) and disclosure of information on compliance/non-compliance with fiscal rules (10 councils). The councils most often give warnings about the state of public finances (Table A3) in the event of there being a discrepancy between the proposed budget and the outlined objectives, as well as in case of overoptimistic forecasts (9 councils each).

Media reports on fiscal councils' communications (Table A4) mostly address analyses, assessments and reports of the councils (as reported by 15 councils); councils' criticism of government fiscal policy (9 cases); their reports on trends in deficits and public debts (8 cases); and their assessments of fiscal transparency and accountability in the budget process (5 cases). One can detect a difference in councils' assessment as between what they communicate and what the media report (Table 3). The media mostly cover analyses, evaluation and reports; criticisms of government fiscal policy and changes in deficits and public debt; and issues in transparency and accountability in the budget process or in councils' activity.

TABLE **3**

Media coverage of most common topics communicated by councils

Communications	Alerts	Media releases
Most important fiscal events	Discrepancy between proposed budgets and fiscal goals / over-optimistic forecasts	Analyses, evaluations and reports
Information on compliance / non-compliance with fiscal rules	Excessive spending / raising public awareness of sound public finances	Criticisms of government fiscal policy and of changes in fiscal deficits and public debt
Announcement of fiscal policy changes / fiscal policy failures	Actual state of fiscal policy	Releases on transparency and accountability in the budget process / councils' activities

Source: Questionnaire results and author's comparison.

Somewhat surprising were answers to Question 5, on the media that issue the largest number of releases on the work of councils. Print media were highlighted by 16 out of 17 councils, while only five noted the digital media. Given the growing influence and importance of digital media, fiscal councils were expected to redirect communication to these media in the future.

Only four councils use international media to send messages about the government's fiscal policy to the world public (Question 7). This is surprising given that international news agencies tend to affect financial markets and "penalize the countries that violate fiscal rules" (Eyraud and Wu, 2015). Seven councils do not use international media, and seven consider it sufficient that the foreign media themselves transmit information published on councils' websites, at press conferences, through social media or foreign correspondents. For example, the Irish IFAC sends reports for publication to the Network of European Council (EUFI) website.

Information on compliance with fiscal rules is publicly available on all councils' web pages (Table 4). Most councils present reports on compliance with fiscal rules through press releases and presentations in parliament (12 each), half present reports at press conferences, and fewer than half at briefings with journalists.

TABLE 4

Is monitoring of the compliance with fiscal rules publicly available?

	AT	CY	DK	FR	EL	LV	LT	LU	HR	IE	HU	MT	NL	DE	PT	RO	SE	UK
council's web site	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•
press releases		•	•		•	•	•	•	•	•	•	•		•		•		•
briefings with journalists		•		•				•				•				•	•	•
press conferences	•	•	•			•	•	•		•				•				•
presented in parliament		•			•	•	•	•		•	•	•	•	•			•	•
other, please specify																	•	

Source: Author's questionnaire results.

Other:

Germany – by presentation in the parliament and legally secured in special cases (presentation of reports in case of non-compliance with fiscal rules in the Federal Parliament and in the State Parliaments).

Netherlands – The Quarterly Review, a CPB publication related to the budget cycle, provides numerous opportunities for assessing compliance with national and EU fiscal rules.

Portugal – a web site release – in the annual fiscal performance reports, annual budget plans and medium-term stability programs.

Sweden – annual report is published in electronic and printed form.

Fewer than half of the councils surveyed rate the visibility of published information they provide as adequate, i.e. transmitted or published by all major media, followed by a public debate. In Sweden, for example, the annual report draws a lot of attention from newspapers and television. Newspaper articles and editorials comment on the report, and representatives refer to it in parliamentary debates. Eight councils also replied that all the mainstream media transmitted or published information on compliance with the rules, but this was not followed by public discussion. The Dutch council judges that the occasional visibility of CPB data allows assessment of compliance with the rules, but most of the time more attention is paid to deficit forecasts, as assessments of compliance with the rules are carried out by another agency, the National Council.[4]

Regarding the media visibility of councils' assessments of fiscal rules (Question 11) just over half (9 out of 17) of the councils replied that information on non-compliance was transmitted by all major media and followed by public debate. In almost a third of the cases, mainstream media did transmit the information, but there was no public debate. For instance, councils in France and Romania reported

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[4] More: www.raadvanstate.nl/the-council-of-state. At the time of the survey the CPB was listed in the EU Independent fiscal institutions database. Today, both CPB and National Councils (which is active since 2014) are members of the network of the EU Independent Fiscal Institutions (EUIFIS).

that information on non-compliance was published in the media very seldom or never. Unsurprisingly, media reported more often on non-compliance than on compliance with the rules. This probably reflects the well-known media market strategy to provide readers with the negative news and criticism of government policies that they find more attractive. Furthermore, more than half of the councils (9 out of 17) stated that the government felt obliged to explain the reasons for the non-compliance identified by fiscal councils; more a than third (7 out of 17) replied that the government did not respond publicly (Question 12).

Governments mostly responded to critical views of fiscal policy by respecting criticism and becoming more transparent (6 out of 17 councils), and by explaining the state of fiscal policy (Question 15). Almost half of the councils (6 out of 13) indicated that citizens did not react publicly even though they were mostly aware of the lack of transparency and accountability in the budget process (Question 21). Very few councils responded that the public was responsive to discussions and pressed for transparency and accountability. Very few also responded that they felt the public lacked knowledge and interest in public finances (2 out of 13 councils). This indicates that the councils do have an influence on the government through the media, and that the public does have an influence on the government, but not to the extent expected in the policy literature. The public generally hardly reacts to information about the lack of fiscal transparency and accountability.

How could fiscal councils increase their impact on transparency and accountability in the future? Answers summarised in Table 5 suggest a few good practices: increasing the number of public debates on fiscal policy in the media (9 out of 18 councils); strengthening their powers through adjustments in national legislation (7 out of 18); and communicating more efficiently with the public (6 out of 18). The questionnaire further indicated that for the vast majority of councils, communication with the public and public information were not regulated by law (see Table A5). The majority of councils did not view staffing problems as a major obstacle to increasing its influence (Table A6).

A good starting point was that councils reported motivation of employees: 17 out of 18 councils saw good prospects for increasing their influence in the future.

TABLE 5

How can the impact of councils on fiscal transparency and accountability in the budget process be increased?

	AT	CY	DK	FR	EL	LV	LT	LU	HR	IE	HU	MT	NL	DE	PT	RO	SE	UK
by strengthening council's power through national legislation changes	●				●		●		●		●	●				●		
by strengthening council's power through changes in European legislation (SGP)					●				●			●				●		
by more efficient communication with the public					●	●	●					●				●		●
by increasing the number of public debates on fiscal policy in the media	●				●	●	●			●	●			●		●		
other, please specify				●						●			●		●	●	●	

Source: Author's questionnaire results.

Other:

France – the influence is already high.

Ireland – by producing quality analyses and effectively communicating the results with the parliament.

Portugal – building a reputation is essential in order to ensure social significance. If quality or independence is lacking in its analysis, no marketing plan could preserve the fiscal council.

Romania – by increasing the public awareness to be implicated in the process of how the government spend the public money, not just in the short-term but also in the medium-term.

Sweden – A strong council needs a legislative background, but the legislative background does not guarantee a strong council. The strength of the institution ultimately depends on the quality and credibility of its work, not its legal status.

A closer look at fiscal councils in Croatia, Hungary, Ireland, the Netherlands, Sweden and UK provides additional insights. These councils seem to be aware of the importance of communication with the media for their role of "fiscal guardians".

In Ireland, the Netherlands Sweden and the UK communication with the public takes place in many different ways. By contrast, in Hungary it takes place only through a website and media interviews, and in Croatia only through a website.

The Dutch council plans to improve its communication strategy by increasing activities in social media. Most council publications are reviewed in the print and electronic media.

These six councils mostly publish information on compliance with the rules on their websites through press releases, and by making presentations in parliament. Most active in terms of communication are the councils in Sweden and the UK. Respondents from the councils noted that information on compliance was transmitted by all important media, and was followed by public discussions, notably in Ireland, Sweden and the UK. In Croatia and Hungary, there was less public discussion of councils' findings.

Governments in these countries generally responded to the councils' findings on non-compliance with fiscal rules. In Sweden, the government was required to respond before passing another budget. In the UK, the government had to announce whether it had taken corrective measures. The Swedish council assessed fiscal transparency both as part of its regular duties and in its annual report. Governments in these countries appreciated councils' work. In Sweden, the government regularly explained the reasons for the situation in response to the council's criticism. In the UK, the council presented information for others to judge and did not openly express critical views.

Most of these six councils believed that preparing public reports that influence media reporting had the greatest impact on fiscal transparency (Table A7). All six councils assessed their impact on public information and on increasing fiscal transparency and accountability as good. Councils in the Netherlands and the UK pointed out that they generally worked with a high level of transparency. Public reactions to information that councils provide to the media vary across countries. In Croatia, these responses show up in a large number of follow-up reactions in the media; in Hungary, in public hearings and media pressure; in Ireland, in critical press reports; and in Sweden, in strong public support for fiscal discipline and the potentially high cost of financial irresponsibility.

5 CONCLUSION

This paper presents the findings from a questionnaire on media communication practices of fiscal councils in EU countries as a potential tool for increasing the transparency and accountability of public finances. Their mandate is to increase the visibility of compliance with fiscal rules through active communication with the public. More effective communication should in theory help improve fiscal transparency by making politicians accountable to the public for their management of public finances. The purpose of the questionnaire was to assess to what extent this has been the case in practice. The findings show the following:

The best practices for fiscal councils to influence accountability of politicians in managing public finances seem to be public disclosure of information about

compliance with fiscal rules, frequent communication with the media, promotion of transparency and accountability, publication of analyses, evaluations and reports, and, last but not least, open and transparent work by fiscal councils themselves.

Most fiscal councils assess the influence of their own work on the state of public finances and fiscal transparency as good. They find that they exert influence on the government and the public through the media, but not to the extent they would like. This is reflected, for instance, in the weak public reaction to councils' findings on the lack of fiscal transparency, and suggests that the councils need to put more effort into their media communication strategies. One obvious choice would be to make more intensive use of the digital media, as their influence is growing relative to traditional outlets like print.

Their influence could also be enhanced by increasing the number of public debates on fiscal policy in the media. Some councils would also benefit from stronger anchoring of their powers in national legislation, as recommended by the OECD.

In sum, this paper provides some tentative evidence that fiscal councils in EU countries are able to help promote fiscal transparency and accountability. The councils themselves see some benefits of their work, and their monitoring of adherence to fiscal rules and warnings about excessive government spending noticed in the media. This informs the public, and may in turn influence politicians' ratings, thereby helping contribute to greater accountability in the management of public finances.

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QUESTIONNAIRE

1. **How does your fiscal council communicate with the public? (multiple replies possible)**
   - web page
   - press releases
   - briefings
   - press conferences
   - social groups (YouTube, Twitter, Facebook, etc.)
   - interviews
   - PR or marketing agency
   - other, please specify

2. **How often does your fiscal council communicate with the public?**
   - a week
   - a month
   - quarterly
   - semi-annually
   - a year
   - once a year
   - other, please specify

3. **When does your fiscal council usually communicate with the public? (multiple replies possible)**
   - when there are significant fiscal events (planning the state budget, presenting the draft state budget, the debate on the state budget in Parliament, the execution of the state budget)
   - when changes in fiscal policy are being announced
   - when tax-policy is out of the set framework
   - in the time of the release of the compliance/incompliance with fiscal rules
   - ahead of parliamentary elections and during the election campaign in order for the voters to be fairly informed about fiscal policy
   - in case of major failures in the conduction of fiscal policy
   - other, please specify

4. **What is the average annual media coverage of the activities of your fiscal council?**
   - more than 10 releases in the media
   - more than 20 releases in the media
   - more than 50 releases in the media
   - more than 100 releases in the media
   - more than 150 releases in the media
   - other, please specify

5. **Which media issue the largest number of releases on the work of your fiscal council?**
   - print media (dailies, weeklies, monthlies, etc.)
   - electronic media (radio, television, etc.)
   - digital media (social groups, Facebook, Twitter, YouTube, etc.)
   - online media (news portals, etc.)

   Additional information

6. **Which area do most of the media reports address?**
   (multiple replies possible)
   - activities of the Council
   - analysis, assessments and reports of the Council
   - criticism of the government's fiscal policy
   - trends in deficit and public debt
   - transparency and accountability in the budget process
   - other, please specify

7. **What international media does your fiscal council use to send a message about the government's fiscal policy to the world public?**
   (multiple replies possible)
   - news agencies (Reuters, Bloomberg, etc.)
   - The Financial Times and the like
   - The Economist and the like
   - international television channels (CNN, CNBC, etc.)
   - they do not use any international media
   - other, please specify

8. **How much funding was allocated from the budget of your fiscal council for marketing and public relations in 2015 and 2016? (amount in EUR)**
   - in 2015
   - in 2016
   - no data on the funding

9. **Is the monitoring of the compliance with fiscal rules publicly available?**
   (multiple replies possible)
   - on the web site of the Council
   - press releases
   - briefing with journalist
   - press conferences
   - presented in the Parliament
   - other, please specify

10. **How do you assess the media visibility of the compliance with fiscal rules?**
    - information about this is published/broadcast in all major media, followed by a public debate
    - information about this is published/broadcast in all major media, no public debate

- information about this is published/broadcast only in some media
- there is no, or insufficient, information about this in the media
- other, please specify

11. How do you assess the media visibility of noncompliance with fiscal rules?
- information about this is published/broadcast in all major media, followed by a public debate
- information about this is published/broadcast in all major media, no public debate
- information about this is published/broadcast only in some media
- there is not, or insufficient, information about this in the media
- other, please specify

12. Please describe the reaction of the government in relation to the assessment of noncompliance with national fiscal rules
- reacts extremely negatively to the fiscal institution
- explains why it does not comply
- publicly announces it is taking corrective steps
- publicly explains why it does not take corrective steps
- usually does not react publicly
- other, please specify

13. How can IFIs contribute to the increase in the (politicians') accountability for not complying with fiscal rules?
(multiple replies possible)
- by better informing the public through the media about the importance of the compliance with the rules and the consequences of the noncompliance
- by educating politicians
- by educating the public
- by the influence of IFIs through the media on the politicians' reputations
- other, please specify

14. How to increase the media visibility of compliance with the rules?
- by more efficient communication with the public
- by creating a communication strategy with the public
- by earmarking the funds for marketing
- by increasing the funds for marketing
- by selecting individuals that have communication skills to head the institution
- other, please specify

15. Please describe the reaction of the government to critical views by your fiscal council on fiscal policy published in the media?
- The government generally respects the criticism, becoming more transparent and accountable.
- The government generally respects the criticism, but does not become more transparent and accountable.
- The government explains the reasons for the state of fiscal policy.
- The government rarely appreciates criticism.

- The government threatens that budgetary resources for the work of fiscal institutions will be reduced.
- The government reacts extremely negatively.
- The government generally does not react.
- Other, please specify.

16. **How does your fiscal council affect the fiscal transparency and (politicians') accountability in the budget process?**
   (multiple replies possible)
   - by promoting fiscal transparency and accountability
   - by analysing fiscal transparency
   - by supervising fiscal sustainability
   - by preparing public reports that have significant media impact
   - by promoting sound fiscal policy
   - other, please specify

17. **What do you see as the main cause of the growth of the deficits and public debts in your countries in the period from 2008 to 2015?**
   (multiple replies possible)
   - excessive government spending in (good) times before the crisis
   - poor risk management before the crisis
   - inadequate and belated government response to the global financial crisis
   - fiscal irresponsibility and lack of transparency
   - politicians were disoriented during the crisis
   - absence of fiscal rules
   - noncompliance with fiscal rules
   - non-existence of independent fiscal institutions
   - introduction of flexible rules
   - susceptibility to political discretion
   - political misuse of state finances
   - bad and irresponsible policies of EU member states
   - increased spending before the elections and transfer of costs to the future generations
   - insufficient and biased information to the public about the state of public finances
   - there is no problem with deficit and public debt, and the public finances were stable
   - other, please specify

18. **Does the higher media visibility of the compliance with rules and more effective communication of IFIs contribute to transparency and (politicians') accountability in the budget process?**
   - yes, please specify how
   - no, please specify reasons

19. **How to increase the impact of IFIs on fiscal transparency and (politicians') accountability in the budget process?**
   - by strengthening the power of IFIs through changing national legislation
   - by strengthening the power of IFIs through changing European legislation (Stability and Growth Pact)
   - by more efficient communication with the public
   - by increasing the number of public debates on fiscal policy in the media
   - other, please specify

20. **What are the obstacles to any increase in the impact of your fiscal council on fiscal transparency and (politicians') accountability in the budget process? (multiple replies possible)**
   - insufficient staffing of Council
   - lack of a communication strategy with the public
   - council is not independent in the performance of its work
   - government ignores Council media views on the state of fiscal policy
   - media views and public discussions do not contribute to the better state of public finances
   - low level of democracy in a society, which is why the impact of public has weakened
   - low level of press freedom, which is why the media do not publish critical views on the government's fiscal policy
   - other, please specify

21. **How does the public respond to the information in the media about the lack of transparency and (politicians') responsibility in the budget process?**
   - by public debates and pressing politicians on more transparent and more responsible behaviour in the budget process
   - by public discussions, but without pressing politicians on more transparent and more responsible behaviour in the budget process
   - by constantly pressing politicians on more transparent and more responsible behaviour in the budget process
   - has evidence of the lack of transparency and (politicians') responsibility in the budget process, but is not responding
   - has no knowledge of and shows no interest in the state of public finances

Additional information

22. **How do you estimate the level of information of your citizens about the existence and activities of your fiscal council?**
   - insufficient
   - barely sufficient
   - good
   - very good
   - exceptionally well-informed

Additional information

23. What has so far been the impact of your fiscal council on the public information about the state of public finances and on the increase in fiscal transparency and (politicians') accountability in the budget process?
- insufficient
- sufficient
- good
- very good
- excellent

Additional information

24. How do fiscal rules and IFIs influence transparency and (politicians') accountability in the budget process?
- by informing the public through media, and the public then influences the politicians' reputation and rating at the elections
- by public disclosure of information about the compliance with fiscal rules and increased communication with the media
- by enhanced communication analysis, evaluation and reporting of independent fiscal institutions
- by promoting fiscal transparency and accountability
- by transparency of the work of an independent fiscal institution as an example of good practice
- other, please specify

25. When does your fiscal council especially issue warnings about the state of public finances? (multiple replies possible)
- in the event of a conflict between the proposed budget and the goals set out
- in the case of overoptimistic forecasts
- in the event of excessive government spending
- in the case of unsustainable tax policy
- in the case of worse fiscal performance than anticipated
- to indicate the actual state of fiscal policy
- to raise public awareness on the importance of sound public finances
- other, please specify

26. Do you think that fiscal rules and IFIs can be powerful communication tools in order to increase fiscal transparency and (politicians') accountability in the budget process?
- yes, please specify how
- no, please specify reasons

TABLE A1

EU fiscal councils that responded to the questionnaire

Country	Council	Year of founding
AT	Fiscal Advisory Council	2002
CY	Fiscal Council	2013
DK	Danish Economic Council	1962
FR	High Council for Public Finance (HCFB)	2013
EL	Parliamentary Budget Office	2010
HR	Commission on Fiscal Policy	2013
IE	Irish Fiscal Advisory Council (IFAC)	2011
LT	State Audit Office	2013
LV	Fiscal Discipline Council	1990
LU	Court of Auditors	1999
HU	Fiscal Council	2009
MT	National Audit Office	2013
NL	Netherlands Bureau for Economic Policy Analysis (CPB)	1945
DE	Independent Advisory Board to the Stability Council	2013
PT	Public Finance Council	2012
RO	Fiscal Policy Council	2010
SE	Swedish Fiscal Policy Council	2007
UK	Office for Budget Responsibility (OBR)	2010

Source: Author.

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TABLE A2
When does your fiscal council usually communicate with the public?

	AT	CY	DK	FR	EL	LV	LT	LU	HR	IE	HU	MT	NL	DE	PT	RO	SE	UK
significant fiscal events					•	•	•	•	•	•	•	•	•		•	•		•
changes in fiscal policy						•					•					•		
tax policy is out of the framework						•										•		
compliance/ non-compliance with the rules	•					•	•	•	•	•		•			•	•		
ahead of parliamentary elections and during the campaign						•										•		
failures in fiscal policy		•				•										•		
other	•	•	•	•		•								•	•		•	•

Source: Author's questionnaire results.

Other:

Austria *– by publication calendar (studies, recommendations, etc.).*

Cyprus *– every fall and spring (specified in legislation) if it considers that EU or national rules have been breached.*

Denmark *– the Council meets twice a year and the Presidency prepare a report for each Council meeting. The report contains economic analysis and policy recommendations on economic policy, as well as short and medium-term forecasts on the key indicators of the Danish economy. The report also includes the Presidency assessment of fiscal policy goals – e.g. adherence to the national Budget Law, adherence to EU rules and assessment of long-term fiscal sustainability. The Presidency is independently responsible for the reports and acts as a Danish "fiscal watchdog". The preliminary version of the report is presented and discussed at the Council meeting. The reports are published immediately after the meeting. Council members' comments are added in the final version of the report. Following the Council meeting the Presidency holds a press conference.*

France *– for each budget and SGP.*

Ireland *– with regard to the first reply, the primary Council communicates with the public at the time of the release of the main reports. Council members and the president sometimes participate in media interviews throughout the year. The president usually participates in fewer media inclusions, the morning after the annual budget is announced in October each year, to give an initial reaction to the budget.*

Latvia *– the Law on Fiscal Discipline gives the Latvian Fiscal Council a broad mandate (Article 28) so that it communicates in all cases where it considers it important.*

Netherlands *– CPB publishes Quarterly Reviews, a budget cycle publication. This provides numerous opportunities for assessing compliance with national and EU fiscal rules. In September, opposition parties seek an analysis of their alternative budget. The CPB provides analysis of political parties' electoral programs. It also provides analysis of Government agreements and major additional policy packages.*

Portugal *– usually when a publication is issued or when a senior council member intervenes at a public event. It publishes an average of 1.5 publications per month, but amount is not the same every month.*

Romania *– on the eve of parliamentary elections and during the election campaign to keep voters impartially informed – only when the Council is asked.*

Sweden *– FPC may decide to hold a press conference at a time when it believes there is a failure in fiscal policy (breach of fiscal rule) and a need for action (e.g. regarding fiscal effects of immigration in 2015). FPC does not hold regular press conferences and tries to stay away from direct involvement in the budget process or election campaigns.*

UK *– in the case of significant fiscal developments and medium-term forecasts while all other outputs are published at a time of the institution's own choosing.*

TABLE A3

When does your fiscal council especially give warnings about the state of public finances?

	AT	CY	DK	FR	EL	LV	LT	LU	HR	IE	HU	MT	NL	DE	PT	RO	SE	UK
conflict between proposed budget and goals set out		●		●		●	●			●	●	●				●	●	
overoptimistic forecasts		●		●	●	●	●	●		●	●	●					●	
excessive government spending	●			●					●	●		●				●	●	
unsustainable tax policy	●									●		●				●		
worse fiscal performance than anticipated							●			●	●	●						
indicate the actual state of fiscal policy	●							●		●	●	●				●		
to raise public awareness	●	●		●		●						●					●	
other			●										●	●	●	●		●

Source: Author's questionnaire results.

Other:

Denmark – the Council meets twice a year and the Presidency prepares a report for each of the meetings. The report contains economic analysis and policy recommendations on economic policy, as well as short- and medium-term forecasts on the key indicators of the Danish economy. It also includes the Presidency assessment of fiscal policy goals – e.g. adherence to the national Budget Law and to EU rules, and assessment of long-term fiscal sustainability. The Presidency is independently responsible for the reports and acts as a Danish "fiscal watchdog". The preliminary version of the report is presented and discussed at the Council meeting. The reports are published immediately after the meeting. Council members' comments are added in the final version of the report. Following the Council meeting, the Presidency holds a press conference.

Germany – alerts are inseparable with the tasks of the Stability Council. It makes significant reference to budgetary surveillance to avoid budgetary urgency (warning of a specified budgetary emergency) and to monitoring compliance with EU budgetary discipline requirements (more on tasks on the Council's website).

Netherlands – the CPB provides the data for assessment. It does not provide explicit warnings.

Portugal – whenever CFB publishes its regular reports. Council does not publish analyses or comments in reaction to particularly events.

Romania – in the case of major fiscal measures envisaged by the government.

UK – OBR publishes its forecasts at the same time as the Ministry of Finance the main announcement of the policy. The OBR does not give warnings about the "state" of public finances, but presents detailed analyses so that everyone can judge the fiscal position.

TABLE A4
Which topics do media reports address?

	AT	CY	DK	FR	EL	LV	LT	LU	HR	IE	HU	MT	NL	DE	PT	RO	SE	UK
activities of the councils									●		●						●	●
analysis, assessments and reports	●	●		●	●		●	●	●	●		●	●	●	●	●	●	●
criticism of fiscal policy	●	●			●	●				●		●			●	●	●	
trends in deficit and debt	●					●	●					●	●		●	●		●
transparency and accountability						●	●					●					●	●
other																●		

Source: Author's questionnaire results.

TABLE A5

The legal determination of the councils' communication with the public

Council	Fiscal Responsibility Act (FRA) – Communication with the public
Denmark	The type and timing of the reports is published on De Økonomiske Råd
France	Under the law in place, the council publishes opinions on Haut Conseil des Finances Publiques
Greece	There is no FRA or legally determined public release of information, but it does publish certain information on Parliamentary Budget Office
Luxembourg	There is no FRA nor is a specific public disclosure of information determined, but certain information is published on Cour des comptes du Grand-Duché de Luxembourg
Croatia	The FRA and the Rules of Procedure determine the publication of certain information on 9th term of the Croatian Parliament
Ireland	The FRA does not specify how information and / or communication with the media is published, but it is transparent on Irish Fiscal Advisory Council
Hungary	The Action Plan determines the publication of information on Action Planof the Fiscal Council for the year 2016
The Netherlands	The manner and dynamics of information publication and communication are published on CPB Netherlands Bureau for Economic Policy Analysis
Germany	Several laws determine the operation of the council, and the public disclosure of the report is determined by specific rules and procedures. Available at The Stability Council
Portugal	Article 32 FRA provides for the publication of a report and all relevant information for the operation of the council on Porutguese Public Finance Council
Sweden	The manner and dynamics of information publication and communication are published on Swedish fiscal policy council
UK	Several laws define the work of the OBR, as well as the manner and dynamics of information disclosure, emphasizing transparency in its work, and in particular the Budget Accountability Charter. Available at Office for Budget Responsibility

Source: Author.

TABLE A6

What are the obstacles to increasing the impact of your council on fiscal transparency and accountability in the budget process?

	AT	CY	DK	FR	EL	LV	LT	LU	HR	IE	HU	MT	NL	DE	PT	RO	SE	UK
insufficient staffing of the council		●						●	●	●		●			●	●		
lack of a communication strategy												●				●		
council is not independent																		
government ignores council and media views on the state of fiscal policy																●		
media views and public discussions do not contribute to the better state of public finances	●															●		
low level of democracy in a society, which is why the impact of the public is weak							●				●							
low level of press freedom, which is why media do not publish critical views on government's fiscal policy																		
other, please specify				●	●	●		●				●	●	●	●	●	●	●

Source: Author's questionnaire results.

Other:

France – *no obstacles.*

Germany – *no obstacles, as the federal budgetary autonomy system does not permit direct control of the budget process, e.g. the process of drafting government budgetary and financial plans by the central instance. The parliaments enacting the budgetary and financial plans are highest instance representing the public.*

Greece – *our office should have a more "executive role" (in the legislative sense).*

Ireland – *insufficient staff of the council is currently not the major issue but could be a limiting factor in the future if demands on the council increase.*

Latvia – *no obstacles. It is necessary to implement a developed communication strategy.*

Luxembourg – *still lacking access to data; "comply or explain" principle could be clarified in the long term through the Memorandum of understanding.*

Malta – *usually media do not properly emphasize the state of public finances, unless there are significant risks of severe deterioration in fiscal position, or serious noncompliance with the EU fiscal rules.*

Netherlands – *no major obstacles.*

Romania – *reputational costs for politicians and government are not contained in legislation.*

Sweden – *we are a small institution (staff of five people) so there are limits to what we can do, but we really enjoy independence and are free to communicate with the public whenever and in whatever way we choose.*

UK – *no obstacles.*

TABLE A7
Comparison of six EU fiscal councils' impact on transparency and accountability

Council	HR Commission on Fiscal Policy	IE Irish Fiscal Advisory Council (IFAC)	HU Fiscal Council	NL Netherlands Bureau for Economic Policy Analysis (CPB)	SE Swedish Fiscal Policy Council	UK Office for Budget Responsibility (OBR)
Impact on transparency and accountability in the budget process	Promoting fiscal transparency and accountability, monitoring fiscal sustainability	Promoting fiscal transparency and accountability, transparency analysis, monitoring fiscal sustainability, preparing public reports with media impact and promoting sound public policies	Monitoring fiscal sustainability and promoting sound public policies	Promoting fiscal transparency and accountability, monitoring fiscal sustainability, preparation of public reports with media influence	Preparation of public reports that influence media reporting and promotion of sound public policies	Promoting fiscal transparency and accountability and preparing public reports to influence media reporting
Results so far in informing the public and increasing transparency and accountability	Good	Good	Good	Good	Good	Good
Impact of fiscal rules and councils on transparency and accountability in the budget process	Public disclosure of information on compliance with fiscal rules and communicating analyses, evaluations and reports	Through the media	Promoting transparency and accountability, and transparency of work	Through the media, the public then affects the reputation of the politician, publicly disclosing information on compliance with fiscal rules and communicating analyses, evaluations and reports, and promoting transparency and accountability	Public disclosure of information on compliance with fiscal rules and communicating analyses, evaluations and reports, and transparency of work	Through the media, the public influences the reputation of politicians, public disclosure of information on compliance with fiscal rules and communication of analyses, assessments and reports, promoting transparency and accountability, and transparency of work

Council	HR Commission on Fiscal Policy	IE Irish Fiscal Advisory Council (IFAC)	HU Fiscal Council	NL Netherlands Bureau for Economic Policy Analysis (CPB)	SE Swedish Fiscal Policy Council	UK Office for Budget Responsibility (OBR)
Public finance alerts	In case of excessive government spending	Disagreement on proposed budgets and stated goals, over-optimistic forecasts, excessive government spending, unsustainable tax policies, poor fiscal performance, reference to the realities and raising public awareness of sound finances	Disagreement of proposed budgets with stated goals, over-optimistic forecasts, poorer fiscal performance than projected, reference to actual situation	Provides data for assessing the situation	Disagreement on proposed budgets and goals, over-optimistic forecasts, excessive government spending, and raising public awareness of sound finances	Council presents its view on public finances at the same time as the Ministry of Finance of the main announcement, does not warn but presents detailed analysis
Public reaction to the media's findings on the non-transparency and irresponsibility	Constant pressure for the sake of transparency and accountability	It is difficult to measure public reaction. From the media reaction, most media outlets and major economic reporters are catching on to the main points / criticism of the budget / SGP that are contained in the reports	Public debates and pressure for transparency and accountability	The issue is not relevant to them	For the most part, the national fiscal backbone is working well and for the most part politicians respect it. There is relatively strong public support for fiscal discipline and therefore the political cost of financial irresponsibility is potentially high	It is not up to OBR to answer this question

Source: Autor's questionnaire results.

The inheritance and gift tax in Germany: Reform potentials for tax revenue, efficiency and distribution

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Abstract:
The inheritance tax is often seen as an effective tool to reduce wealth inequality, to raise public revenues if needed, and to increase incentives to work by lowering the tax burden on labour, which is especially high in Germany, according to the OECD. The purpose of this paper is therefore to shed light on the question of whether an inheritance tax is a promising tool for fighting wealth inequality without having distorting effects on the economy. For this purpose, firstly, the distributional effects of inheritances on wealth distribution are evaluated for Germany and are then compared with those in Austria and France, using data from the Household Finance and Consumption Survey (HFCS). A change in the German inheritance tax law in 2009 is further used in a difference-in-difference analysis to identify the behavioural effects of the change in the inheritance tax on the volume of bequests, which are large and robust for different specifications. Secondly, the insight from part one is applied to the design of an inheritance tax reform for Germany. The potential tax revenue of the reform can be estimated by using the data from the inheritance and gift tax statistics. A revenue shift from income to inheritance tax could be used to increase work incentives by cutting the marginal tax rates for the working population. However, it turns out that taxing inheritances will be accompanied by significant behavioural responses of donors via tax planning. Furthermore, the introduction of a flat tax model with a broad tax base would not generate enough additional revenue to foster relevant employment effects.

Keywords: inheritance taxation, wealth distribution, redistribution, inequality, labour supply, Germany

1 INTRODUCTION

In 2013, Thomas Piketty's book "Capital in the Twenty-First Century" led to a surge in the public debate on inequality. He argued, amongst other things, that inheritances play an important role in explaining the inequality of wealth distribution (Piketty, 2013). Against this background, taxing wealth and inheritances to a larger extent is back on the table. Piketty, for example, estimates an inheritance tax rate between 50 percent and 60 percent as optimal regarding the equity-efficiency trade-off for the United States and France (Piketty and Saez, 2013). Equity and efficiency are the two central principles in tax policy. Proponents of the inheritance and gift tax – referred to below as inheritance tax – emphasize its potential power to fight wealth inequality (Beckert and Arndt, 2016). According to the OECD (2018), from both an efficiency and an equity perspective, inheritance taxes are a feasible tool in tax policy and are a better alternative to taxes on net wealth. In contrast to a net wealth tax, the complex valuation of assets usually takes place only once per generation instead of annually and, thus, raising the tax is less costly. In addition, inheritance taxes tend to be less distortive.

Inheritance taxes are of great interest for another reason: It is widely supposed that the volume of inheritances will continue to grow due to demographic changes.

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MARTIN BEZNOSKA, TOBIAS HENTZE, MAXIMILIAN STOCKHAUSEN:
THE INHERITANCE AND GIFT TAX IN GERMANY
REFORM POTENTIALS FOR TAX REVENUE, EFFICIENCY AND DISTRIBUTION

The volume of taxable inheritance has more than doubled in the past decade. Higher revenue from the inheritance tax might increase the incentives to work, by lowering the tax burden on labour, which is particularly high in Germany according to the OECD (2019: 147). The International Monetary Fund (IMF, 2019) proposes a tax reform for Germany consisting of two pillars: First, the tax wedge on labour should be decreased. Second, inheritance and property taxes should be used to satisfy any fiscal needs.

Historically, the inheritance tax in Germany has repeatedly been subject to decisions by the constitutional court regarding discrimination issues. Substantial and long-lasting reforms have often been claimed. Currently, the inheritance tax law is characterized on the one hand by high and progressive tax rates of up to 50 percent and, on the other hand, by remarkable personal tax allowances as well as tax exemptions for business assets. This limits the effective tax rate on inheritances and leads to a revenue proportion of less than 1 percent in terms of total tax revenue. The repeated court decisions indicate that the political will in Germany for any reform has not been very high.

This is understandable since cutting the personal tax allowances would most likely not be accepted by voters. According to a representative survey, three out of four Germans are in favour of the higher taxation of inheritances exceeding 1 million euro per heir (Deutsche Bank, 2018: 57). This implies that, for example, a tax-free bequest of a private real estate ("grandma`s house") should be ensured. Furthermore, the taxation of inheritances comes at a cost, since optimal decisions for consumption and capital accumulation of testators are distorted. This is especially risky in the case of inherited company shares as business continuity could be threatened, which in consequence can increase unemployment. This would widen of the gaps in wealth inequality in the long run, since the unemployed cannot save at all. Therefore, any reform of the inheritance tax is a complex matter. A well-designed tax law is needed to achieve a high degree of equity and efficiency.

2 INHERITANCE TAX IN GERMANY
Even if the inheritance tax plays an important role in public debates, it is of minor importance from a fiscal perspective. In all OECD countries the revenue it produces accounts for less than 1 percent of total tax revenue (including social security contributions). In Germany, the fiscal importance of the inheritance tax is above the OECD average at below 0.2 percent of GDP (Figure 1). Only in Belgium, France, Finland, Korea and Japan is the relevance of the inheritance tax significantly greater than in Germany. Eleven OECD countries do not levy an inheritance tax at all.

FIGURE 1

Inheritance tax as percentage of GDP in OECD countries, 2017
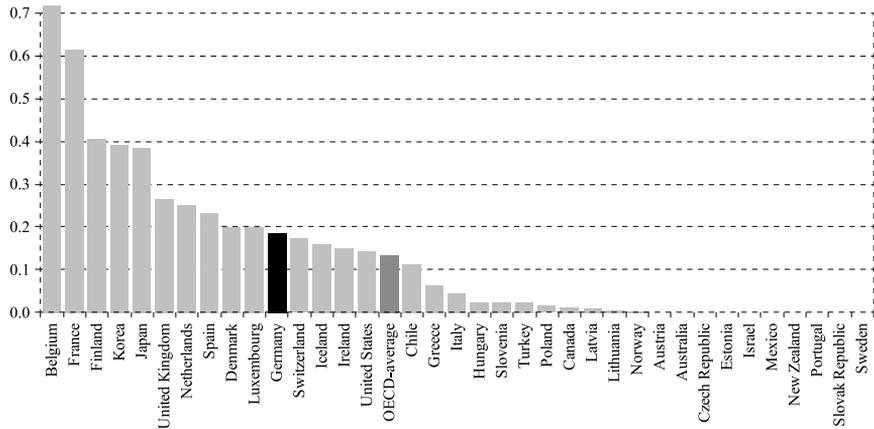
Note: OECD statistics total tax revenue include social security contributions and therefore differ from national statistics. The value for Greece refers to 2016.

Source: OECD database, own illustration.

The inheritance tax has been of minor fiscal importance in Germany for decades. In the beginning of the 1960s and 1970s, it contributed on average only 0.3 percent to the total tax revenue (without social security contributions). In the 1980s and 1990s, the value went up slightly. The uptick continued, reaching an all-time maximum in 2016 of almost 1 percent. In 2018, while total tax revenue in Germany amounted to nearly 780 billion euro, the revenue from the inheritance tax only amounted 6.7 billion euro, which is about 0.8 percent.

A long-term trend for the fiscal importance of the inheritance tax to increase can be seen in Figure 2. Its overall growth since 1991 is remarkably higher than that of total tax revenue. Some of these increases may be due to demographic changes, which are expected to foster wealth concentration and bequest volume in the future (Zagheni and Wagner, 2015). But another reason may be the great fluctuation of the tax base via tax planning of donors and testators in response to tax reforms (Sommer, 2017). The appearance of the latter phenomenon will be examined in the following chapters.

FIGURE 2

Inheritance tax and total tax revenue in Germany, Index: 1991=100 (in %)
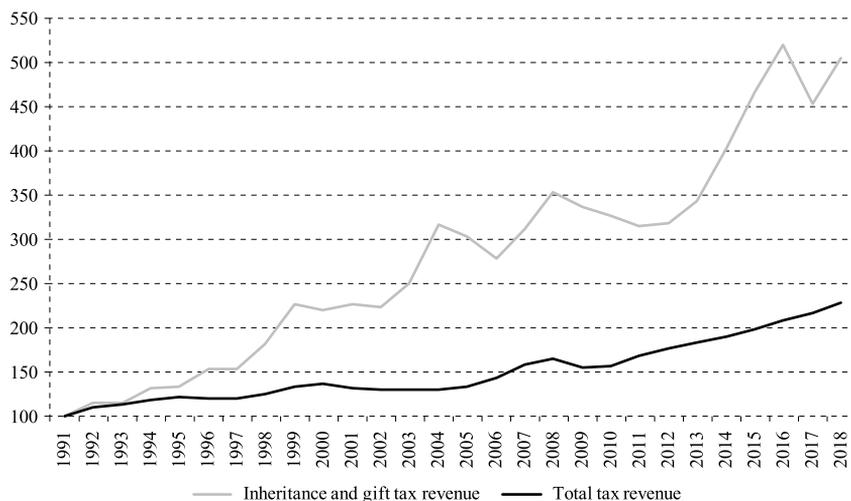
Source: Bundesministerium der Finanzen, 2019; own calculations.

In Germany, the inheritance tax has always been levied on the inheritor. In contrast, in the United States, the whole inheritance is taxed at once and the inheritance tax must be paid by the testator. This difference in tax design implies that the tax base in Germany is often significantly smaller than the value of the inheritance as it is divided by the number of inheritors.

The nominal tax rates are progressive and depend on the value of the inheritance as well as on the tax class (Table 1). The three tax classes are defined by the degree of relationship (Table 2). The minimum tax rate is equal to 7 percent, while the maximum is 50 percent.

TABLE 1

Inheritance tax rates (in %)

Tax bracket in euro up to thousands	Tax class I	Tax class II	Tax class III
75	7	15	30
300	11	20	30
600	15	25	30
6,000	19	30	30
13,000	23	35	50
26,000	27	40	50
above 26,000	30	43	50

Source: German inheritance tax and gift tax law, own illustration.

Up to 2008, Germany imposed an inheritance tax with a general tax allowance for the business sector combined with a valuation method for business assets that was

not intended to reflect market value and, thus, led to rather small values. As family-owned companies play a significant role in the German economy, taxing the substance of a family business in the case of succession means a competitive disadvantage for this company. This can limit future investments or even put existing jobs at risk. However, the Federal constitutional court challenged these rules. The inheritance tax had to be renewed since the assessed tax values did not reflect the actual value (BVerfG, 2006). The valuation for the relevant asset categories differed significantly. Hence, the tax rules and tax exemptions were modified in Germany by changing the valuation rules as well as increasing tax allowances and exemptions for businesses.

TABLE 2

Personal tax allowances (in thousand euro) and tax classes

	Personal tax allowance (§ 16 Inheritance tax law)	Tax class (§ 15 Inheritance tax law)
For spouse and partner of a registered civil partnership	500	I
For children and grandchildren whose parents have died, as well as for stepchildren and adopted children	400	I
For grandchildren	200	I
For great-grandchildren; for parents and grandparents to acquire by inheritance	100	I
For parents and grandparents in the case of gift, for siblings, children of siblings, stepparents, children in law, parents-in-law, divorced spouses and life partner of a cancelled civil partnership	20	II
For all other recipients of a gift or inheritance	20	III

Source: German inheritance tax and gift tax law, own illustration.

Nonetheless, the new rules were challenged again by the Federal Constitutional Court in 2014 since the extent of tax exemptions introduced by the previous reform was not justified. The law had to be renewed by June 30, 2016. However, the general approach of tax exemptions for the business sector was not challenged. The judgement consisted of three pillars.

Firstly, even the heirs of small businesses must demonstrate a commitment to retain jobs to obtain exemption from the tax. Companies with up to 20 employees were excluded from these requirements before. The maximum number of employees is now set to five in order not to generally exclude too high a share of companies from the tax. However, if heirs sell the company shares within a few years, they will lose the tax exemption.

Second, what are called administrative assets, including non-business assets such as pieces of art or leased land, were no longer spared as generously as in the past. The maximum ratio of administrative assets to operating assets has been decreased from 50 percent to 10 percent. Those administrative assets exceeding the percentage rate are fully taxed.

Third, the heirs of large companies or company shares will not be able to avoid the statutory tax rate anymore, unless they can prove that they have no financial ability-to-pay. The constitutional court has criticized the exemption of large corporate heirs regardless of their economic situation and solvency. For this reason, the federal government has set a threshold of 26 million euro in terms of inheritance value per heir. Above this threshold, the full inheritance value without any tax exemptions is taxed unless the heir has no ability-to-pay. This means that the heir must use up to 50 percent of own total assets to pay the bill. If the heir does not want to disclose the value of private assets, the heir can accept a smaller tax exemption declining with the value of the inheritance (Beznoska and Hentze, 2016).

In the context of the reform, the valuation parameters for business assets were corrected in order to eliminate any overvaluation. In 2015, the overvaluation of business assets was about 50 to 60 percent (Hentze, 2016). The magnitude is (hypothetically) confirmed by today's (2019) parameters, assuming the previous tax law to be still effective (Table 3). A value of 44 percent in calculation (3) means an overvaluation of 56 percent. Due to the adjustment of the valuation parameters as part of the inheritance tax reform in 2016, the overvaluation of business assets declined to approximately 11 percent (market value is equal to 89 percent of the current tax law value, see Table 3).

TABLE 3
Valuation of business assets

	Law before the 2016 reform	Law after the 2016 reform	Current market valuation
Basic interest rate (in %, 2019)	0.6	-	0.6
Market risk premium (in %)	4.5	-	7.0
Beta factor	1	-	1
Capitalization rate (in %)	5.1	-	7.6
Capitalization factor (1/capitalization rate)	19.61	13.75	13.16
Markdown due to limited fungibility of family owned companies (in %)	-	30	35
Adjusted capitalization factor	19.61	9.63	8.55
In percent of (1)			44
In percent of (2)			89

Note: Current market valuation compared to the rule of law before and after the reform in 2016.
Source: KPMG (2019); own calculations.

The modified valuation parameters partly offset the restriction of tax exemptions regarding the tax liability of inherited business assets. Generally, the tax burden for large inheritances of companies has increased due to the reform in 2016 while it can be lower for smaller ones (Beznoska and Hentze, 2016).

3 INHERITANCES AND NET WEALTH INEQUALITY

How inheritances shape wealth distribution and what behavioural effects are associated with a change in the inheritance tax on the volume of bequests is the subject of the following chapter. In particular, the effects of inheritances on net wealth distribution are discussed in a comparative framework using survey data for Germany, Austria, and France from the Household Finance and Consumption Survey (HFCS). The descriptive analysis is extended by a comprehensive difference-in-difference analysis exploiting the differences between Germany and France to identify the behavioural effect of the change in the German inheritance tax law in 2008 on the volume of bequests.

3.1 DISTRIBUTIONAL EFFECTS OF INHERITANCES
ON NET WEALTH INEQUALITY

As we know from previous research, inheritances are crucial for the relative net wealth position of private households and they are unequally distributed among them. About one third of all European households have inherited wealth – the share is also one third in Germany – and these households are on average wealthier than those without any bequests (Fessler and Schürz, 2015). In addition, the International Monetary Fund states that inheritances of family businesses in particular contribute to a large extent to the gap between wealthy and non-wealthy households (IMF, 2019). Company shares are mainly owned by a rather small number of households. Therefore, wealth in terms of family businesses is highly concentrated. However, even if the importance of family businesses for the German economy were lower and the share of stockholders higher, it is unclear whether the resulting wealth concentration would be significantly lower in the long run because the stockholder allocation could still tend to be very unequal among German households. In addition, the low share of people owning stocks in Germany today gives us reason also to expect a rather unequal distribution of stocks in this alternative state of the world while a large fraction of company stocks could also be owned by foreign shareholders, which would reduce the equalizing effect among German households.

A common belief is that unequally distributed inheritances increase wealth inequality and, thus, should be taxed heavily. But inheritances have two distinct effects. On the one hand, inheritances generally increase inequality within a generation (Brunner, 2014). On the other hand, inheritances redistribute wealth between generations and thus have an inequality-decreasing effect, too. In sum, the latter effect seems to outweigh the first, so that the overall effect of inheritances is inequality-decreasing (see Wolff and Gittleman, 2014; Bönke, Werder and Westermeier, 2017; Beznoska, Niehues and Stockhausen, 2018: 13).

In this regard, Bönke, Werder and Westermeier (2017) show for a wide range of euro area countries that the coefficient of variation on overall net wealth including inheritances is always smaller than if the capitalized value of inheritances is subtracted from net wealth. The only exception is Luxembourg. For example, the coefficient of variation on net wealth including inheritances is 2.8 in Germany in 2010, while it is 7.1 if the capitalized value of inheritances is excluded from net wealth. The results for Austria and France are similar: The coefficient of variation on net wealth including inheritances is 2.9 in Austria and 3.6 in France. If the capitalized value of inheritances is excluded from net wealth, the coefficient of variation is 12.3 and 105.6, respectively.

The same equalizing effect also persists if a different inequality measure is used for a more recent year, here the Gini coefficient in 2014. The data used for this are taken from the HFCS, first conducted in 2010 under the supervision of the European Central Bank (ECB). Data of the second wave, in 2014, have been used for our analyses. The third wave, covering the year 2017, is not yet available. The HFCS provides harmonised household data for more than 84,000 households in 18 euro area countries except Lithuania. Hungary and Poland are also covered (ECB, 2016). A major advantage of the HFCS is its rich information on assets, liabilities, income and consumption of households in the eurozone. It also encompasses data on the time and value of the three most important inheritances and gifts *inter vivos* a household has ever received.

In Figure 3, Gini coefficients on capitalized bequests (assuming a real interest rate of 3 per cent on average), net wealth including capitalized bequests, and net wealth excluding capitalized bequests are depicted for Germany, Austria, and France in 2014. These three countries are well suited for comparison because of similarities with regard to the level of the welfare state as well as structural parameters of the economy. Three things stand out: 1) Capitalised inheritances are generally the most unequally distributed and France shows the highest degree of inequality of these three countries. 2) Net wealth excluding capitalised inheritances is more equally distributed than inheritances. 3) The most equally distributed is net wealth including capitalized bequests. Thus, the combination of two unequal distributions leads to a third, more equal distribution. This effect can be observed in all three countries under consideration. This mainly results from the facts that the relative importance of the value of inheritances decreases with an increase of the wealth position and that inheritances are usually divided among several heirs. Or as Bönke, Werder and Westermeier (2017) put it: "in relative terms – poorer households tend to receive higher inheritances", which reduces overall relative net wealth inequality.

FIGURE 3

Gini coefficients for different wealth types in Germany, Austria, and France (2014)
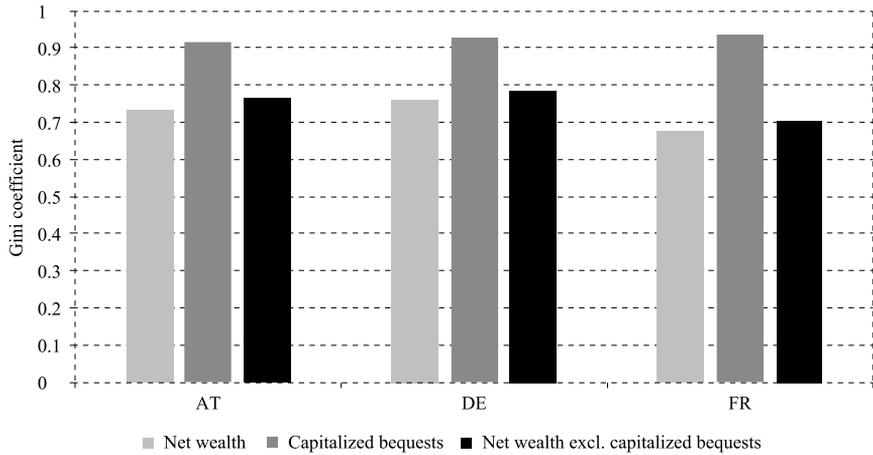
Note: A real interest rate of 3% per annum is used for capitalisation since the year of transfer receipt. For this purpose, all bequests are expressed in prices of 2010 using country specific consumer price indices.

Source: ECB, 2nd wave; own calculations.

Similar equalizing effects are found in Boserup, Kopczuk and Kreiner (2016) for Denmark as well as in Elinder, Erixson and Waldenström (2018) for Sweden. Both studies exploit comprehensive administrative datasets to evaluate the effects of bequests on the level and distribution of net wealth. They also find that bequests increase absolute wealth inequality due to a higher variance of bequests among heirs, but they decrease measures of relative wealth inequality, since the relative importance of bequests is larger for households with no or little pre-bequest wealth.

The empirical literature on the direct effects of an inheritance tax on the distribution of net wealth is still very limited. One major reason for this is the lack of appropriate data in most countries. Since an inheritance tax includes allowances and gradually rising nominal tax rates in many countries, the tax is quasi-progressive by construction, so that the average nominal tax rate increases with increasing inheritance value. However, the effective tax rate can differ, for example, due to tax exemptions for business assets. The overall effect of the inheritance tax can thus be regressive.

It is not clear *a priori* whether the redistributive effect of inheritances shown above will increase or decrease as a result of a progressively designed inheritance tax. Ultimately, it depends on how exemptions are designed, who receives the inheritance, i.e. the position in the wealth distribution, and how the inheritance tax revenues are redistributed. Since inheritance tax revenues are rarely passed on to less wealthy households as a direct wealth transfer, taxation does not necessarily

lead to a greater alignment of net wealth. If, for example, inheritance tax receipts are used to finance basic insurance benefits, this will equalise income flows, but not wealth stocks. At least not in the short term. In contrast, an inheritance or gift is a direct wealth transfer – in many cases between households – that directly effects the distribution of net wealth. Hence, even a 100 percent taxation of inheritances would not automatically lead to a decrease in net wealth inequality. The opposite could be the case.

Elinder, Erixson and Waldenström (2018) were the first to examine the (mechanical) effects of an inheritance tax on wealth inequality, using Swedish tax data. For this purpose, they calculate the difference of Gini coefficients for net wealth including inheritances net-of-inheritance-tax payments and including inheritances before tax payments. The behavioural responses of testators or heirs due to changes in inheritance taxation are not considered in their analysis. Their key finding is that taxing inheritances increases relative inequality (but reduces absolute dispersion), since the relative inheritance tax burden is larger for less wealthy households of heirs than for the wealthy. Hence, a (progressive) inheritance tax counteracts the equalizing inheritance effect, although the effects are small.

Unfortunately, the effect of the abolishment of the inheritance tax in Austria in 2008 on the distribution of net wealth cannot be observed and exploited for our analysis, since there is no comprehensive wealth data for the years before 2010. However, at the very least, the abolition of the inheritance tax in Austria did not let wealth inequality rise in the following years. Between years 2010 and 2014 net wealth inequality – measured by the Gini coefficient – decreased and remained unchanged up to the year 2018 (Fessler, Lindner and Schürz, 2019). In Germany, net wealth inequality slightly increased from 2010 to 2014 but by 2018 had not changed very much (Deutsche Bundesbank, 2019).

3.2 BEHAVIOURAL EFFECTS OF AN INHERITANCE TAX ON THE VOLUME OF BEQUESTS

The rich information content of the HFCS can also be exploited to depict the development of the volume of inheritances over time in different countries. Nevertheless, we are aware of several limitations of the HFCS data regarding, for example, the representativeness of the very rich or issues of unit and item nonresponse, which are addressed by oversampling of the rich (the very top is still missing) or strategies of multiple imputations to generate missing information (Tiefensee and Grabka, 2016). These problems make it even more difficult to make reliable statements on the effects of an inheritance tax on individual behaviour and the volume of bequests. However, we shall endeavour to approach this question with cautious use of HFCS data, still the best available.

For this purpose, Germany, France, and Austria are investigated in more detail, again, since they all have undergone interesting changes in their inheritance tax laws in recent years. While taxation of inheritances was abolished in Austria at the

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beginning of 2008 (except for transfers of real estate), allowances were increased for all tax classes in Germany to January 1, 2009 and tax brackets were unified and partly increased for distant relatives. Additionally, the general tax exemptions for business assets in Germany were replaced by new valuation rules combined with exemptions, which were more comprehensive than before. However, before exemptions were granted, considerable and complex demands were made on a business's ability to guarantee the retention of jobs (see chapter 2). The debate on the necessary changes to inheritance taxation in Germany was very intensive in 2007 and 2008 and the legislator delayed for the maximum allowable period before implementing the new regulations. As a result, there was uncertainty as to when the reform would be introduced and households seem to have changed their behaviour, particularly with regard to the planning of gifts already in 2008. This is the main reason why we already include 2008 in the first period after the reform in a difference-in-difference analysis. As a robustness check we will change this and exclude 2008 from the first period after the reform. In France, the inheritance tax was completely abolished for spouses in 2008 and higher allowances were granted in 2012.

Figure 4 depicts the descriptive analysis of the volume of inheritances for five periods of a similar length; three periods before and two after the inheritance tax reform in Germany, namely 1996-1999, 2000-2003, 2004-2007, 2008-2011, and 2012-2014. The last period encompasses only three years instead of four. That is why the yearly period averages are also depicted in Figure 4 (right scale) next to the period totals (left scale). In general, we find that the inheritance volume measured in 2010 prices increased in all three countries during the first three periods. The increase is less pronounced in Austria. The trend changes in the fourth period: in Germany, the inheritance volume more than halves and decreases from 304 billion euro in period three to 135 billion euro in period four. In France, it continues to increase and reaches a new high of 202 billion euro. In Austria, the inheritance volume increases from 25 to 34 billion euro.

What are the probable reasons for the different developments? The decrease in Germany can be the result of higher inheritance tax rates for distant relatives combined with some pull-forward effects that took place before the introduction of the reform and are due to uncertainty about the future. A large source of uncertainty in this period can especially stem from the new rules regarding business assets, which introduced a lot of complexity into the inheritance tax law. Higher tax allowances for spouses/partners should have counteracting effects, but they seem to be less strong. This might also be due to the data structure of the HFCS which only covers inheritances among households while in most cases beneficiary spouses live in the same household. The abolition of the inheritance tax for spouses in France in 2008 should therefore have a positive effect that is also not covered well in the HFCS data. For our difference-in-difference estimator this is good news because it helps us to clearly identify the effect of the German inheritance tax reform on the level of bequests. The increase in Austria is as expected, reflecting the complete abolition

of the inheritance tax in 2008. The effects of the Great Recession in 2007/2008 seem to be of less importance regarding the trends in inheritance volumes and should have affected the three countries in a similar way.

The development from the fourth to the fifth period is also different in each country. In Germany, the volume of inheritance increases and continues to increase with the same speed as before the reform in 2008. The yearly period average in period five is even slightly higher than in the third period. In France, the volume of inheritances does not change between the fourth and fifth period regarding the yearly period averages. This is as expected since there was another inheritance tax reform in 2012 in which allowances for close relatives were decreased. In contrast, there was a decrease of the mean volume of inheritances in Austria from the fourth to the fifth period. This may be induced by pull-forward effects that took place in the period of the abolishment of the inheritance tax. Overall, the descriptive analysis shows that even minor changes in inheritance taxation are accompanied by a considerable change in inheritance tax volumes as we would expect them from theory.

Next, a difference-in-difference estimator is applied to Germany and France to identify the differential effects of the inheritance tax changes in Germany in 2008 on the volume of bequests. For this purpose, country differences between Germany and France are exploited and exogenous variation is created by the inheritance changes in Germany where allowances were increased across all tax classes on the one hand and where tax brackets were unified and mostly increased for distant relatives.

A critical assumption for the validity of the difference-in-difference estimator is that the development of the inheritance volume must have been similar in both countries before the treatment (but not in the levels). If the common trend assumption is violated then the difference-in-difference estimator would be biased (Ashenfelter, 1978; Ashenfelter and Card, 1985; Card and Krueger, 1994; Meyer, 1995; Bertrand, Duflo and Mullainathan, 2004; Schmitz, 2019, among others). Our graphical analysis in Figure 4 gives evidence that the common trend assumption holds for Germany and France before the treatment happened. Austria is therefore not used in this setting, since it is expected to violate the common trend assumption of the difference-in-difference estimator to get unbiased results.

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FIGURE 4

Inheritance volume in Germany, Austria, and France

Germany

France

Austria
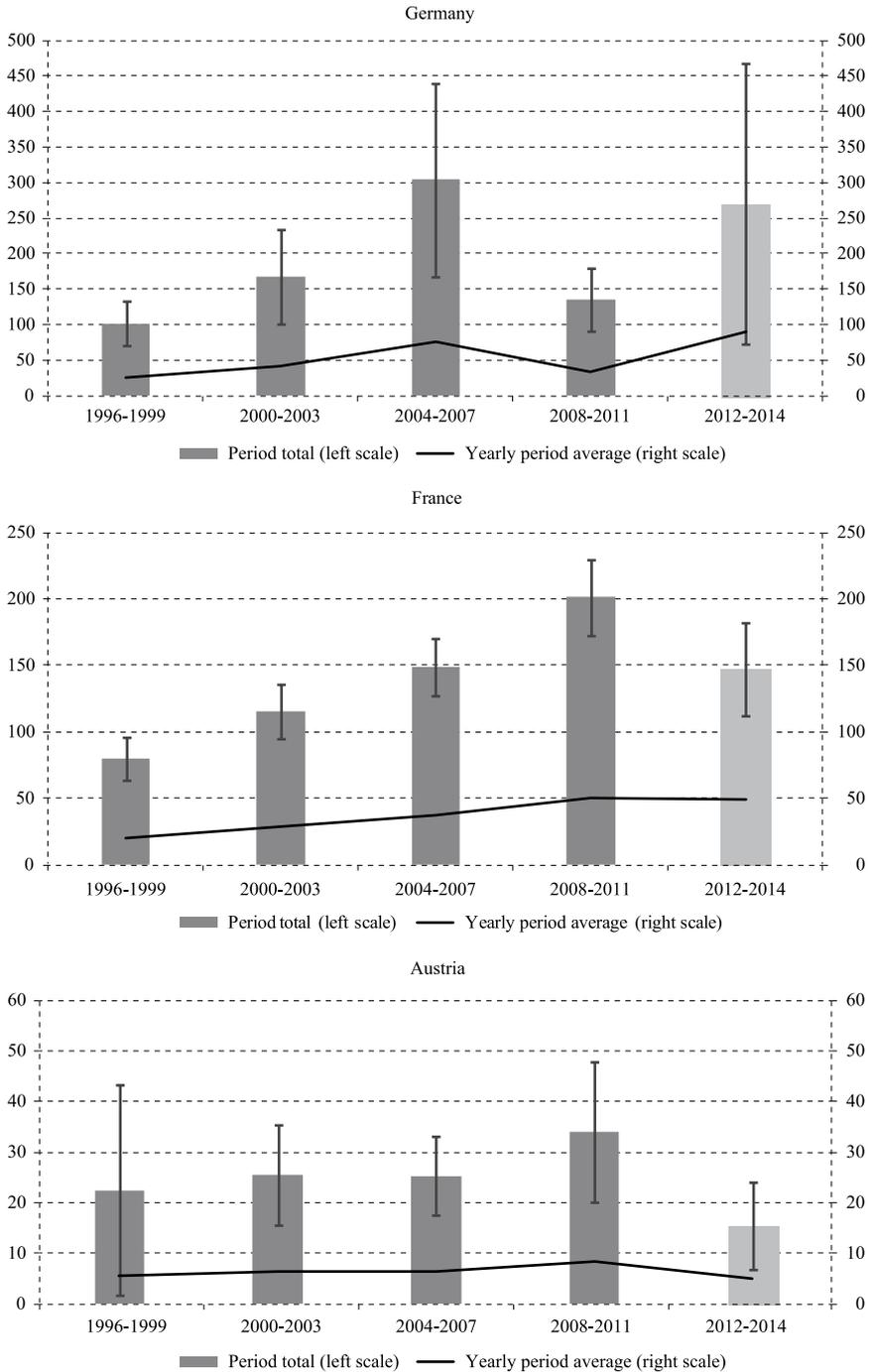
Note: In billion euro and prices of 2010. 95% confidence intervals are calculated using multiple imputation estimates from five imputations.

Source: ECB, 2nd wave; own calculations.

In addition, France and Germany are especially suited for the comparison because they are similar in many respects regarding, for example, population size, the GDP per capita, or the tax and transfer system. As mentioned before, the results could be distorted due to the Great Recession. However, both countries were affected in the same way, so that the direction of the distortion should be the same and the difference-in-difference estimator should not be affected much by this. In this regard, it is assumed that the higher the inheritance tax, the lower the inheritance volume. The partial increase of the inheritance tax for distant relatives in Germany should have led to a decrease in the mean volume in Germany in the years following if this effect dominates the effect from the increased allowances. This seems to be the case, as shown in Figure 4 above.

The analysis makes use of observations before and after the inheritance tax change in Germany. As before, the inheritance volume is observed over three four-year periods before and one period after the reform in Germany. The changes in France in 2008 should be of minor importance, since the HFCS only covers inheritances between different households and not intrahousehold. The fifth period (2012-2014) cannot be used because of the inheritance reform in 2012 in France which would bias the results. The treatment thus occurred in Germany in the fourth period (2008-2011) and the regional differences between Germany and France are exploited. Hence, Germany is the treatment group and France is the control group. The difference-in-difference estimator can be written as

$$y_{i,t} = \beta_0 + \beta_1 D_t^T + \beta_2 D_t^A + \beta_3 D_t^T D_t^A + \beta_4 agehh_{i,t} + u_{i,t}$$

where $y_{i,t}$ is the inheritance volume in country i in period t. D_t^T is a time dummy that is equal to one in all periods after the reform and otherwise zero, while D_t^A is a treatment dummy, which is one only for Germany and otherwise zero. The coefficient of interest is β_3 since it captures the average treatment effect of the policy change, i.e. the effect of the abolition of the inheritance tax on the inheritance volume. In addition, the variable *agehh* controls for age effects using the age of the household head and $u_{i,t}$ is an error term.

TABLE 4

Results of the difference-in-difference estimator L4P3

Variable	Coef.	Std. Err.	t-value	P>t	[95 % Conf. Interval]	
Time dummy (β_1)	8,482	5,530	1.53	0.125	-2,357	19,322
Treatment dummy (β_2)	70,319	16,779	4.19	0.000	37,418	103,219
Timedy#treatdy (β_3)	-67,325	19,401	-3.47	0.001	-105,408	-29,242
Age of hh head (β_4)	89	266	0.34	0.738	-434	612
Constant (β_0)	61,152	14,536	4.21	0.000	32,580	89,724
Observations	5,118					

Note: Germany vs. France, period length = 4 years each, 3 periods before treatment. Period 1: 1996-1999, period 2: 2000-2003, period 3: 2004-2007, period 4: 2008-2011. All inheritances are measured in prices of 2010. Treatment took place in Germany. Standard errors are calculated using multiple imputation estimates from five imputations.

Source: ECB, 2nd wave; own calculations.

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The results of the difference-in-difference estimation are shown in Table 4. We find evidence that the inheritance tax reform in Germany in 2008 has led to a significant decrease in the average inheritance volume. The estimated coefficient of the treatment effect (β_3) is negative and statistically significant to the one percent level controlling for potential age effects. If we replace the (continuous) age variable with dummies for different age groups, the main results are not altered and households with a mid-age head tend to profit more from bequests (see Table A8 in the Appendix). Successively reducing the number of periods before the treatment does not alter the results as shown in Tables A1 and A2 in the Appendix. The treatment effect continues to be negative and statistically significant to the one and five percent level, respectively. Integrating additional time dummies for the first and second period in the baseline model to capture time effects does not change the results, either (see Table A3 in the Appendix).

In contrast, if the fifth period is included in the estimation the treatment effect vanishes. This is as expected because the inheritance tax reform in 2012 in France was like that in Germany in 2008, so that the effect points in the same direction regarding the development of the inheritance volume as in Germany. The results also change if we shift all periods to the right by one year while retaining the four-year observation periods. This would make 2009 the first year after the reform. However, since in this case 2012 is included in the post-reform period, which is problematic in France, as mentioned, we no longer find a statistically significant effect in this case. If we shorten all the observation periods to three years so that, among other things, the period after the reform only covers the years 2009 to 2011, the resilient effect returns (see Table A4 in the Appendix). This underscores the robustness of our results.

In addition, we can show that the treatment effect also persists if only gifts are considered in the analysis. Although the sample size is smaller and the standard errors are larger, the p-value of the estimated treatment effect β_3 is smaller than 0.1, the estimator has the same negative sign as before and the scope of the effect is quite similar. Since gifts are especially important for questions of tax planning and are the main source of behavioural changes due to changes in the inheritance tax regime, they are likely to explain most of the effects we found before (see Tables A5 to A7 in the Appendix for the results).

In sum, the difference-in-difference analysis gives us empirical evidence that households directly respond to changes in inheritance taxation, for example by tax planning of donors, even if only distant relatives are affected, as was primarily the case in Germany in 2008. This is broadly in line with the results of Sommer (2017). Even though the size of the effect is hard to interpret the behavioural responses seem to be rather large. This is indicated by the large absolute and relative changes in the volume of inheritances in all three countries due to different reforms as depicted in Figure 4.

4 THE PRESENCE OF TAX PLANNING IN THE INHERITANCE TAX STATISTICS

The estimated effects from the survey data analysis of chapter 3 indicate some kinds of tax planning behaviour in response to the reform 2009. The uncertainty about the new provisions of the tax law seemed to induce pull-forward effects as well as suspensions of bequests which can appear, of course, most likely in cases of donation. Other effects would be attributed to the relocation of assets that has to occur a certain time in advance of a bequest being made. This latter source of tax base effects is hard to observe in the data. But indications for donor tax planning can be evaluated over time with the public inheritance and gift statistics (Federal Statistical Office, 2019a). However, some restrictions apply to this data.
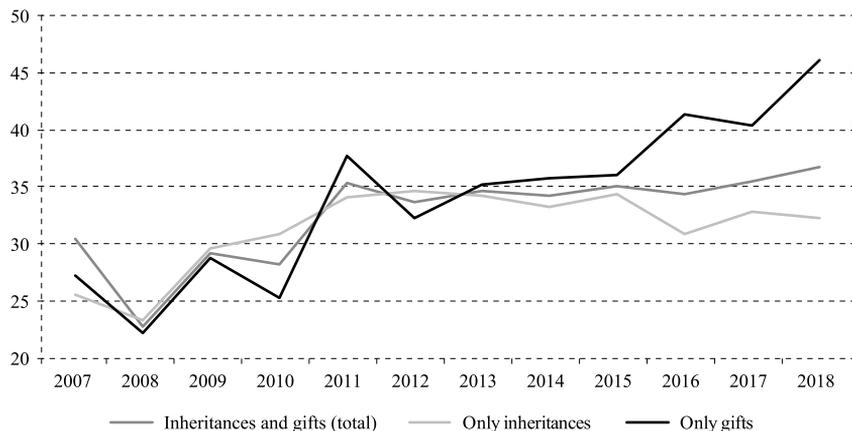
Since inheritance cases below the threshold for personal tax allowances and thus without any tax liability do not enter the inheritance and gift statistics, the tax base named in them is substantially lower than the actual volume. Studies that estimate the annual inheritance volume for Germany put it to between 200 and 400 billion euro using information from rich-lists to correct for distortions at the top in the underlying survey data (Tiefensee and Grabka, 2017; Bach and Thiemann, 2016; Braun, 2015; Schinke, 2012; Brunner, 2014). This range shows the uncertainty of any estimates.

Regarding the observed tax base, the public inheritance and gift tax statistics distinguish between the volumes before- and after-tax exemptions for businesses. Therefore, the statistical tax base before any deductions of 84.7 billion euro for 2018 was below the actual inheritance volume. In the years 2014 to 2017 the volume was roughly 100 billion euro every year.

In 2018, out of the remaining inheritance volume of roughly 85 billion euro, business assets of about 40 billion euro were exempted from taxation. This exempted inheritance volume reflects 20 percent of the lower bound of the estimated potential inheritance volume of 200 billion euro. Furthermore, personal tax allowances decreased the tax base by approximately 20 billion euro (equal to 10 percent of 200 billion euro). Thus, the preliminary tax base is only 13 percent of the actual inheritance volume. However, preceding inheritances. within the last 10 years before the inheritance at hand, increased the tax base in 2018 by 10 billion euro resulting in a final tax base of about 35 billion euro (which implies an average tax rate of 19 percent as the tax revenue amounts to 6.7 billion euro). The statistics refer to 194,000 inheritance cases.

FIGURE 5

Tax exemptions divided by inheritances and gifts (in %)
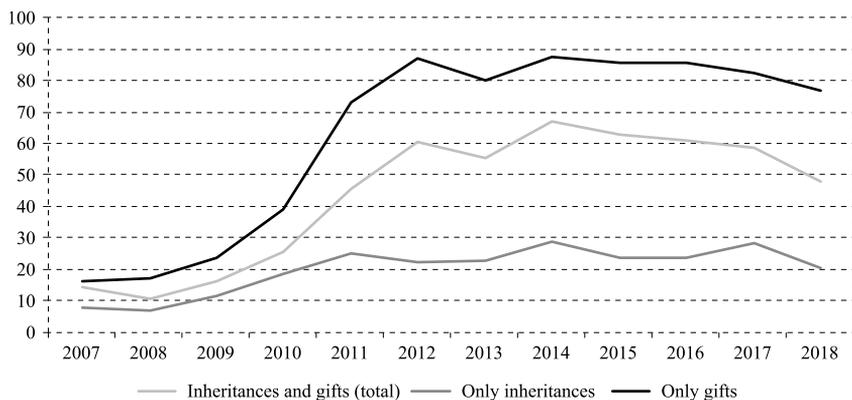
Source: Federal Statistical Office (2019a); own calculations.

Regarding the time period from 2007 to 2018, the degree of tax exemption for business assets with respect to the observed tax base (before deductions) significantly increased from 14 to 48 percent (Figure 5). This was mainly induced by the reform in 2008. However, the trend was interrupted by the recent reform in 2016. This development is in line with the general evaluation of the reforms in 2008 and 2016. Interestingly, the degree of tax exemption for business assets is much higher in terms of gifts than inheritances. This indicates that gifts are strategically used in order to benefit from the tax exemptions for business assets. In the case of death, it is, naturally, not possible to use the exemptions strategically. By transferring business assets within a family by gifts, it is possible to lower the effective tax burden. Besides this, it should be borne in mind that donors have an incentive to convert non-business assets to business assets. Interestingly, the future performance might be negatively affected by bequeathing a firm to any family member (Perez-Gonzalez, 2006).

FIGURE 6

Personal tax allowances divided by inheritances and gifts (in %)

Source: Federal Statistical Office (2019a); own calculations.

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Meanwhile, personal tax allowances for family members range between 23 per-cent (2008) and 37 percent (2018) in terms of the total value after tax exemptions and preceding inheritances. In other words, the taxable amount is reduced by 23 and 37 percent respectively due to personal tax allowances. The gap between the percentages for inheritances and gifts is much smaller than that regarding tax exemptions for business assets. However, it has recently widened in the course of the reform in 2016. For gifts the rate was equal to 46 percent in 2018, while it was 32 percent for inheritances (Figure 6). This also indicates that gifts are strategi-cally used in order to maximize tax allowances and, thus, to minimize the effec-tive tax burden especially after the recent reform.

FIGURE 7

Average inheritance tax rate - Tax revenue divided by the final tax base (in %)
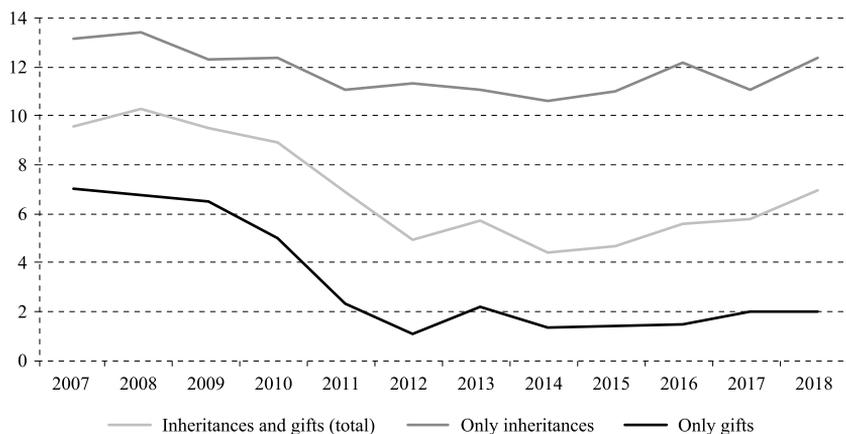

Source: Federal Statistical Office (2019a); own calculations.

The average tax rate for total inheritances and gifts, i.e. tax revenue divided by the final tax base, amounted to 19 percent in 2018 as mentioned above. The percent-age has slightly fluctuated over the years which might be due to the volume of each inheritance that determines a higher or lower tax rate in accordance with the progression (Figure 7). In line with the observations in the Figures above, there is a remarkable difference between the average tax rate for inheritances and that for gifts. Again, this descriptive result supports the hypothesis that gifts are strategi-cally used to minimize the tax burden.

While the overall average tax rate has increased in the last 10 years (Figure 7), the effective tax rate which is referred to as tax income divided by the total value before any deductions, has halved. This is due to the higher degree of tax exemp-tions for business assets from 2009 to 2015. In the course of the reform in 2016, the percentage has risen again since tax exemptions for business assets were restricted (Figure 8). The gap between the numbers for inheritances and gifts has remained stable over the years.

FIGURE 8

Effective inheritance tax rate - Tax revenue divided by the total value before any deductions (in %)

Source: Federal Statistical Office (2019a); own calculations.

5 PROPOSALS FOR A SUSTAINABLE INHERITANCE TAX DESIGN

In conclusion, the inheritance tax law in Germany has always been a complex issue. Efficiency losses cannot be neglected since the behavioural responses seem to be rather large. This raises the question of whether a better designed tax law could facilitate a higher degree of tax efficiency without hampering equity issues. Hence, the challenge of reforming the inheritance tax law with a high degree of efficiency and equity will be addressed.

5.1 GENERAL REFORM OPTIONS FOR THE INHERITANCE AND GIFT TAX

Against the background of efficiency and equity as the two fundamental principles in tax policy, a well-designed tax law is needed, to prevent negative effects on jobs and investments. An inheritance tax always means taking assets created by taxed income. Thus, it always leads to double taxation. This does not necessarily suggest neglecting the idea of inheritance taxes, rather the careful consideration of any levy to prevent distortions in economic activities. The trade-off between equity and efficiency is evident.

From an equity perspective, one could argue that high (and progressive) tax rates with rather restrictive personal tax allowances and tax exemptions would be a favourable tax design. But there are some issues that need to be addressed in this context. As already mentioned in chapter 3.1, the tax design of a high and progressive tax rate alone does not necessarily reduce wealth inequality which would depend on which and how many inheritors receive bequests. However, if there are no or only small behavioural effects, such a tax could maximize the possible revenue from inheritances and redistribute wealth among households or could improve the quality of public institutions and services. With behavioural effects, the efficiency loss would be high in such a system. The reasons for that are

straightforward. The potential testator has a higher incentive to consume instead of saving. Most important, evasive reactions in terms of the relocation of assets can be expected to grow. It is possible to circumvent the inheritance tax by moving to another country. The data analysis in Chapter 3 gives slight evidence for these correlations, since behavioural responses to change in the inheritance tax can be observed in Germany, Austria, and France to similar extents.

Thus, from an efficiency perspective, the picture is different. A broad tax base (no exemptions for businesses and self-used real properties and rather low personal allowances), low tax rates (2 to 10 percent for close relatives) and extensions for payments are often recommended for a well-designed inheritance tax (SVR, 2009: 191f; Deutsches wissenschaftliches Institut der Steuerberater, 2015; Houben and Maiterth, 2011). At the same time, such a regime is at least considered not to be entirely unfair since all heirs pay their (fair) shares. Yet, extensions for tax payments are reasonable to avoid any solvency issues in the case of inherited business assets. Otherwise, a tax liability even of a rather small rate below 10 percent could cause illiquidity or the need to sell business parts or assets. In Austria, for example, the Social Democrats have proposed the reintroduction of the tax by allowing an extension for payment of 10 years (Steuerreformkommission, 2014: 191).[1]

There is a certain trade-off between equity and efficiency. A (low) flat tax is supposed to minimize tax avoidance and would strengthen the tax efficiency, but a progressive tax rate would lead to higher tax revenues especially regarding non-business assets which are not or only slightly sensitive to tax planning. Generally, a combination of a broad tax base, i.e. no or very little exemption of business assets, and low tax rates is supposed to minimize any distortions. A reform in favour of a broad tax base and a rather low tax rate requires two substantial changes in German inheritance tax law. First, the tax exemptions for business assets must be cut. Second, personal tax allowances must be at least reduced.

Presuming a broad tax base with no exemptions, the design of the tax rates is key for the perceived equity. Today, a progressive tax rate, i.e. the (nominal) tax rates increase with the inheritance volume, is in place in Germany. Furthermore, the tax rate is higher for inheritances between unrelated parties as it decreases with the degree of relationship. Most German economists are, however, in favour of a flat tax model without any tax exemptions for the business sector (Dorn et al., 2017; Bach and Thiemann, 2016). A flat tax model would be simpler and more transparent, but it is often regarded as not fair. Such a reform – by preserving the current revenues – would result in higher tax payments for heirs of medium-sized companies, while heirs of large business assets would have to pay less than under the current system (Beznoska and Hentze, 2017). This would be the price for a transparent and understandable tax law.

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[1] Under the current German regime, tax payments can be extended by 7 years but by applying an interest rate of 6 percent which is far too high compared to market rates. Due to the current interest policy of the European Central Bank, an interest-free deferral would be appropriate.

5.2 THE IMPLICATIONS OF A TAX SHIFT AWAY FROM LABOUR TO INHERITANCES AND GIFTS

The tax exemptions for business assets amounted to a volume of inheritances of roughly 40 billion euro in 2018. The average tax rate in 2018 was equal to 19 percent. Broadening the tax base and cutting the tax rate could mean taxing the additional 40 billion euro (which were exempted in reality) at a tax rate of 10 percent (instead of the actual average of 19 percent). This would lead to additional tax revenues of 4 billion euro. However, at the same time the actual tax base in 2018 would be taxed at a rate of 10 percent (instead of 19 percent) leading to a decrease in tax revenue of a little bit more than 3.2 billion euro. In other words, a reform in favour of broadening the tax base and cutting the rate would lead to only negligible additional revenues. The plus of less than 0.8 billion euro amounts to 0.1 percent of total tax revenue in Germany.

Of course, one could argue in favour of a tax rate higher than 10 percent in order to boost the revenue effect. But the extent is strongly limited as distortions are supposed to grow with the tax rate. For instance, a flat tax rate of 15 percent would lead to 4.5 billion euro additional revenues, a tax rate of 20 percent to 8.3 billion euro more (Table 5). However, this only refers to the first-round effects without any behavioural adjustments. Especially for a rather high tax rate, increasing evasion activities are likely which would shrink the revenue effect. At the same, a low flat tax rate might enlarge the tax base by reducing activities aimed at evasion.

TABLE 5

Estimated revenue and labour supply effects of a flat tax reform

Flat tax rate	10 %	15 %	20 %
	In billion euro per year		
Tax revenue	7.5	11.2	14.9
Difference to status quo	0.8	4.5	8.3

Estimated labor supply responses for a revenue-equivalent tax cut of the income tax			
	In percent of total hours worked		
Women	-	0.10	0.19
Men	-	0.06	0.11

Note: Labour supply effects are evaluated at the median of the income distribution.

Source: Federal Statistical Office (2019a); GSOEP data 2018 (v34); labour supply model from Stockhausen (2019); own calculations.

The additional tax revenue can be used to flatten the progressive income tax tariff, which means to cut the marginal tax rates for a large part of the working population. In our microsimulation model (Stockhausen, 2019), such a reform can be simulated on micro data of the German Socio-Economic Panel (GSOEP) to compute labour supply effects for the population. Therefore, the second-tax bracket of the

progressive-linear income tax tariff is smoothed to obtain a revenue-neutral reform.[2] The reform lowers the marginal tax rates over a wide range of taxable income by up to 3 percentage points. However, the simulated labour supply effects are very low. Evaluated at the median of the income distribution, the shift of the tax burden from the income tax to the inheritance tax in the scenario with a flat rate of 15 percent leads to an increase of 0.1 percent of total hours worked for women. For men, the effect is even smaller with an increase of 0.06 percent. In the scenario with a 20 percent flat tax, the effects amount to 0.19 percent for women and 0.11 percent for men. Thus, the latter scenario corresponds to an increase in employment of 25,000 full-time-equivalent employed women and about 21,000 men (Federal Statistical Office, 2019b). The reason for these small effects is, on the one hand, the already high employment situation in Germany. Since women have a higher part-time employment rate, they tend to react more than men to a tax cut because of higher potentials in labour supply. In general, most of the predicted effect stems from the intensive margin. On the other hand, the additional tax revenue from the inheritance tax is just too small to allow for significant tax cuts in the income tax.

FIGURE 9

Distributional and labour supply effects of a cut in income tax of 8.3 billion euro (2019, in percent of gross income (tax relief) and in percent of total hours worked (labour supply)
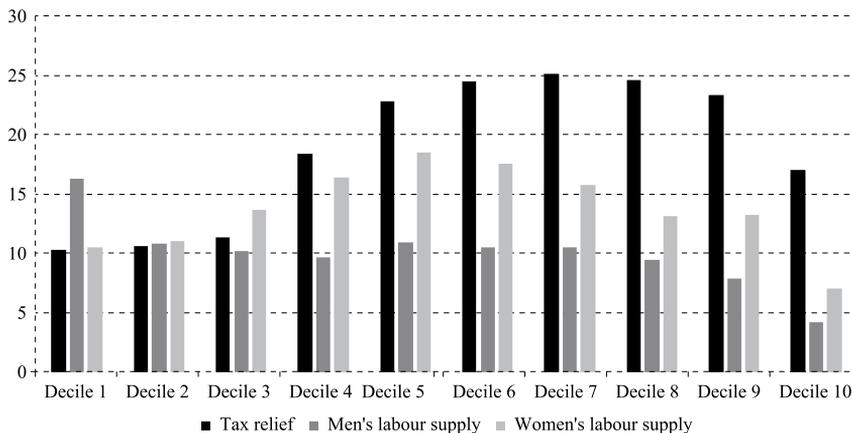
Note: Deciles of the distribution of household's equivalised gross income.

Source: GSOEP data 2018 (v34); microsimulation model Beznoska (2016); labour supply model from Stockhausen (2019); own calculations.

The distributional effects of the tax cut lie in a range between 0.1 percent and 0.25 percent of taxpayers' gross income (Figure 9). The effect increases with higher income to the seventh decile and then decreases slightly again. At the mean, this corresponds to a tax relief of about 170 euro per year per taxpayer. The highest

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[2] This implies a shift of the beginning of the third tax-bracket according to the 2019 income tax tariff from 14,254 euro of taxable income per year to 15,400 euro (15 percent scenario) or 16,400 euro (20 percent scenario), respectively.

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labour supply responses for women are found in the middle of the income distribution. Men's labour supply effects are relatively smooth along the distribution. Exceptions are the first decile, where especially single men react more strongly, and the tenth decile with low responses in all types of households. However, the magnitudes of the effects are overall rather small.

5.3 FURTHER REVENUE POTENTIALS OF THE INHERITANCE AND GIFT TAX

As the potential of taxing business assets is limited in terms of increasing the tax revenue, the personal tax allowances are of special interest. From the inheritance tax statistics, it can be deduced that any inheritances which do not enter the statistics are below the respective personal tax allowance. Referring to the guestimates of the annual inheritance volume between 200 and 400 billion euro (see above), a volume of about 100 to 300 billion euro must be allocated to inheritances below the thresholds. Acknowledging the volume of 400 billion euro as appropriate, a tax rate of 10 percent would mean tax revenues of 40 billion euro. This would be a substantial increase compared to the current tax revenue of less than 7 billion euro. However, it is obvious that the main part of the additional tax revenue (32 of 33 billion euro; 1 billion euro can be allocated to taxing business assets without any tax exemptions) results from taxing small inheritances, i.e. below the personal tax allowances. Thus, increasing the revenues significantly requires, amongst other things, taxing family properties in a much broader way. Such a reform could be perceived as being unfair.

Based on Bach et al. (2014), for instance, it follows that an inheritance tax reform with a general personal tax allowance of 100,000 euro regardless of the degree of relationship, no tax exemptions for business assets and a proportional tax rate of 10 percent would lead to a revenue increase of 20 percent. Applied to the tax revenue in 2018 this would mean additional revenues of 1.4 billion euro for the price of a substantially restricted allowance volume (at least for close family members). By altering the personal tax allowances to a range between 20,000 to 200,000 euro depending on the degree of relationship the revenue increase would be about 25 percent, i.e. 1.7 billion euro with respect to 2018. The main reason for the increase is the reduced personal tax allowance for close family members from 500,000 euro to 200,000 euro. It is more than unsure whether such a reform would be accepted by the public since most transfers of real estate would effectively constitute a tax event.

There is one restriction of this calculation, referring to gifts and not inheritances. As even rich individuals can use gifts to circumvent the inheritance tax, the cases below the personal tax allowances do not only refer to middle-class families. Therefore, the gift tax has to be interpreted as a tax privilege for rather wealthy households that can fully use the personal tax allowances several times. However, the total volume is restricted by the thresholds and the time period of 10 years in which all inheritances and gifts are cumulatively considered for tax purposes.

In summary, the calculations reveal that not limiting exemptions for business assets, but personal allowances are key to increasing the inheritance tax revenue. However, it is more than unsure whether there will be a common approach among the political parties to tax rather small inheritances ("grandma`s house"). Of course, the personal tax allowances do not have to be cut to zero but could be slightly lowered. This could increase the political support for such a reform while additional revenues could still be generated.

What lessons can be learned from this? The most striking result is that the potential of the inheritance tax to finance public needs or to lower the tax burden on labour are clearly limited unless the personal allowances are significantly cut. However, any small increase could be used to shift the tax burden from labour to wealth in terms of inheritances. Inheritance tax and income tax are correlated, as an inheritance tax can be interpreted as a tax on income of the inheritor in the sense of a net asset increase in some asset classes (windfall gains). Therefore, the inheritance tax fills a gap caused by the pattern of the income tax (Deutsches wissenschaftliches Institut der Steuerberater, 2015: 9).

From a German perspective, there are good reasons for lowering the relatively high burden on labour. The labour market suffers from rather high taxation of even low- and middle incomes. Against this background it seems plausible to shift the tax burden partly from labour to wealth since positive economic effects in terms of growth can be expected (European Commission, 2019; Altzinger and Humer, 2013).

6 CONCLUSION AND OUTLOOK

From a fiscal perspective, the inheritance tax has never played a major role in Germany. However, the political debate has always been intensive. Even after several reforms the German inheritance tax remains complicated. No ideas for simplification, e.g. by a flat-tax model, have been successful. The tax treatment of business assets is always subject to litigation. Therefore, an inheritance tax reform is reasonable in terms of lower assessment costs and higher tax efficiency. However, behavioural responses of private households to changes in inheritance taxation should be considered if a new inheritance law is designed. The effects of such a reform, which are mainly caused by tax planning on the part of donors and testators, can be large as shown in the difference-in-difference analysis in chapter 3. They also reflect distortions as donors make great efforts to reduce the tax burden of their heirs.

Currently, reform to broaden the tax base and cut the tax rates is often proposed. This would reduce complexity and ensure that all heirs pay their fair shares. The extent to to which gifts are used in order to minimize the tax burden could be reduced by introducing a flat tax model. Long term interest-free deferrals would be an important aspect in this regard in order to prevent any solvency issues in the case of inheritance.

As a consequence of introducing a flat tax model with a broad tax base, the tax burden for smaller inheritances would generally increase and decrease for larger ones. This would not strengthen the equity aspect of the inheritance tax. In addition, inheritances *per se* do not increase wealth inequality. This depends on several preconditions, for example the position of the heir in the net wealth distribution. The importance of the inheritance tax for equity and reducing inequality is not as high as is partly presumed by politicians.

Any substantial increases in tax revenues are not likely unless the personal tax allowances are substantially cut, expanding the circle of taxpayers to those receiving smaller bequests. While increasing the tax revenue from inheritances and gifts and simultaneously lowering the tax burden on labour might increase economic efficiency, the limited revenue potential of the inheritance tax confines the possibilities of such a reform. Our simulation analysis shows that a tax shift away from labour to inheritances would increase labour supply only at a marginal level. Additionally, if inheritance tax rates are set rather high, evasion activities increase which might have a negative effect on labour demand.

In conclusion, a reform towards a flat tax model could improve tax efficiency by not hampering equity. The fiscal expectations of such a reform should not be too high as the potential to lower the tax burden on labour by increasing the inheritance tax revenue is, at least for now, rather limited.

Disclosure statement
No potential conflict of interest was reported by the authors.

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APPENDIX

TABLE A1

Results of the difference-in-difference estimator L4P1

Variable	Coef.	Std. Err.	t-value	P>t	[95% Conf. Interval]	
Time dummy (β_1)	5,676	6,465	0.88	0.380	-6,994	18,347
Treatment dummy (β_2)	95,888	34,141	2.81	0.005	28,954	162,822
Timedy#treatdy (β_3)	-92,682	37,148	-2.49	0.013	-165,522	-19,843
Age of hh head (β_4)	137	350	0.39	0.695	-554	829
Constant (β_0)	61,604	18,443	3.34	0.001	25,151	98,056
Observations	3,097					

Note: Germany vs. France, period length = 4 years each, 1 period before treatment. Period 1: 2004-2007, period 2: 2008-2011. All inheritances are measured in prices of 2010. Treatment took place in Germany. Standard errors are calculated using multiple imputation estimates from five imputations.

Source: ECB, 2nd wave; own calculations.

TABLE A2

Results of the difference-in-difference estimator L4P2

Variable	Coef.	Std. Err.	t-value	P>t	[95% Conf. Interval]	
Time dummy (β_1)	6,604	5,805	1.14	0.255	-4,774	17,982
Treatment dummy (β_2)	82,501	22,243	3.71	0.000	38,897	126,104
Timedy#treatdy (β_3)	-79,983	24,078	-3.32	0.001	-127,219	-32,747
Age of hh head (β_4)	-13	296	-0.04	0.966	-595	569
Constant (β_0)	68,003	15,983	4.25	0.000	36,558	99,449
Observations	4,253					

Note: Germany vs. France, period length = 4 years each, 2 periods before treatment. Period 1: 2000-2003, period 2: 2004-2007, period 3: 2008-2011. All inheritances are measured in prices of 2010. Treatment took place in Germany. Standard errors are calculated using multiple imputation estimates from five imputations.

Source: ECB, 2nd wave; own calculations.

Table A3

Results of the difference-in-difference estimator with additional period dummies L4P3

Variable	Coef.	Std. Err.	t-value	P>t	[95% Conf. Interval]	
Time dummy (β_1)	-6,040	11,301	-0.53	0.593	-28,189	16,110
Treatment dummy (β_2)	70,439	16,771	4.20	0.000	37,553	103,324
Timedy#treatdy (β_3)	-67,024	19,166	-3.50	0.000	-104,646	-29,402
Age of hh head (β_4)	180	247	0.73	0.467	-307	668
Period 1 dummy	-36,169	16,847	-2.15	0.032	-69,193	-3,146
Period 2 dummy	-17,868	18,519	-0.96	0.335	-54,169	18,434
Constant (β_0)	71,233	18,056	3.95	0.000	35,821	106,646
Observations	5,118					

Note: Germany vs. France, period length = 4 years each, 3 periods before treatment. Period 1: 1996-1999, period 2: 2000-2003, period 3: 2004-2007, period 4: 2008-2011. All inheritances are measured in prices of 2010. Treatment took place in Germany. Standard errors are calculated using multiple imputation estimates from five imputations.

Source: ECB, 2nd wave; own calculations.

Table A4

Results of the difference-in-difference estimator L3P4

Variable	Coef.	Std. Err.	t-value	P>t	[95% Conf. Interval]	
Time dummy (β_1)	4,418	5,097	0.87	0.386	-5,573	14,408
Treatment dummy (β_2)	62,168	16,410	3.79	0.000	29,988	94,349
Timedy#treatdy (β_3)	-51,079	19,985	-2.56	0.011	-90,486	-11,671
Age of hh head (β_4)	102	262	0.39	0.697	-413	617
Constant (β_0)	61,510	14,492	4.24	0.000	33,026	89,995
Observations	4,981					

Note: Germany vs. France, period length = 3 years each, 4 periods before treatment. Period 1: 1997-1999, period 2: 2000-2002, period 3: 2003-2005, period 4: 2006-2008, period 5: 2009-2011. All inheritances are measured in prices of 2010. Treatment took place in Germany. Standard errors are calculated using multiple imputation estimates from five imputations.

Source: ECB, 2nd wave; own calculations.

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TABLE A5

Results of the difference-in-difference estimator using gifts only L4P3G

Variable	Coef.	Std. Err.	t-value	P>t	[95% Conf. Interval]	
Time dummy (β_1)	-2,392	7,905	-0.30	0.762	-17,887	13,102
Treatment dummy (β_2)	73,343	35,500	2.07	0.039	3,764	142,923
Timedy#treatdy (β_3)	-76,710	40,648	-1.89	0.059	-156,395	2,975
Age of hh head (β_4)	929	497	1.87	0.062	-45	1,903
Constant (β_0)	33,968	23,540	1.44	0.149	-12,181	80,118
Observations	1,906					

Note: Germany vs. France, period length = 4 years each, 3 periods before treatment. Period 1: 1996-1999, period 2: 2000-2003, period 3: 2004-2007, period 4: 2008-2011. All inheritances are measured in prices of 2010. Treatment took place in Germany. Standard errors are calculated using multiple imputation estimates from five imputations.

Source: ECB, 2nd wave; own calculations.

TABLE A6

Results of the difference-in-difference estimator using gifts only L4P2G

Variable	Coef.	Std. Err.	t-value	P>t	[95% Conf. Interval]	
Time dummy (β_1)	-5,691	8,114	-0.70	0.483	-21,594	10,212
Treatment dummy (β_2)	98,578	51,256	1.92	0.054	-1,882	199,039
Timedy#treatdy (β_3)	-101,722	56,015	-1.82	0.069	-211,519	8,075
Age of hh head (β_4)	969	577	1.68	0.093	-162	2,099
Constant (β_0)	35,655	26,692	1.34	0.182	-16,697	88,007
Observations	1,585					

Note: Germany vs. France, period length = 4 years each, 2 periods before treatment. Period 1: 2000-2003, period 2: 2004-2007, period 3: 2008-2011. All inheritances are measured in prices of 2010. Treatment took place in Germany. Standard errors are calculated using multiple imputation estimates from five imputations.

Source: ECB, 2nd wave; own calculations.

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TABLE A7

Results of the difference-in-difference estimator with additional period dummies using gifts only L4P3G

Variable	Coef.	Std. Err.	t-value	P>t	[95% Conf. Interval]	
Time dummy (β_1)	-29,450	21,293	-1.38	0.167	-71,184	12,284
Treatment dummy (β_2)	77,108	37,865	2.04	0.042	2,893	151,322
Timedy#treatdy (β_3)	-78,869	41,919	-1.88	0.060	-161,042	3,305
Age of hh head (β_4)	1,210	452	2.68	0.008	323	2,097
Period 1 dummy	-70,068	40,394	-1.73	0.083	-149,239	9,102
Period 2 dummy	-28,646	38,051	-1.02	0.310	-113,223	35,932
Constant (β_0)	49,616	29,682	1.67	0.095	-8,569	107,801
Observations	1,906					

Note: Germany vs. France, period length = 4 years each, 3 periods before treatment. Period 1: 1996-1999, period 2: 2000-2003, period 3: 2004-2007, period 4: 2008-2011. All inheritances are measured in prices of 2010. Treatment took place in Germany. Standard errors are calculated using multiple imputation estimates from five imputations.

Source: ECB, 2nd wave; own calculations.

TABLE A8

Results of the difference-in-difference estimator with additional period dummies and age group dummies L4P3AG

Variable	Coef.	Std. Err.	t-value	P>t	[95% Conf. Interval]	
Time dummy (β_1)	-3,970	10,892	-0.36	0.715	-25,318	17,378
Treatment dummy (β_2)	71,151	17,373	4.10	0.000	37,082	105,220
Timedy#treatdy (β_3)	-64,576	19,262	-3.35	0.001	-102,388	-26,765
Period 1 dummy	-34,731	15,962	-2.18	0.030	-66,020	-3,441
Period 2 dummy	-15,400	18,045	-0.85	0.393	-50,773	19,973
Age groups (ref.: 16-30)						
Age 31-45	59,955	21,593	2.78	0.006	17,527	102,383
Age 46-60	57,262	15,970	3.59	0.000	25,845	88,680
Age 61-75	42,944	14,381	2.99	0.004	14,185	71,702
Age 76+	39,859	16,015	2.49	0.013	8,401	71,318
Constant (β_0)	29,656	14,614	2.03	0.043	933	58,379
Observations	5,118					

Note: Germany vs. France, period length = 4 years each, 3 periods before treatment. Period 1: 1996-1999, period 2: 2000-2003, period 3: 2004-2007, period 4: 2008-2011. All inheritances are measured in prices of 2010. Treatment took place in Germany. Standard errors are calculated using multiple imputation estimates from five imputations.

Source: ECB, 2nd wave; own calculations.

Performance-Based Budgeting in the Public Sector

MICHIEL S. DE VRIES, JURAJ NEMEC and DAVID ŠPAČEK (eds.)
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Performance-based budgeting (PBB) has been a crucial part of public sector management in many countries for the past few decades. Different aspects of PBB have been implemented on various levels of government and fields of public policy. The book *Performance-Based Budgeting in the Public Sector* provides a comprehensive view of how several countries use PBB in public management. One of the assets of this publication with three editors (Michiel S. de Vries, Juraj Nemec and David Špaček)[1], is its collaboration of diverse economists from various countries and from different fields of study. The case studies are provided not only by researchers from academia but also by professionals with practical public sector experience, municipal councillors or internal auditors, for instance. This collaboration between academic insights and hands-on experience provides an interesting perspective and unique conclusions in the field of PBB. A contributing fact is that the book not only focuses on EU countries (as is common in such publications) but also expands its analysis and conclusions to countries all over the world.

The publication is divided into several sections. Formally, the book has four main parts – introduction, use of PBB in the developed world, use of PBB in transitional countries and conclusion. However, the section on PBB in transitional countries has also a separate part on performance-based funding (PBF). The main distinction within the book can be seen between the first chapter and the rest of the publication – while the first chapter (introduction) focuses on the theoretical aspects of PBB, the others summarize the main findings of various authors concerning PBB in their respective countries. Most case studies emphasize the process of the implementation and historical development of PBB in the country under review, but several chapters provide analysis of primary or secondary data in order to evaluate the effectiveness and use of PBB and PBF. Case studies vary not only in the data sources used, but also in the level of government they focus on (implementation and use of PBB at national, regional or local levels).

The introduction of the book provides an in-depth, but at the same time easy to understand definition of PBB. It illustrates different types of PBB that can be implemented to best fit the needs of specific areas of the public sector and various government programs. However, the book not only accentuates the benefits PBB may bring, but also compares it to other forms of budgeting and compares and contrasts the advantages and obstacles, and ponders whether it should be implemented or not. Thus, the introduction is more than just a mere collection of theoretical facts and information, it also asks questions and challenges a reader to discuss the pros and cons of PBB.

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Chapters 2 through 6 focus on the implementation and effectiveness of PBB in some developed countries (US, Australia, Netherlands, Germany, Austria, Switzerland and Italy). A case study introducing PBB in the US analyses the effectiveness of PBB in the field of higher education using secondary data, based on several factors, such as length of time it has been in use, level of higher education institution or state characteristics. A case study from Australia, specifically from New South Wales, emphasizes the risks and undesired effects that performance monitoring might bring if policy makers do not follow the theoretical aspects of performance measurement. Chapters concerning the Netherlands, Germany, Austria, Switzerland and Italy summarize how PBB was implemented in these countries on various levels of centralization.

Chapters 7 through 11 focus on the implementation of PBB in transitional and developing countries (South Africa, Russia, Ukraine, Slovakia and Slovenia). The common characteristics of transitional countries is that they are latecomers in the field of PBB compared to developed countries, having started introducing it in the last decade or two. The case study of Russia shows the PBB implementation process, while chapters dealing with South Africa, Slovenia and Ukraine focus more on the specific projects in one of the regions to provide an in depth understanding of how it is actually used in the selected region and how it is connected to performance measurement. A section dedicated to Slovakia uses primary (questionnaire) and secondary data to analyse budget indicators and to present opinions of municipal representatives on PBB.

Chapters 12 and 13 deal with Bulgaria, Slovakia and the Czech Republic. The focus of the Bulgarian case study is on the funding of kindergartens, concluding that there is no link between funds and the performance of these institutions. The case study of Slovakia and the Czech Republic ponders PBF of universities and how it affects performance, while highlighting the downsides and challenges of such funding.

There are some common themes that can be seen throughout the book. Firstly, some case studies begin with the emphasis on the New Public Management (NPM) movement, which is said to be some sort of starting point for PBB in all the countries under review. While the NPM movement dates back to the 1990s, PBB started being implemented in the last ten to twenty years in most countries showed in the publication. Secondly, some of the presented case studies focus on the historical development of PBB implementation in the country and the obstacles the government faced in its implementation. Whether developed or transitional, most countries are still undergoing the process of transitioning from more traditional (e.g. item-based) budgeting towards PBB.

Even though the publication focuses on several countries that operate in completely different economic conditions, they mostly face the same issues and challenges in terms of PBB. One of the focal points of its implementation is the

definition and measurement of performance indicators. While focus on performance indicators gradually grows, there are still some problems concerning performance measurement. Since it is sometimes difficult to quantify the performance of policy programs, many programs focus on input or output indicators, instead of outcome or ratio indicators, which are better suited to illustrate the performance of a program. It is also difficult to define and measure policy goals and to link them to indicators – while some policy programs define too few performance indicators, others define too many and fail to keep track of them. The main issue concerning performance measurement is that even though countries adhere to some sort of legislation or standards regarding PBB, most of those presented have weak connections between performance indicators and the actual process of budgeting, meaning that despite defining, measuring and reporting performance indicators, policy makers rarely adjust budget appropriations according to the achieved results. The often used top-down approach in the transition to PBB results in public sector employees without sufficient education, qualification and skills to adhere to these changes. The unclear definition of PBB often leads PBB concepts differing among countries and even on various levels within the country. It is difficult, accordingly, to compare the extent of PBB use in different regions.

The conclusion of the book provides a brief summary of all case studies presented and their main findings, with editors' call for attention to the recurring obstacles of PBB and the statement that these dilemmas need to be taken into account for its further implementation.

Overall, *Performance-Based Budgeting in the Public Sector* is a publication that provides a comprehensive and eloquent background to PBB that can be used as introduction to the field, as well as a guideline for government officials to the main challenges and opportunities PBB approach provides. The writing style is easy to understand but still manages to adhere to high academic standards. The book also provides future opportunities to expand the scope of research to other countries or to revisit the presented case studies in the future and to document the further progress (or regress) they may have undergone in the field of PBB.