

COUNTRY REPORT: POLAND

1. DESCRIPTION OF THE INDIRECT TAX SYSTEMS IN POLAND

This section describes the indirect tax system for Poland. First we explain the value added tax rates, which goods and services they apply on, and which exemptions there are to the standard rates. We then summarize excises for each product category. Finally we list the other notable indirect taxes besides VAT and excises. Information generally refers to June 30th in a given year, unless specified otherwise. Indirect taxes in the Polish central budget compose of VAT, excise tax and gambling tax.

1.1 Value Added Tax

The current VAT rates and legislation are regulated by the VAT bill from 11th March 2004 (Dz.U. 2004 nr 54 poz. 535, with further changes). This bill introduced a 22% standard rate and two reduced rates of 7% and 3% respectively. These rates remained stable over the years with major changes taking place in January 2011. In response to the financial crisis and growing public debt, Polish government introduced a new 23% standard rate together with 8% and 5% reduced rates. With 5% rate being the lowest possible according to EU treaties. No major changes in these rates were introduced since then, although these higher rates were introduced only as temporary measures, but have remained unchanged in 2016. Table 1 presents an overview of these changes

each year many minor changes to the VAT bill were made, on a level of detail that is impossible to capture in the more aggregated COICOP categories. A reduced 8% rate on toddler clothes and shoes was changed to a standard 23% rate to be in line with EU regulation. Also according to the EU regulations, exporters to the EU have to pay 0% VAT, allowing them to reclaim the VAT paid on purchasing inputs. Companies with yearly sales below 150 000 PLN are exempt from the VAT payment, but at the same time they cannot deduct VAT.

Table 1: Overview of changes in VAT rates (2014-2016)

	2004	2011	2016
	March	Jan	April
Standard	22%	23%	23%
Reduced I	7%	8%	8%
Reduced II	3%	5%	5%

Source: Bill, Dz.U. 2004 nr 54 poz. 535, with further changes

In the VAT bill a general 22% (23% since 2011) rate is applied to all goods and services with the exceptions pointed out in the VAT bills and attachments to it. VAT rates apply to specific product categories. Products are classified according to a Polish good and service classification, PKWiU (Polish Classification of Goods and Services), which is overall compatible with the European Classification of Products by Activity (CPA). The PKWiU 2008 classification lists around 3200 detailed goods, but the identification of goods and services with rates different from the standard rate is done in the VAT bill by groups. Some of more general groups with non-standard rates are mentioned in Table 2.

VAT is the most important tax in central budget revenues. Overall the VAT revenues account for more than 40% of total central budget revenues. This share has been rising since 2013 after dropping in 2012 from 44.2% to 40.4%. VAT revenues in Poland have recently become a subject of controversy due to non-negligible scale of VAT evasion. It is estimated that the VAT gap in Poland in 2013 amounted up to 27% of total VAT revenues and has been increasing since 2010¹.

Table 2: VAT revenue 2008-2015

	2008	2009	2010	2011	2012	2013	2014	2015*
% of government revenues	40.2	36.3	43.8	44.2	40.4	41.8	43.3	45.3*
% of GDP	8.0	7.3	7.6	7.8	7.1	7.0	7.1	7.5*

Source: EUROSTAT; MF, Sprawozdanie z wykonania budżetu państwa; own calculations,

Notes: (*) 2015 information based on planned revenues from 2015 budget bill.

1.2 Excise duties and prices

According to the Polish excise bill (Dz. U. z 2014 r. poz. 752) goods for which excise tax needs to be paid include energetic goods, electrical energy, alcoholic beverages, tobacco products, dried tobacco and new cars. The regulation is harmonized with the EU directives. Most products are taxed per unit of production. In case of liquid fuels it is either litre or kilogram of product. With the exception of coal, coke and gaseous fuels that are taxed according to GJ of energy. Electrical energy is taxed according to MWh. Alcohol products are taxed according to content of 100% of pure alcohol or to hectolitre in case of weaker alcohols. Tabaco is a mix of unit and price taxation and finally cars (new) are taxed proportionally to the tax base.

Products imported for individual consumption are exempt for the excise duty. The specific amounts for each product categories are given in the tax bill.

1.2.1 Alcoholic beverages

Alcoholic beverages are defined as ethyl alcohol, beer, wine, fermented beverages and intermediary products. Each product is identified according to the CN classification (corresponding to the EU CPA classification²). Alcohol is identified as every product with alcohol concentration above 1,2%. Beer is identified also as every product mixed with beer containing above 0.5% of alcohol. Wine is identified as containing up to 15% of pure alcohol with all the alcohol coming from fermentation. Fermented beverages can contain up to 10% of alcohol or up to 15% in case of fermentation. Intermediaries are defined as all other products containing up to 22% of alcohol. Also excise tax for beer is calculated according to hl of product and Plato degree, not to alcohol content. One degree Plato is equivalent to 1% of extract used in the production of beer.

Excise is calculated according to hectolitres of pure alcohol. Beers, wines and other fermented drinks have their own excise rates according to hl of product. In 2013 cider and Perry drinks with

¹ European Commission (2015), Study to quantify and analyse the VAT Gap in the EU Member States, TAXUD/2013/DE/321

² See correspondence tables:

http://ec.europa.eu/eurostat/ramon/relation/index.cfm?TargetUrl=LST_REL&StrLanguageCode=PL&IntCurrentPage=4

less than 5% of alcohol have been introduced as a new category out of general fermented beverages. In 2014 the excise for pure alcohol went up by approximately 15% and remained stable since.

Some alcohol, e.g. contaminated alcohol, alcohol used in pharmaceuticals and some food products, and alcohol used in the process of food production (e.g. vinegar) is exempt from the excise duty.

Table 3: Excises on alcoholic beverages (PLN per unit, 2011-2016)

	2011	2012	2013	2014	2015	2016	unit
Beer	7.79	7.79	7.79	7.79	7.79	7.79	hl x °Plato
Wine	158	158	158	158	158	158	hl
Fermented beverages	158	158	158	158	158	158	hl
Intermediaries							
<i>Cider, Perry < 5% alc.</i>	-	-	97	97	97	97	hl
<i>Other intermediaries</i>	318	318	318	318	318	318	hl
Ethyl alcohol	4960	4960	4960	5704	5704	5704	hl of pure alc.

Notes: da=degree alcohol, pa=pure alcohol.

Source: Ministry of Finance, Stawki Akcyzy, <http://www.finanse.mf.gov.pl/akcyza/stawki-akcyzy>

1.2.2 Tobacco

Cigarettes, Tabaco for smoking, cigars and cigarillos are subjected to the excise tax, which in 2014 comprised of over 29% of the whole excise revenues. Cigarettes and fine-cut smoking tobacco are subjected to both per unit and ad valorem excise tax. The ad valorem tax rate has been a steady 31.41% of the final, maximum price printed on the packaging of the cigarettes. The excise duty cannot be smaller than the minimal value as calculated from the average weighted price of cigarettes, as published in the Ministry of Finance announcements.

Besides changing the amount of tax per 1000 units of cigarettes to meet up with the minimal value required by the EU, in 2013 dried tobacco has been introduced as a separate excise category. Also in 2015 the unit of measure for cigars and cigarillos has changed from 1000 pc to 1kg.

Table 4: Excises on tobacco products (2011-2016)

	2011	2012	2013	2014	2015	2016
<u>Specific excises</u> (PLN per 1000 units, or per kg)						
<i>Cigarettes (1000 units)</i>	158.36	170.97	188.00	206.76	206.76	206.76
<i>Fine-cut smoking tobacco (1 kg)</i>	102.32	115.86	128.02	141.29	141.29	141.29
<i>Cigars and cigarillos (1000 units)</i>	244.40	254.20	266.90	280.25	393.00*	393.00*
<i>Dried tobacco (1 kg)</i>	-	-	218.40	229.32	229.32	229.32
<u>Ad valorem excises</u> (% of retail price)						
<i>Cigarettes</i>	31.41	31.41	31.41	31.41	31.41	31.41
<i>Fine-cut smoking tobacco</i>	31.41	31.41	31.41	31.41	31.41	31.41

Source: Ministry of Finance, Stawki Akcyzy, <http://www.finanse.mf.gov.pl/akcyza/stawki-akcyzy>

(*) Excise per 1 kg

1.2.3 Energy products

Revenue from excises on energy products comprise of more than 50% of total excise revenues (for 2014). These products include coal, engine and heating fuels, gas, oils and electricity. The unit of measurement is 1 tonne, 1 litre, 1 gigajoule or 1 MWh. For products taxed according to their energetic equivalent the excise tax bill provides conversion values per 1t or 1000 cubic metres. Energetic values depend on the product classified according to the CN classification. Also until 01/01/2012 coal and coke used for heating were exempt from excise tax. Gaseous products for household heating are also exempt from excise tax.

Electricity, taxed at 20 PLN per 1 MWh, is subjected to numerous exemptions regarding industry. For example 2016 bill introduced a special rate for mining and coke production amounting to 3 PLN per 1 MWh. Moreover that year introduced exempting from the excise duty electricity used in the process of chemical reduction, electrolysis, metallurgic processing and mineral processes. Electrical energy used as an intermediary in the process of electricity production and electricity produced from renewable energy sources is also exempt for all the included years.

The legislator introduced different rates for engine and heating oils. Also heating oils have to be marked and tainted to avoid using them as propellant. The rates for fuels have remained stable in the analysed period. Still, in 2015 the rates for engine petrol, other engine fuels, gaseous fuels and gas oil have been lowered.

Table 5: Excises on energy products (PLN per unit, 2011-2016)

	2011	2012	2013	2014	2015	2016	unit
<u>Petrol</u>							
<i>Engine petrol</i>	1565.0	1565.0	1565.0	1565.0	1540.0	1540.0	1000 litre
<i>Aviation petrol</i>	1822.0	1822.0	1822.0	1822.0	1822.0	1822.0	1000 l
<i>Jet engine petrol</i>	1822.0	1822.0	1822.0	1822.0	1822.0	1822.0	1000 l
<i>Jet engine fuels</i>	1401.0	1446.0	1446.0	1446.0	1446.0	1446.0	1000 l
<i>Paraffin</i>	1822.0	1822.0	1822.0	1822.0	1822.0	1822.0	1000 l
<i>Other engine fuels</i>	1822.0	1822.0	1822.0	1822.0	1797.0	1797.0	1000 l
<u>Gas oil</u>							
<i>Propellant</i>	1048.0	1196.0	1196.0	1196.0	1171.0	1171.0	1000 l
<i>Heating (d< 890kg/m³)</i>	232.0	232.0	232.0	232.0	232.0	232.0	1000 l
<i>Heavy (d≥ 890kg/m³) fuel oil for heating</i>	64.0	64.0	64.0	64.0	64.0	64.0	1000 kg
<i>Lubricant oil</i>	1180.0	1180.0	1180.0	1180.0	1180.0	1180.0	1000 l
<u>Gaseous fuels</u>							
<i>Propellant - liquified</i>	695.0	695.0	695.0	695.0	670.0	670.0	1000 l
<i>Propellant - gaseous</i>	11.04	11.04	11.04	11.04	10.54	10.54	Gigajoule
<i>Gaseous fuels for heating</i>	1.28	1.28	1.28	1.28	1.28	1.28	Gigajoule
<u>Coal and Coke</u>	-	1.28	1.28	1.28	1.28	1.28	Gigajoule
<u>Electricity</u>	20.0	20.0	20.0	20.0	20.0	20.0	MWh

Source: MF, Stawki Akcyzy, <http://www.finanse.mf.gov.pl/akcyza/stawki-akcyzy>

1.2.4 Product and sector specific charges

Other products with obligatory excise tax include newly bought or imported passenger cars. This tax comprises around 2.6% of the total excise due (for 2014). The legislator distinguishes between passenger cars with engine above 2000 cc, which are taxed at 18.6% of their price, and other passenger cars taxed at 3.1% of their price.

Table 6: Other excises (2011-2016)

	2011 - 2016	unit
Passenger cars, engine > 2000 cc	18,6	% Price
Other passenger cars	3,1	% Price

Source: Ministry of Finance, Stawki Akcyzy, <http://www.finanse.mf.gov.pl/akcyza/stawki-akcyzy>

1.2.5 Tax revenue from excise duties

The excise tax amounts for more than 20% of central government revenues, making it the third biggest revenue source, just after VAT and PIT, but before CIT. Out of different categories car fuels comprise for most of the amount, that is 46.3% of total excise due in 2014 and have been growing proportionally to GDP in the period of 2010 to 2014. Excise on tobacco, making up to 29,1% of total excise revenues in 2014, has been dropping proportionally to budget revenues in the mentioned

before period. One of the reason for this could be the increasing rates of the excise tax and increasing size of the shadow economy in these products. A similar effect can be seen in excise for alcohol, where after increasing the rate for pure alcohol in 2013 by 15%, the amount of excise revenue in this category dropped by 4.4% in the next year.

Table 7: Proceeds from excise duties (2010 -2014)

	2010	2011	2012	2013	2014
<u>Excise / budget rev., %</u>					
car fuel	9.50	9.07	9.43	9.68	10.05
tobacco	6.97	6.58	6.46	6.52	6.32
alcohol	4.09	3.71	3.68	3.95	3.72
electricity	0.93	0.88	0.82	0.87	0.82
cars	0.53	0.45	0.45	0.51	0.58
home fuel	0.16	0.13	0.09	0.09	0.09
other	0.07	0.06	0.08	0.09	0.13
total	22.25	20.88	21.02	21.72	21.71
<u>Excise / GDP, %</u>					
car fuel	1.65	1.74	1.88	1.87	1.97
tobacco	1.21	1.26	1.29	1.26	1.24
alcohol	0.71	0.71	0.73	0.76	0.73
electricity	0.16	0.17	0.16	0.17	0.16
cars	0.09	0.09	0.09	0.10	0.11
home fuel	0.03	0.02	0.02	0.02	0.02
other	0.01	0.01	0.02	0.02	0.03
total	3.85	4.01	4.18	4.20	4.26

Source: MF (2015), Kompendium Statystyczne Służby Celnej 2010-2014; EUROSTAT; own calculations

1.2.6 Prices

Table 8 lists consumer prices at the most detailed level of commodity groups available in HBS.

Table 8: Average consumer prices of items subject to excises (PLN per unit, 2011-2015)

	2011	2012	2013	2014	2015	unit
Spirits and liqueurs (vodka, 40%)	3980.0	4054.0	4074.0	4334.0	5012.0	100 l
Wine (dry, white)	1216.0	1229.33	1261.33	1280.0	1293.3	100 l
Beer (light, full, ca. 12 ° Plato)	580.0	584.0	578.0	572.0	562.0	100 l
Cigarettes	510.5	563.5	598.0	624.0	641.0	1000 cigarettes
Electricity	630.0	660.0	670.0	640.0	650.0	MWh
Natural gas and town gas	2640.0	2909.3	2731.8	2849.3	2775.2	kWh
Coal	777.61	818.16	809.51	802.37	789.33	1000 kg
Diesel	5080	5730	5540	5280	4550	1000 litre
Petrol (95 octane, unleaded)	5140	5730	5510	5300	4650	litre

Source: GUS (2015), Ceny w gospodarce narodowej w 2014

1.3 *Other indirect taxes*

Besides VAT and excises, governments raise important revenues through different indirect tax instruments. Central budget revenues identify gambling tax as an additional indirect tax category. This tax is paid by the gaming company proportionally to the total amount of bets placed. The percentage of this tax ranges from 2.5% on bets placed in games involving animal races, up to 50% for card games and lottery machine games.

Fuel tax is an additional tax that is not being part of the central budget, but still is levied on fuel producers and importers, influencing final price of fuels. This tax is directed into the National Roads Fund and Railway Fund. The rates differ for different fuel types and in 2011 (Mon.Pol. Nr 97, poz. 1133) they amounted to 95.15 PLN per 1000 l of engine petrol, 239.84 PLN per 1000 l of gas oil fuels and 122.82 PLN per 1000 kg of gas and other fuels. Both mentioned before funds received together in 2011 around 4.218 bn PLN from this tax³.

Table 9: Revenue from other indirect taxes (2011)

	billion PLN	% of government revenue
Gambling tax	1.477	0.53
Fuel tax	4.218	1.52

³ BGK (2012), Sprawozdanie z działalności Banku Gospodarstwa Krajowego w 2011 roku

2. DATA

2.1 Description of HBS

The Household Budget Survey (HBS) is conducted by the Central Statistical Office of Poland. The survey sample covers the whole territory of Poland and consists of private households (i.e. collective households such as homes for elderly, hospitals, student hostels, and other types of collective households are not covered by the survey sample). Data on most non-durable expenditures is derived from diaries filled in by respondents over a period of one month. Data on other kinds of spending is collected through face-to-face interviews and cover longer periods. All socio-demographic characteristics of households reflect the situation at the time of the interview.

2.2 Sample descriptives

Table 10 presents the distribution of expenditure in the HBS data across income deciles. We can see from the table that households with lower income spend a larger share of their income, with the lowest decile spending on average 20.2% more than they earn, implying negative saving. Households in the highest decile spend only 56.0% of their income. On average 73.4% of household disposable income is spent. For households across the income distribution *Food and non-alcoholic beverages* is the largest category, ranging from 37.7% of total expenditures for the poorest to 17.0% for the richest decile. *Home fuels, electricity & water* is the second most important category representing between 21.0% (for decile 2 and 3) to 10.8% of total expenditures (for decile 10). Spending on *durables, restaurants and hotels, private transport and recreation and culture* are almost twice as high as a percentage of total expenditures for the highest deciles than for the lowest deciles, whereas the lowest deciles spend relatively more on *tobacco* and on *communication services*.

Table 10: Mean (unequalised) household disposable income and expenditure by income decile and expenditure category, PLN/month

Expenditure category	1	2	3	4	5	6	7	8	9	10	All
1. Food & non-alcoholic beverages	523	546	570	591	624	676	689	742	768	855	658
2. Alcoholic beverages	14	14	16	19	23	28	32	40	48	82	32
3. Tobacco	38	41	38	37	41	45	44	53	51	51	44
4. Clothing & footwear	54	56	66	82	98	115	126	166	202	378	134
5. Home fuels, electricity & water	256	314	371	400	408	441	463	481	514	542	419
6. Housing & rents	61	82	98	107	127	145	157	174	226	316	149
7. Household goods & services	27	32	34	36	38	43	48	53	59	88	46
8. Health	60	81	104	109	127	140	146	170	178	254	137
9. Private transport	67	73	84	100	121	152	171	235	292	472	177
10. Public transport	17	18	21	23	23	27	31	33	37	48	28
11. Communication	71	81	89	97	107	116	124	139	153	181	116
12. Recreation & culture	67	79	91	98	114	135	150	177	221	371	150
13. Education	8	10	13	16	22	23	31	35	45	92	29
14. Restaurants & hotels	14	15	25	30	42	56	66	97	156	416	92
15. Other goods & services	57	65	79	83	109	115	133	159	206	333	134
Durables	53	48	65	75	107	110	153	182	212	547	155
Mean household income	1155	1712	2022	2326	2618	3021	3412	4007	4835	8971	3407
Mean total expenditure	1388	1554	1763	1904	2131	2366	2563	2936	3367	5027	2500

Notes: deciles are constructed on the basis of household disposable income equalised with the modified OECD scale, allocating the same number of households to each decile.

Source: HBS 2011

2.3 Comparison of variable distributions in HBS and EUROMOD input data

The following subsection gives an overview of the comparability of HBS and the EUROMOD input data. Table 11 presents the comparison of sample descriptives of the HBS for the year 2011 and SILC 2012. In general the variables match well, the main differences being a difference in car and computer ownership, and in economic status of the household head.

Table 11: Sample descriptives

	HBS	SILC
Household heads		
Mean age	50.7	51.0
Share of men	0.59	0.60
Primary education or less	0.18	0.21
Secondary education	0.59	0.53
Higher education	0.22	0.27
Employed	0.63	0.71
Unemployed	0.02	0.03
Retired	0.30	0.19
Households		
Household size, mean	2.80	2.81
Number of children, mean	0.53	0.52
Number of active persons	1.89	1.90
Owns a car	0.52	0.68
Owns a computer	0.46	0.64
Central region	0.22	0.21
Southern region	0.22	0.21
Eastern region	0.17	0.17
North-western region	0.15	0.16
South-eastern region	0.10	0.11
Northern region	0.15	0.15

Note: variables presented in the table are self-reported

Source: HBS 2011, SILC 2012

In other cases there are almost no differences between datasets and overall one can conclude that there is a very good match between HBS and SILC data.

Figure 1: Household head/household characteristics, HBS vs SILC

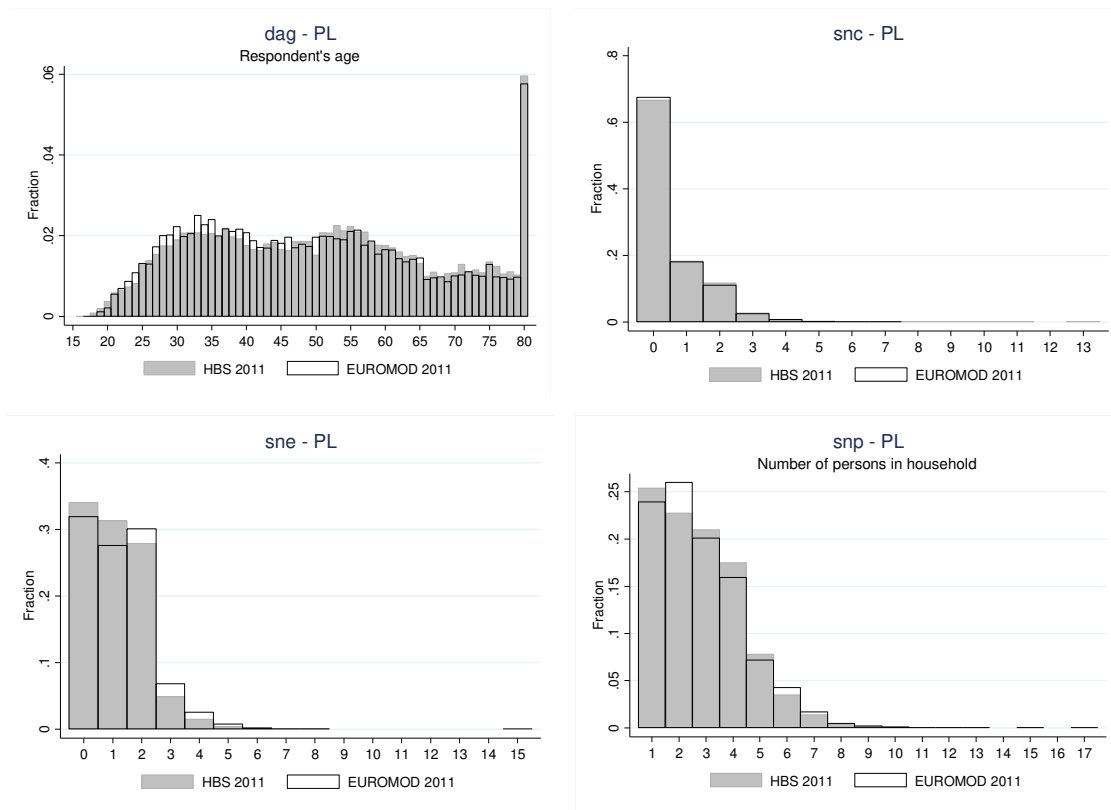
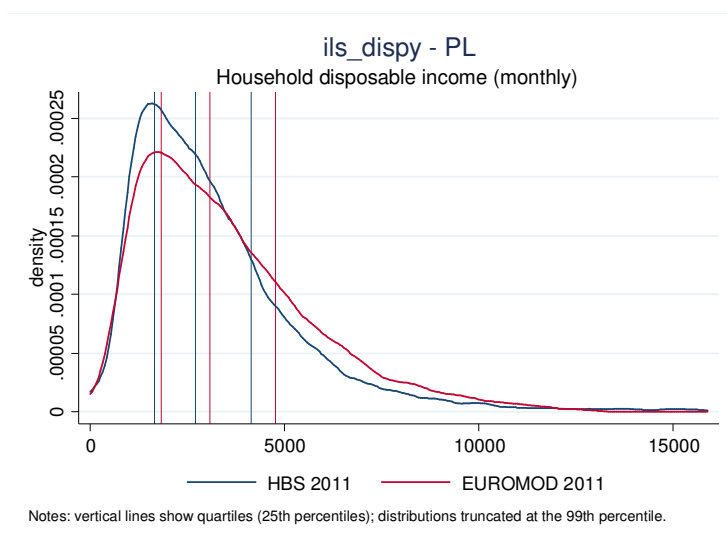


Figure 2 draws the kernel distribution functions of the disposable income in the SILC (as simulated using the 2011 policy system) and the HBS. We notice how the simulated disposable household incomes in SILC are generally higher than the ones observed in the HBS.

Figure 2: Household disposable income, HBS vs SILC



3. VALIDATION OF ESTIMATED ENGEL CURVES AND EXPENDITURES IMPUTED INTO EUROMOD

Table 14 presents the total expenditure and expenditures by category as observed in HBS, simulated in EUROMOD and observed in OECD data. EUROMOD simulations are very close to the expenditures observed in HBS. The three largest expenditure groups according to HBS and EUROMOD are food and non-alcoholic beverages, home fuels and durable goods. However according to the OECD statistics the two largest expenditure groups after food are other goods and services and private transport. In OECD data the differences between different expenditure groups are somewhat smaller than what we see in the HBS.

Table 14: Total annual expenditure by category: HBS (2011), EUROMOD (2011 simulations) and National Accounts (2011)

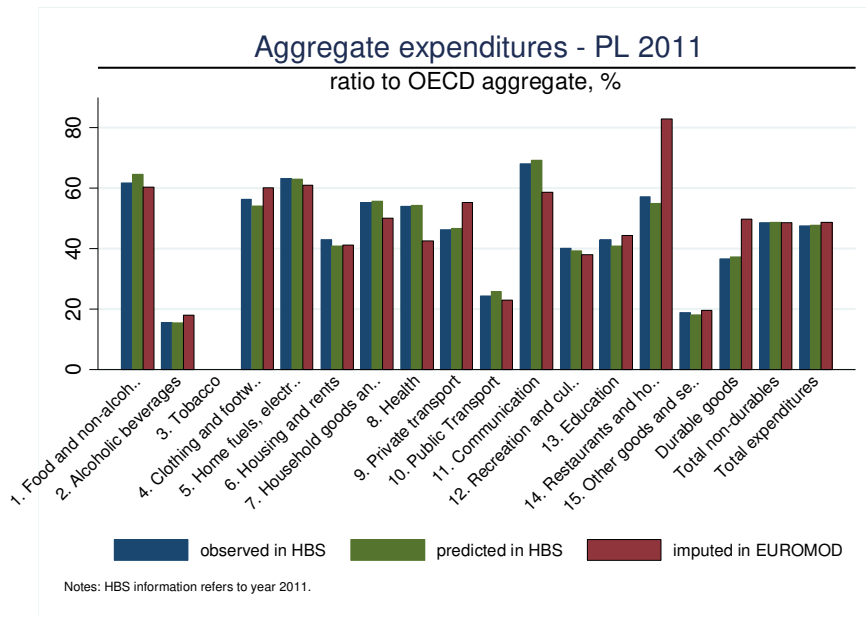
Expenditure category	Annual expenditure, million PLN			Share, %		
	HBS	EUROMOD	Nat.Acc.	HBS	EUROMOD	Nat.Acc.
1. Food & non-alcoholic beverages	107419	105172	173976	26.3	27.4	25.2
2. Alcoholic beverages	5166	5945	33108	1.3	1.3	1.4
3. Tobacco	7174	7075	n.a.	1.8	1.8	1.7
4. Clothing & footwear	21895	23383	38804	5.4	5.1	5.6
5. Home fuels, electricity & water	68375	66029	108193	16.8	16.6	15.8
6. Housing & rents	24394	23361	56664	6.0	5.6	5.6
7. Household goods & services	7464	6756	13485	1.8	1.8	1.6
8. Health	22342	17624	41333	5.5	5.5	4.2
9. Private transport	28845	34521	62318	7.1	7.1	8.3
10. Public transport	4516	4258	18471	1.1	1.2	1.0
11. Communication	18900	16271	27743	4.6	4.7	3.9
12. Recreation & culture	24536	23152	60891	6.0	5.8	5.5
13. Education	4797	4952	11154	1.2	1.1	1.2
14. Restaurants & hotels	14950	21703	26159	3.7	3.5	5.2
15. Other goods & services	21859	22838	115532	5.4	5.1	5.5
Durable goods	25275	34383	69047	6.2	6.3	8.2
Total non-durables	382632	383040	787830	93.8	93.7	91.8
Total expenditures	407907	417423	856877	100.0	100.0	100.0

Sources: HBS 2014, SILC 2012, OECD, EUROMOD

Next we look at how actual and imputed expenditure data compare across sources. From Figure 3 we can see that expenditures in the HBS (and imputed in SILC) can deviate quite substantially from the aggregates observed in the national accounts statistics (OECD). Total expenditures in the HBS make up only to 47.6% of total expenditures in the national accounts. Lowest coverage is achieved by expenditure on *alcoholic beverages* (15.6%), *public transport* (24.4%), and *other goods & services* (18.9%). There is not one single good for which observed total expenditures in HBS, or simulated expenditures exceed 70% of the national accounts total. There are no national account figures on the consumption of *tobacco products*.

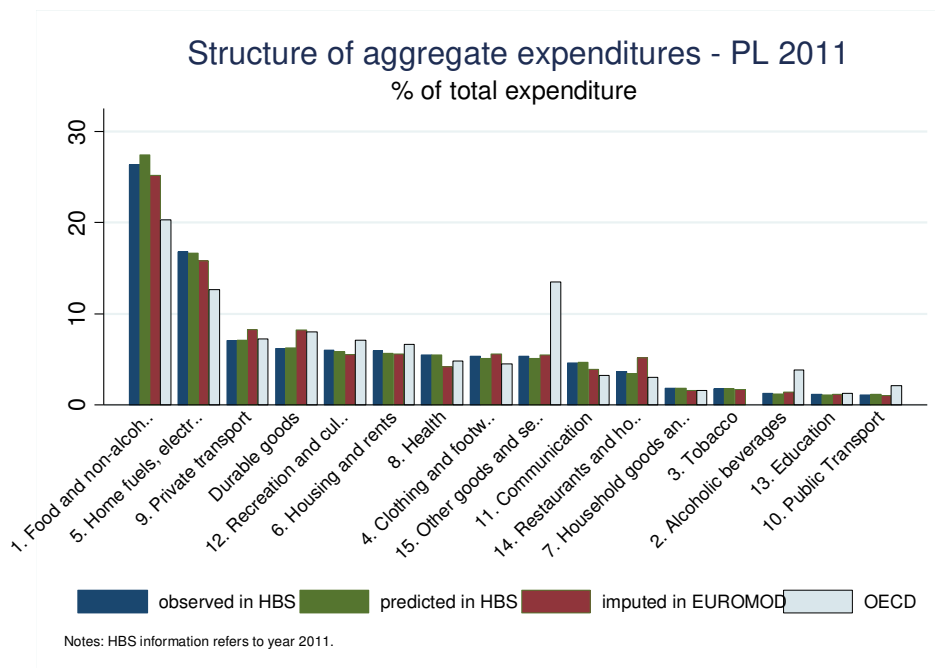
The match between actual HBS data and predictions into HBS is very good with almost no noticeable difference in most categories. Imputation into EUROMOD also matches up well with the actual HBS data. Total imputed expenditure covers around 102.3% of actual expenditure in the HBS. Biggest difference can be seen in *restaurant & hotels expenditures* with the simulated expenditure reaching 145.2% of the total observed in HBS. Imputed *health expenditures* are 78.9% of total health expenditures observed in the HBS.

Figure 3: Aggregate observed and imputed household expenditures by category, ratio to the OECD total, %



The most important expenditure category is durable goods, followed by food, and restaurant and hotel services, food and non-alcoholic beverages that makes up around a quarter of total expenditure according to the different data sources. From Figure 4 we can also see that in addition to the previously highlighted differences in expenditure figures there are noticeable differences in the structure of expenditures when comparing with the OECD data. Although the differences in the structure are not as big as was the case with aggregate expenditure.

Figure 4: Share of expenditures in HBS (2014), EUROMOD (2014 simulations) and OECD (2014) by expenditure category, % of total expenditure



Finally, Figure 5 shows for each non-durable expenditure category its share in total non-durable expenditure and the share of durable expenditure in total expenditure by ventile of household equivalised disposable income, comparing observed and predicted values in HBS 2014 with imputed values in SILC.

Figure 5: Observed, predicted and imputed expenditure shares by ventiles of household equivalised disposable income, %

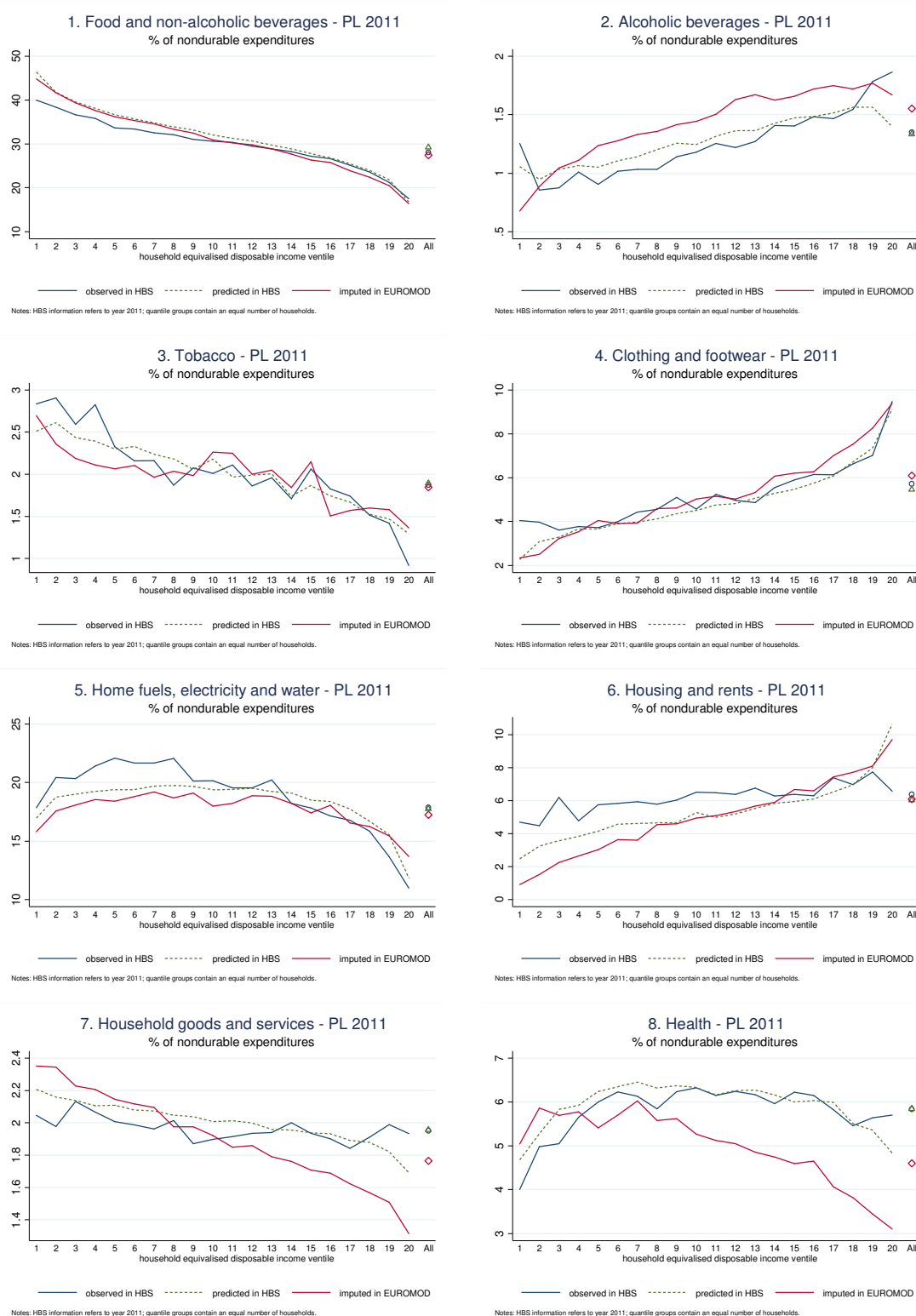
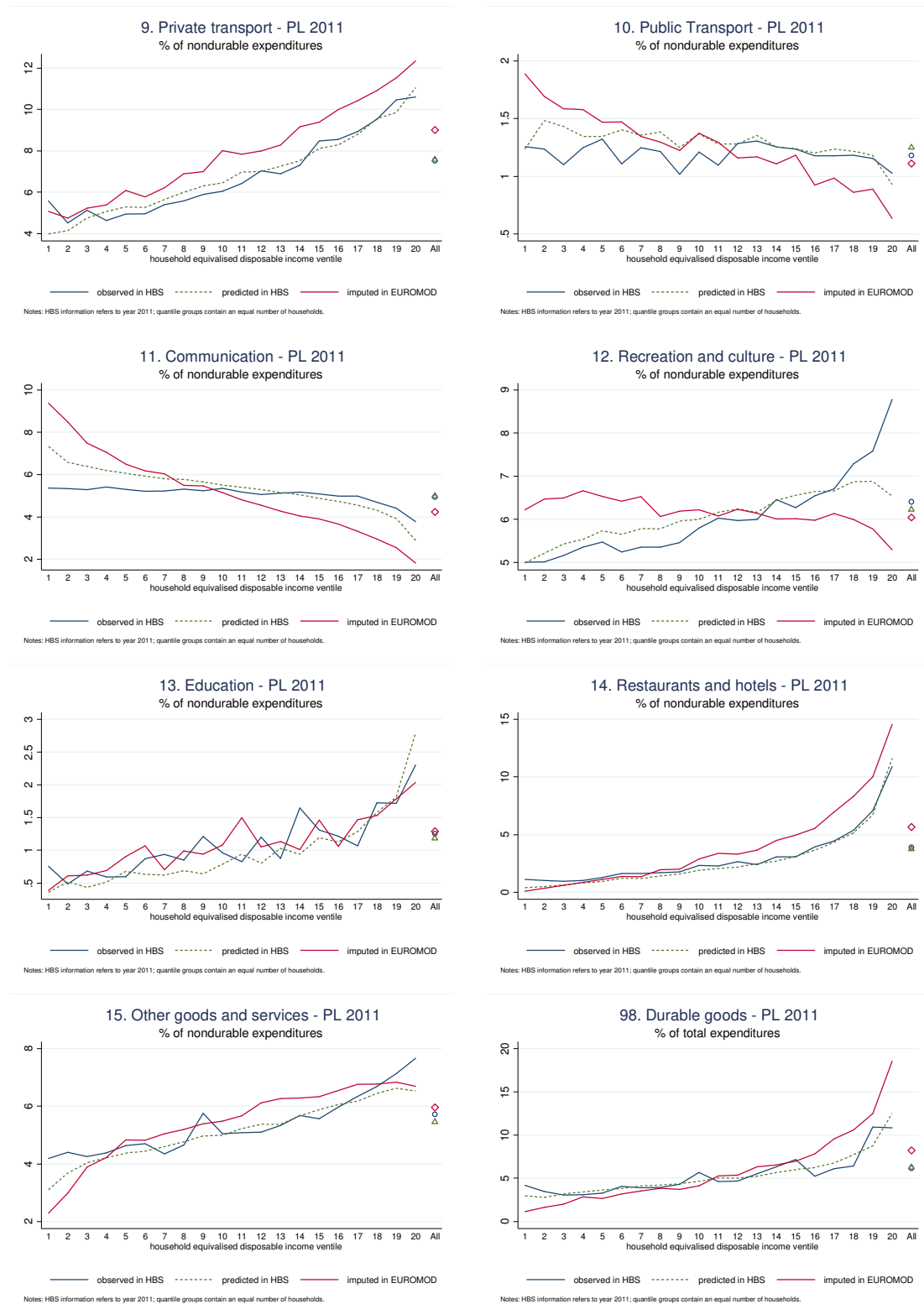


Figure 5: Observed, predicted and imputed expenditure shares by ventiles of household equivalised disposable income, %



Source: authors' calculations

Household expenditures for other years than 2014 are simulated in real terms, i.e. on the basis of 2011-2016 incomes up- or backrated to 2014. To obtain nominal expenditures and calculate indirect taxes for a given year, simulated real expenditures are then uprated - PL 2011 with the same

index. The index is based on actual year-on-year nominal growth of household consumption in 2012-2015 and forecasted nominal growth of private consumption in 2016.

4. VALIDATION OF INDIRECT TAX SIMULATIONS IN EUROMOD

Table 15 presents the implicit tax rate by expenditure category. Because VAT rates have remained unchanged during the observed period we only see changes in the implicit tax rates in categories that are subject to some type of excises. The highest taxed items are tobacco products, the second highest category is alcoholic beverages followed by private transport. In all these categories the relevant excises have been increased over the years and therefore we can see a rise in the implicit tax rate.

Table 15: Implicit indirect tax rate by expenditure category, % of expenditures, 2011-2016

Expenditure category	2011	2012	2013	2014	2015	2016
1. Food & non-alcoholic beverages	6.7	6.7	6.7	6.7	6.7	6.7
2. Alcoholic beverages	47.6	47.2	47.1	48.7	46.0	46.0
3. Tobacco	80.4	79.8	80.9	82.6	81.7	81.7
4. Clothing & footwear	17.1	18.6	18.6	18.6	18.6	18.6
5. Home fuels, electricity & water	17.9	18.5	18.5	18.5	18.5	18.5
6. Housing & rents	15.9	15.9	15.9	15.9	15.9	15.9
7. Household goods & services	18.7	18.7	18.7	18.7	18.7	18.7
8. Health	4.9	4.9	4.9	4.9	4.9	4.9
9. Private transport	39.2	37.5	38.2	39.0	41.6	41.6
10. Public transport	7.7	7.7	7.7	7.7	7.7	7.7
11. Communication	18.5	18.5	18.5	18.5	18.5	18.5
12. Recreation & culture	11.4	11.4	11.4	11.4	11.4	11.4
13. Education	0.0	0.0	0.0	0.0	0.0	0.0
14. Restaurants & hotels	11.9	11.9	11.9	11.9	11.9	11.9
15. Other goods & services	13.3	13.3	13.3	13.3	13.3	13.3
Durable goods	18.9	18.9	18.9	18.9	18.9	18.9

Source: authors' calculations, EUROMOD

For 2011 the total indirect tax amount estimated by EUROMOD made up 41.4% of the total relevant indirect taxes collected in Estonia. For excises the ratio remained between 15% to 26% and for VAT it was 51%. The issue about actual tax amounts is that they represent tax revenues from all sources. It is not possible to break the tax revenue down by taxes paid by the households and businesses. Low coverage of alcohol and tobacco excises can be explained by the underreporting of alcohol and tobacco expenditure. Low coverage of energy excise can be the result of a larger share paid by businesses. In the case of VAT it would make sense to assume that households would be responsible for the majority of collected VAT. The relatively low coverage can be partly explained by the HBS not capturing all the expenditure of the households. If we took all the expenses captured in HBS and allocated it as VAT taxable expenses then we would get coverage of still only 71%.

The coverage of total indirect taxes, especially that of VAT, drops slightly across the years. This can be explained by the expenditure data originating from the period of economic uncertainty. Data collected while households were still recovering from the effects of the crisis does not accurately represent the level of expenditure one might expect now.

Table 12: Indirect tax amounts 2011-2016 (million PLN)

		2011	2012	2013	2014	2015	2016
VAT	EUROMOD	54406	55823	56746	57767	56568	57703
	Actual	122647	116265	116607	122671		
	Coverage (%)	0.44	0.48	0.49	0.47		
Excises	EUROMOD	14476	14553	15106	15801	16217	16024
	Actual	63019	64438	65764	66131		
	Coverage (%)	0.23	0.23	0.23	0.24		
Total indirect taxes	EUROMOD	68882	70377	71852	73568	72786	73727
	Actual	185666	180703	182371	188802		
	Coverage (%)	0.37	0.39	0.39	0.39		

Sources: EUROMOD, OECD

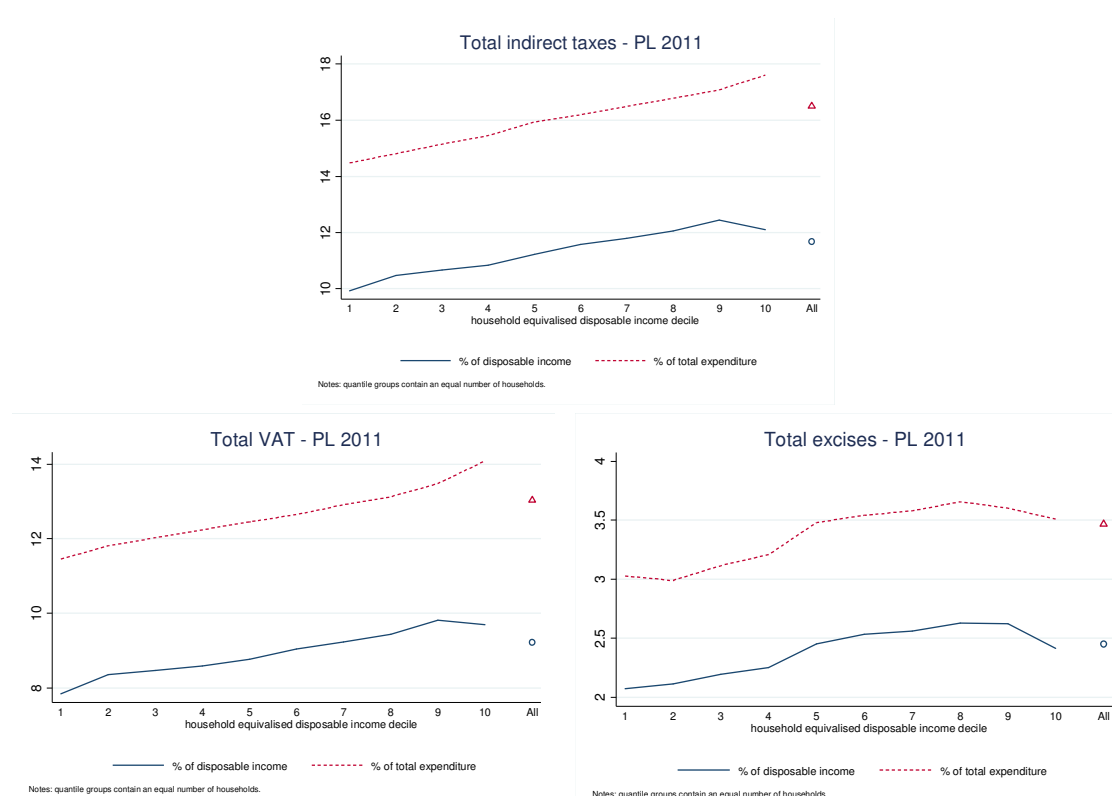
Table 13 presents the VAT and excises by each decile, as well as the share of household income each households spend –on average- in each income decile. Both VAT and excises are progressive with respect to income, as the bottom decile pays 7.8% of income on VAT and 2.1% on excises, the top decile pays 9.7% on VAT and 2.4% on excises (the 9th decile pays the highest share of income in taxes: 9.8% and 2.6% respectively. This information is graphically presented in Figure 6.

Table 13: Mean household income, expenditure and indirect taxes by income decile, in 2011 PLN/month

Income decile	Disposable income	Expenditure	VAT	Excises	Share of exp. in income (%)	Share of VAT in income (%)	Share of excises in income (%)
1	1085.7	743.8	85.2	22.5	68.5	7.8	2.1
2	1774.1	1255.0	148.2	37.5	70.7	8.4	2.1
3	2241.6	1578.9	189.9	49.2	70.4	8.5	2.2
4	2573.4	1805.6	221.0	57.9	70.2	8.6	2.3
5	2926.9	2062.7	256.9	71.8	70.5	8.8	2.5
6	3462.6	2476.9	313.3	87.8	71.5	9.0	2.5
7	3973.9	2842.3	367.0	101.8	71.5	9.2	2.6
8	4528.0	3255.2	427.2	119.0	71.9	9.4	2.6
9	5598.1	4076.3	549.4	146.9	72.8	9.8	2.6
10	8464.7	5826.2	820.7	204.5	68.8	9.7	2.4
All	3662.1	2591.7	337.8	89.9	70.8	9.2	2.5

Notes: deciles are constructed on the basis of household disposable income equivalised with the modified OECD scale, allocating the same number of households to each decile.

Source: EUROMOD

Figure 6: Incidence of indirect taxes by income decile, % of income and expenditure

Notes: deciles are constructed on the basis of household disposable income equivalised with the modified OECD scale, allocating the same number of households to each decile.

Source: EUROMOD

Table 14 summarizes the distributional information on VAT and excises by expenditure deciles, and expressing the average VAT and excises paid as expenditure of total expenditures. We can deduce that both VAT and excises are progressive in terms of expenditures: the lowest decile pays 6% of their income in VAT and 1.5% in excises, for the top decile this is respectively 10.2% and 2.5%.

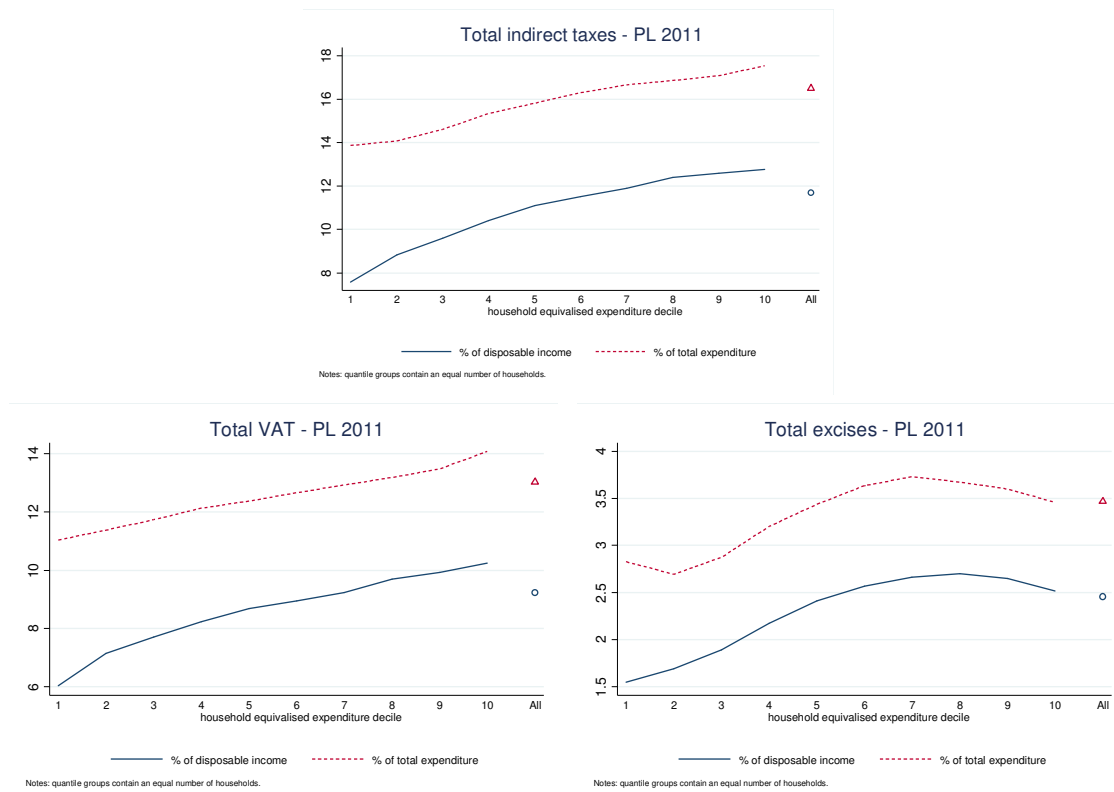
Table 14: Mean household income, expenditure and indirect taxes by expenditure decile, in 2011 PLN/month

Expenditure decile	Disposable income	Expenditure	VAT	Excises	Share of VAT in expenditure (%)	Share of excises in expenditure (%)
1	922.5	504.7	55.7	14.3	6.0	1.5
2	1514.8	950.3	108.2	25.6	7.1	1.7
3	2072.5	1361.1	159.7	39.1	7.7	1.9
4	2630.8	1784.6	216.5	57.1	8.2	2.2
5	3136.8	2199.8	272.3	75.6	8.7	2.4
6	3636.1	2568.8	325.3	93.4	8.9	2.6
7	4174.2	2978.0	385.1	111.1	9.2	2.7
8	4744.5	3489.4	460.2	128.2	9.7	2.7
9	5544.4	4084.1	550.6	147.0	9.9	2.7
10	8249.6	6000.7	845.1	207.5	10.2	2.5
All	3662.1	2591.7	337.8	89.9	9.2	2.5

Notes: deciles are constructed on the basis of household total expenditure equivalised with the modified OECD scale, allocating the same number of households to each decile.

Source: EUROMOD

Figure 7: Incidence of indirect taxes by expenditure decile, % of income and expenditure



Notes: deciles are constructed on the basis of household total expenditure equivalised with the modified OECD scale, allocating the same number of households to each decile. Source: EUROMOD

5. REFERENCES

EUROSTAT

Kompendium Statystyczne Służby Celnej 2010-2014

Ministry of Finance, Stawki Akcyzy, <http://www.finanse.mf.gov.pl/akcyza/stawki-akcyzy>

OECD.Stat: <https://stats.oecd.org/>

6. ANNEX

Table 15: Overview of reduced VAT product categories (2011)

Standard rate	
Reduced I (8%)	Housing renovation, processed food, chalk and dolomite, meat, fish, bread, flour produce, oils and fats, soups, fodder, fertilizer, non-educational books and newspapers, sanitary products, pharmaceuticals and medical articles, farming services, communal services (e.g. waste, water), transportation, restaurant and accommodation services, cultural and recreational services, funeral services
Reduced II (5%)	Basic food products (bread, dairy products, processed meat, grain products, pasta, juice processed fish, plants and vegetables) and educational books and magazines
0%	Import and export of goods within the EU, sea, air and international transportation, tourist services
Exempted	Post services, healthcare, education services, goods and services made by political, union or religious organizations, sport services (non-profit), cultural services (public and individual artists), renting (housing and land), financial services, social care

Source: Dz.U. 2004 nr 54 poz. 535, with further changes

Table 16: Index factor used for imputing expenditures

Year	Index factor (2011=100)
2005	100.0
2006	101.0
2007	103.5
2008	107.9
2009	111.6
2010	114.6
2011	119.5
2012	123.9
2013	125.0
2014	125.0
2015	123.9
2016	123.1

Source: OECD household expenditure data, Ministry of Finance spring 2016 forecasts, own calculations