

Online Appendix

“Estimating the Effect of Immigration on Public Finances: Evidence from the influx of Venezuelan migrants to Colombia”

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A. Incidence of indirect taxes, tariffs, and import duties

This online appendix contains the estimates on the incidence of indirect taxes, tariffs, and import duties on households’ income and expenditure.

A.1. Unit of analysis

In this section we use as the unit of analysis the expenditure unit of the household. We thus make a distinction between the members of the household and the expenditure unit. The expenditure unit considers all members of a particular household who are related by blood, marriage, adoption, or other legal arrangements. In other words, it considers only the members of the household after excluding domestic workers, their children, and those living as a roomer in a private home or lodging house. The expenditure unit is usually the core of all consumption decisions within a household.

The data we will use in this section allows us to estimate the total income, of the household but not the total expenditure. However, both items can be estimated for the expenditure unit. Now, we will refer to the unit of analysis interchangeably as the expenditure unit or household.

A.2. Data and additional sources of information

In order to estimate the incidence of indirect taxes, tariffs, and import duties between 2013 and 2018 on the income and expenditure of households, we used the 2014 Quality of Life Survey (*Encuesta de Calidad de Vida—ECV*) and the 2016-2017 Household Income and Expenditure Survey (*Encuesta Nacional de Presupuestos de los Hogares—ENPH*) carried out by Colombia’s National Department of Statistics (DANE). These surveys consist of a sample of over 20,000 households and 67,000 nationally representative individuals. A limitation of both surveys is the lack of an identifier for the country of origin, which does not allow us to separately identify consumption patterns for natives and immigrants. In this sense, we have to assume both groups have similar consumption decisions. Taking into account that Colombia and Venezuela share cultural traits, this does not strongly weaken the assumption.

Both surveys allow us to estimate the total spending of the household from eight types of expenditure grouping a little more than 100 categories of items or

services that make up the main expenditures: food, early childhood and education, health, clothing expenses and footwear, services and equipment for housing, culture and recreation, transportation and communications, and other household expenses. We apply the tax structure in place in 2014, 2016 and 2017. Since by the end of 2016 the Congress approved changes to the tax system, particularly changes to indirect taxes, it is important to split the HIES sample according to the year each household was surveyed. Overall, this splits the sample 50/50. We construct the income deciles from the annualized information of the expenditure unit.

In addition, we use the information from DANE's supply and use tables from the National Accounts System to estimate the incidence of tariffs and import duties.

A.3. Methodological approach to the incidence of taxes, tariffs, and import duties

To estimate consumption and taxation patterns, we will use the following methodology, based on the work of Steiner and Cañas (2014):

- $Expenditure_{hi}$: Household expenditure level (h) for each of the goods (i).
- $Consumption_{hi}$: Household expenditure level (h) for each of the goods (i) after deducting indirect taxes.
- τ_i : Tax rate with which the consumption of each good (i) is taxed.
- EIT_{hi} : Expenditure of the household (h) on indirect taxes on each of the goods (i).
- EIT_h : Total expenditure of the household (h) on indirect taxes.

Then we can estimate the total expenditure of the household by using the following relations:

1.
$$Consumption_{hi} = \frac{Expenditure_{hi}}{(1 + \tau_i)}$$
2.
$$EIT_{hi} = Expenditure_{hi} - Consumption_{hi}$$
3.
$$EIT_h = \sum_{i=1}^n EIT_{hi}$$

Based on the above, we estimate the effective tax rate (ETR), defined as the proportion of the total income—or expenditure—of the expenditure unit (TIEU) used to pay indirect taxes, tariffs or import duties. Such rate is estimated using the following equation:

$$4. \quad ETR_h = \frac{EIT_h}{TIEU_h}$$

Now, the total income of the expenditure unit is used to create the deciles. This corresponds to the sum of current income (monetary and non-monetary) including income received by children under 12 years of age, transfers (from entities or households), benefits and other current income, the imputation of the estimated rent for homeowners, de facto occupants of a dwelling or in usufruct, and occasional monetary income. On the expenses side, we use the sum of the current and occasional expenses of the household (monetary and non-monetary), including the personal expenses of each of its members, but excluding the expenses of domestic workers, their children, and those living as a roomer in a private home or lodging house. Additional exercises including self-consumption and self-supply as part of income and expenses were carried out but are not presented here.

To estimate the incidence of tariffs and import duties for each expenditure group we use the information on total revenues from tariffs and import duties, the value of imported goods and services—including tariffs and import duties, and the value of total supply after mark-ups, taxes, and subsidies. We then compute the share of tariffs and import duties in the final value of imported goods and services, and the share of imported goods in the total supply. We then apply these shares to the total spending of the household.

A.4. Adjustments for inconsistencies in the reporting of information

In order to correct possible biases generated by extreme or atypical values in the information reported in the surveys, the following adjustments were made to the sample: (1) for all observations with income equal to zero and expenses greater than zero, the value of the expenditure variable was imputed as income; (2) the sample is restricted to those observations for which its distance from the third quartile, as a proportion of the interquartile range, is less than three;¹ (3) observations with an income lower than $\frac{1}{4}$ of the monthly minimum wage are excluded [see Ramírez and Molina (2003)]. By doing so we expect to reduce the information bias caused by households that report very low income that does not fit the household consumption pattern. (4) Lastly, households with an expenditure / income ratio greater than 2.5 are excluded in order to avoid the overestimation of spending for the payment of indirect taxes, thus avoiding the presence of consumption levels that are not achievable with the reported income level. The last two adjustments are a common problem in household surveys as the data comes from self-reported information.

¹ Although this rule is more restrictive and significantly reduces the income ‘cap’, the results for the highest deciles do not show a significant variation. In any case, this does not affect the analysis.

Table A1

Household monthly income and expenditure by income decile, including self-consumption and self-supply

Income decile	Number of households			Mean income of the household			Mean expenditure of the household			Expenditures/Income Ratio		
	2014	2016	2017	2014	2016	2017	2014	2016	2017	2014	2016	2017
1	1,290,535	1,326,290	1,363,078	366,366	619,030	631,606	498,575	842,681	854,485	1.36	1.36	1.35
2	1,257,551	1,326,858	1,412,415	610,566	926,406	922,142	764,662	1,079,394	1,068,993	1.25	1.17	1.16
3	1,240,650	1,326,620	1,314,310	789,433	1,111,353	1,165,713	913,745	1,175,447	1,214,861	1.16	1.06	1.04
4	1,262,738	1,337,571	1,388,202	971,850	1,356,355	1,366,724	1,069,454	1,306,476	1,335,077	1.10	0.96	0.98
5	1,264,014	1,360,313	1,337,324	1,189,968	1,598,572	1,606,057	1,199,923	1,435,857	1,463,946	1.01	0.90	0.91
6	1,262,013	1,279,957	1,361,960	1,463,835	1,894,319	1,898,333	1,364,199	1,604,425	1,626,414	0.93	0.85	0.86
7	1,263,756	1,326,348	1,382,746	1,826,395	2,159,337	2,175,143	1,629,991	1,711,710	1,766,374	0.89	0.79	0.81
8	1,262,402	1,325,726	1,342,984	2,376,830	2,520,218	2,637,979	1,967,250	1,891,348	1,991,666	0.83	0.75	0.75
9	1,262,269	1,339,146	1,370,390	3,350,499	3,332,854	3,565,383	2,568,828	2,274,601	2,504,331	0.77	0.68	0.70
10	1,262,684	1,313,271	1,355,319	7,974,389	6,779,020	7,189,811	5,620,368	3,578,479	4,208,419	0.70	0.53	0.59
Total	12,628,613	13,262,100	13,628,727	2,090,946	2,356,424	2,348,627	1,758,716	1,750,468	1,824,547	0.84	0.74	0.78

Source. Authors' calculations using data from the 2014 ECV and 2016-2017 ENPH.**Table A2**

Household monthly income and expenditure by income decile

Income decile	Number of households			Mean income of the household			Mean expenditure of the household			Expenditures/Income Ratio		
	2014	2016	2017	2014	2016	2017	2014	2016	2017	2014	2016	2017
1	1,265,532	1,326,290	1,363,078	325,000	536,406	551,064	453,631	777,076	792,990	1.40	1.45	1.44
2	1,265,309	1,326,858	1,412,415	571,551	853,836	865,937	715,785	1,005,021	1,009,866	1.25	1.18	1.17
3	1,259,144	1,326,620	1,314,310	757,115	1,059,802	1,088,293	885,924	1,119,774	1,144,307	1.17	1.06	1.05
4	1,262,212	1,337,571	1,388,202	939,718	1,325,763	1,331,800	1,041,606	1,259,583	1,281,210	1.11	0.95	0.96
5	1,262,628	1,360,313	1,337,324	1,158,949	1,546,377	1,560,237	1,148,570	1,363,310	1,403,395	0.99	0.88	0.90
6	1,272,442	1,279,957	1,361,960	1,440,562	1,830,740	1,814,569	1,367,366	1,529,713	1,539,092	0.95	0.84	0.85
7	1,252,824	1,326,348	1,382,746	1,802,306	2,075,798	2,167,908	1,612,715	1,639,133	1,728,733	0.89	0.79	0.80
8	1,265,938	1,325,726	1,342,984	2,348,684	2,514,574	2,564,658	1,945,261	1,839,194	1,901,179	0.83	0.73	0.74
9	1,259,790	1,339,146	1,370,390	3,324,309	3,321,237	3,520,593	2,527,952	2,220,453	2,415,530	0.76	0.67	0.69
10	1,262,795	1,313,271	1,355,319	7,936,389	6,748,541	7,161,976	5,581,321	3,497,135	4,098,913	0.70	0.52	0.57
Total	12,628,613	13,262,100	13,628,727	2,059,728	2,315,583	2,299,887	1,727,497	1,688,296	1,754,419	0.84	0.73	0.76

Source. Authors' calculations using data from the 2014 ECV and 2016-2017 ENPH.

Table A1 shows the average monthly income and expenditure of the household in each income decile for the years 2014, 2016 and 2017. The average monthly income of the household in decile 10 went from under 22 times that of the first decile in 2014 to over 11 by 2017. Now, these relationships are cut in half when looking at average expenditures. On the other side, the expenditures/income ratio per decile decreases as the average income increases, going from around 1.36 pesos spent for each peso of income for the first decile to about 0.5-0.70 pesos spent for each peso of income in the last decile. It is interesting that around half of the households the expenditures/income ratio is greater than 1 in 2014, that is, their total expenses exceed their total income. However, this relationship is slightly reduced when self-consumption and self-supply are excluded (Table A2) and declined for almost all deciles except the first one during 2016-2017.

A.5. Results

Only the results excluding self-consumption and self-supply in income and expenses are presented below, taking into account that this information is not available in the Labor Force Survey.

Indirect taxes

Tables A3 to A5 show the aggregate incidence of indirect taxes as a proportion of household's income and expenditure by income decile, using different definitions of income. The results indicate that while high-income households spent more of their expenditures on indirect taxes, as a proportion of their income, the burden of indirect taxes is lower. On average the incidence of indirect taxes on both incomes and expenditures of households increased over the years. While the latter is consistent with changes in the tax structure, this suggest that household's income and expenditures have increase at a slower pace. The incidence of indirect taxes for the different measures of income and expenditure range from 5.0-6.7% on average across all years. In addition, our estimates show that the changes in tax rates from 2014 to 2017 affected more heavily the lower-income households.

When we look at the breakdown by type of tax (Figures A1 to A3), in general, the value-added tax is the largest component of indirect taxes averaging over 4% of households' income, followed by consumption tax and fuel taxes (fuel tax, surcharge on gasoline and diesel, and carbon tax). In last place are the taxes on alcohol (beer, wine and spirits) and tobacco. Again, the proportion of income that is spent on VAT is higher for the poorest decile than for the richest decile. In the case of expenditures that increase as a function of the income level of the household (e.g., consumption, fuel and, to a lesser extent, tobacco), the incidence of taxes is slightly higher for the highest deciles.

Table A3

Total incidence of indirect taxes using the total current income

Income decile	Per capita income			Per capita expenditure			Effective tax rate: income (%)			Effective tax rate: expenditure (%)		
	2014	2016	2017	2014	2016	2017	2014	2016	2017	2014	2016	2017
1	1,349,811	1,535,865	1,587,218	1,842,464	2,104,868	2,101,977	5.091	6.561	8.205	3.624	4.262	5.864
2	2,171,308	2,534,472	2,599,687	2,652,740	3,050,283	3,089,521	4.801	5.824	7.242	3.787	4.653	5.845
3	2,870,252	3,375,482	3,440,864	3,282,137	3,812,152	3,784,450	4.859	5.405	6.880	4.000	4.599	5.980
4	3,625,626	4,309,111	4,352,243	3,948,370	4,573,127	4,694,473	4.629	5.524	6.656	4.038	5.031	5.928
5	4,576,366	5,348,605	5,429,351	4,739,591	5,187,136	5,480,414	4.884	4.783	6.842	4.323	4.617	6.208
6	5,751,931	6,589,150	6,761,567	5,579,573	6,276,592	6,429,987	4.419	5.070	5.811	4.357	5.055	5.835
7	7,278,177	8,205,195	8,528,514	6,914,617	7,259,464	7,949,265	4.599	4.656	5.890	4.596	4.945	6.027
8	9,554,873	10,500,000	11,300,000	8,787,628	8,700,517	9,728,272	4.653	4.465	5.713	4.748	5.047	6.222
9	14,000,000	14,900,000	16,800,000	11,800,000	11,800,000	14,200,000	4.522	4.554	5.692	4.941	5.298	6.329
10	38,900,000	37,700,000	45,800,000	29,500,000	32,000,000	33,300,000	4.311	4.320	5.102	5.348	5.909	6.509
Total	9,000,945	9,498,223	10,600,000	7,906,539	8,472,453	9,069,062	4.677	5.121	6.405	4.376	4.943	6.074

Notes. We annualized the income and expenditures of the household. Indirect tax estimates are computed using both the frequent and occasional expenses. Self-consumption and self-supply expenses are excluded from the estimates. The reported per capita income is the current income. *Source.* Authors' calculations using data from the 2014 ECV and 2016-2017 ENPH.

Table A4

Total incidence of indirect taxes using the total current monetary income

Income decile	Per capita income			Per capita expenditure			Effective tax rate: income (%)			Effective tax rate: expenditure (%)		
	2014	2016	2017	2014	2016	2017	2014	2016	2017	2014	2016	2017
1	953,961	1,122,957	1,190,593	2,147,957	1,565,244	1,550,819	9.237	8.691	11.391	3.457	7.031	9.643
2	1,696,760	2,041,153	2,072,680	2,988,487	2,428,619	2,412,769	6.238	7.484	9.212	3.780	6.617	8.489
3	2,312,377	2,789,194	2,820,366	3,781,584	2,982,746	3,052,221	5.997	6.994	8.931	3.927	6.760	8.423
4	2,997,376	3,557,616	3,623,209	4,138,319	3,515,865	3,633,773	5.833	6.422	7.923	4.018	6.548	7.892
5	3,815,970	4,475,460	4,583,011	5,003,782	4,269,493	4,377,036	5.556	6.379	7.763	4.262	6.606	8.327
6	4,860,076	5,634,266	5,768,140	5,764,226	5,020,769	5,138,974	5.105	6.239	7.071	4.320	7.445	7.815
7	6,214,165	7,166,115	7,414,107	7,020,297	5,597,408	6,217,070	5.392	5.150	6.669	4.556	6.719	7.858
8	8,221,136	9,211,641	9,806,289	9,709,808	6,973,404	7,816,209	5.524	5.340	6.956	4.816	7.008	8.748
9	12,000,000	13,200,000	14,600,000	11,600,000	9,292,821	10,900,000	5.354	5.156	6.573	5.155	6.967	8.650
10	32,100,000	34,400,000	41,100,000	26,400,000	7,600,000	24,000,000	5.034	4.939	5.858	5.725	8.663	9.136
Total	7,502,766	8,314,392	9,266,001	7,845,345	5,903,879	6,902,180	5.929	6.284	7.837	4.400	7.032	8.498

Notes. We annualized the income and expenditures of the household. Indirect tax estimates are computed using both the frequent and occasional expenses. Self-consumption and self-supply expenses are excluded from the estimates. The reported per capita income is the current income. *Source.* Authors' calculations using data from the 2014 ECV and 2016-2017 ENPH.

Table A5

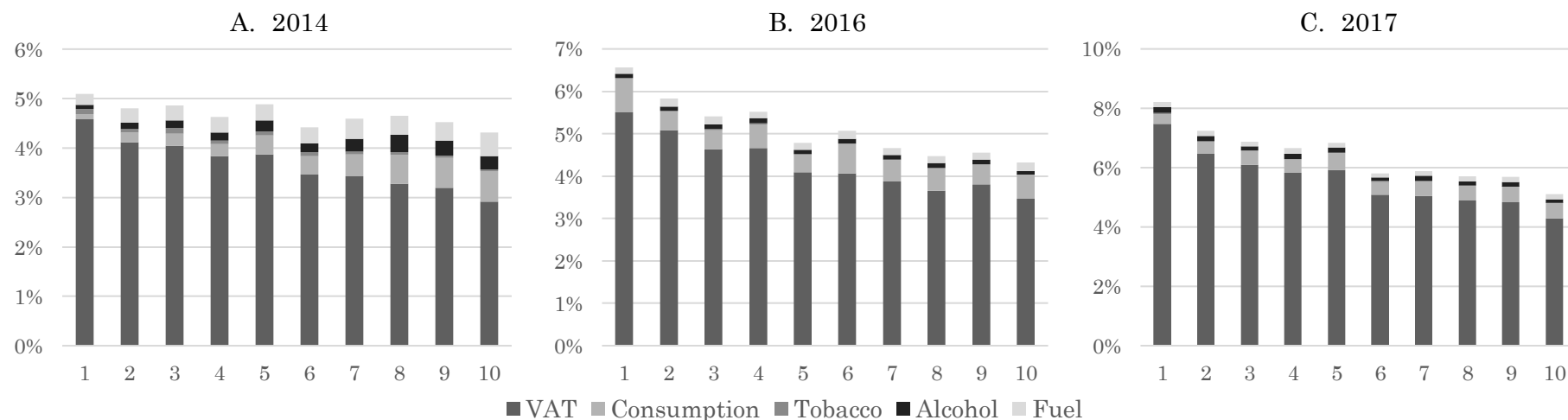
Incidence of indirect taxes from monetary expenditures using the total current monetary income

Income decile	Per capita income			Per capita expenditure			Effective tax rate: income (%)			Effective tax rate: expenditure (%)		
	2014	2016	2017	2014	2016	2017	2014	2016	2017	2014	2016	2017
1	953,961	1,122,957	1,190,593	2,147,957	1,565,244	1,550,819	5.305	5.624	7.149	2.563	4.093	5.382
2	1,696,760	2,041,153	2,072,680	2,988,487	2,428,619	2,412,769	4.620	5.367	6.647	2.924	4.529	5.709
3	2,312,377	2,789,194	2,820,366	3,781,584	2,982,746	3,052,221	4.492	5.051	6.672	3.029	4.696	6.089
4	2,997,376	3,557,616	3,623,209	4,138,319	3,515,865	3,633,773	4.226	4.793	6.372	3.068	4.689	6.244
5	3,815,970	4,475,460	4,583,011	5,003,782	4,269,493	4,377,036	4.356	4.703	5.962	3.341	4.752	6.124
6	4,860,076	5,634,266	5,768,140	5,764,226	5,020,769	5,138,974	3.799	5.108	5.865	3.266	5.592	6.438
7	6,214,165	7,166,115	7,414,107	7,020,297	5,597,408	6,217,070	3.859	4.137	5.641	3.389	5.154	6.469
8	8,221,136	9,211,641	9,806,289	9,709,808	6,973,404	7,816,209	4.301	4.468	5.668	3.753	5.592	6.811
9	12,000,000	13,200,000	14,600,000	11,600,000	9,292,821	10,900,000	3.810	4.366	5.640	3.867	5.913	7.261
10	32,100,000	34,400,000	41,100,000	26,400,000	17,600,000	24,000,000	3.454	4.159	5.277	4.084	7.181	8.232
Total	7,502,766	8,314,392	9,266,001	7,845,345	5,903,879	6,902,180	4.224	4.781	6.090	3.328	5.215	6.474

Notes. We annualized the income and expenditures of the household. Indirect tax estimates are computed using both the frequent and occasional expenses. Self-consumption and self-supply expenses are excluded from the estimates. The reported per capita income is the current income. *Source.* Authors' calculations using data from the 2014 ECV and 2016-2017 ENPH.

Figure A1

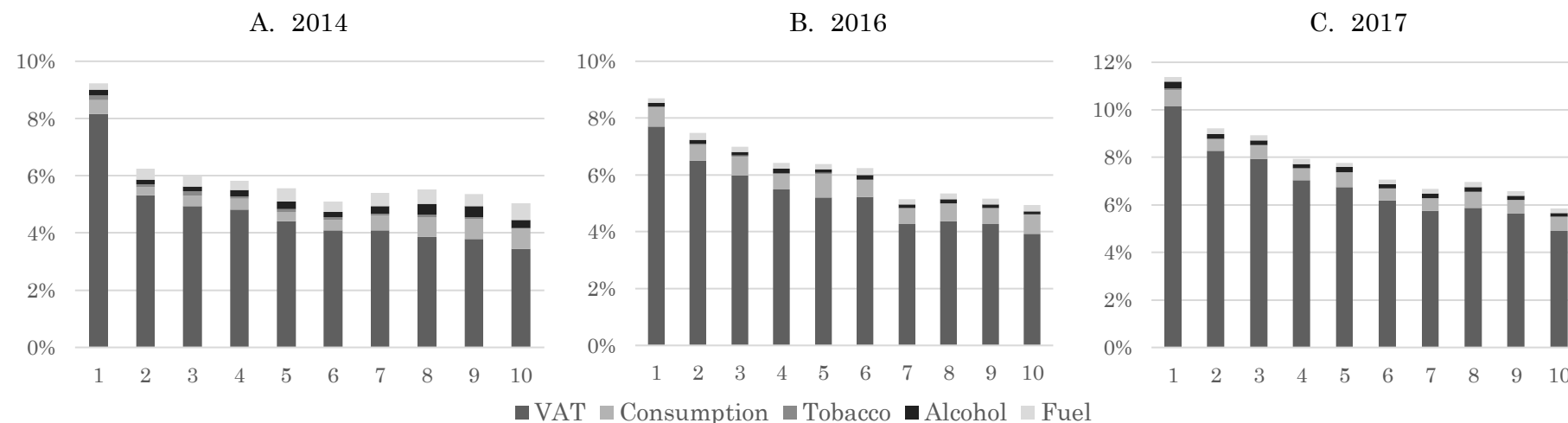
Tax incidence on the total current income by type of tax and income decile



Source. Authors' calculations using data from the 2014 ECV and 2016-2017 ENPH.

Figure A2

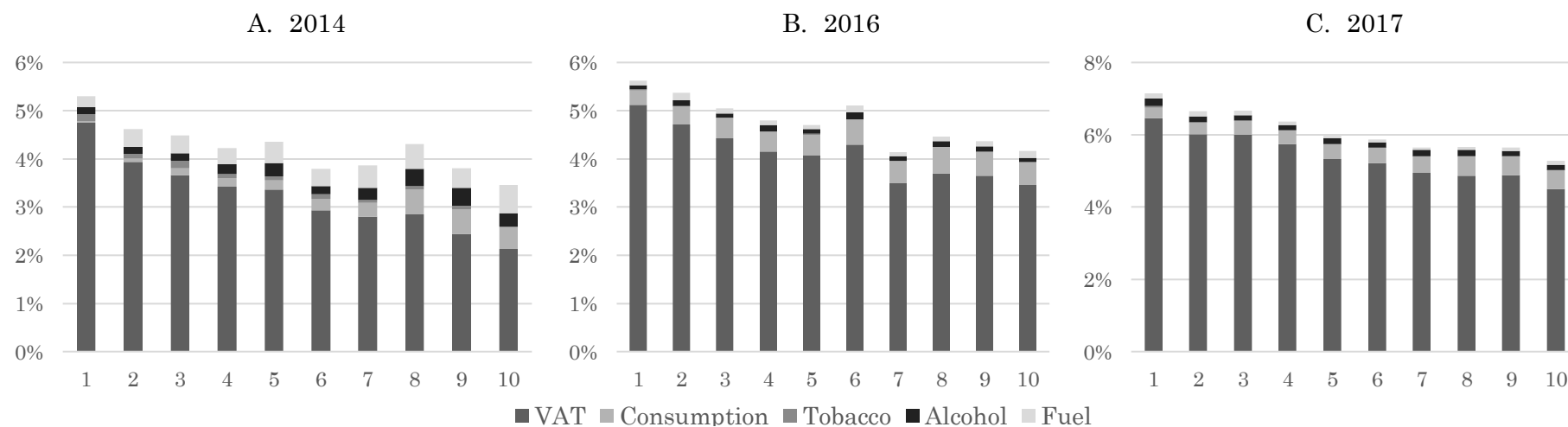
Tax incidence on the total current monetary income by type of tax and income decile



Source. Authors' calculations using data from the 2014 ECV and 2016-2017 ENPH.

Figure A3

Tax incidence on the total current income by type of tax and income decile, using monetary expenditures



Source. Authors' calculations using data from the 2014 ECV and 2016-2017 ENPH.

Tariffs and import duties

Tables A6 shows the total incidence of tariffs and import duties as a proportion of households' income by decile. We present estimates for the incidence of tariffs and import duties on the total current income, total current monetary income and total current income using monetary expenditures. On average the incidence of tariffs and import duties increased over time, from 0.22% in 2014 to 0.33% in 2016-2017 using the total current income. Now, the results show a higher incidence for low-income households, with a slight increase in the last deciles in most cases.

Table A6
Total incidence of tariffs and import duties

Income decile	Percent of total current income			Percent of total current monetary income			Percent of total current income using monetary expenditures		
	2014	2016	2017	2014	2016	2017	2014	2016	2017
1	0.235	0.676	0.454	0.423	0.695	0.638	0.201	0.425	0.356
2	0.214	0.404	0.363	0.312	0.531	0.473	0.169	0.360	0.320
3	0.226	0.353	0.339	0.269	0.461	0.435	0.155	0.318	0.316
4	0.209	0.330	0.332	0.309	0.383	0.399	0.149	0.290	0.303
5	0.252	0.292	0.322	0.224	0.354	0.389	0.135	0.277	0.282
6	0.179	0.290	0.304	0.220	0.338	0.356	0.125	0.273	0.283
7	0.210	0.267	0.279	0.290	0.320	0.320	0.121	0.241	0.265
8	0.221	0.276	0.266	0.222	0.335	0.326	0.118	0.269	0.256
9	0.200	0.279	0.284	0.230	0.313	0.322	0.105	0.247	0.267
10	0.230	0.266	0.309	0.271	0.304	0.351	0.092	0.275	0.298
Total	0.218	0.344	0.325	0.277	0.404	0.401	0.137	0.298	0.294

Notes. We annualized the income and expenditures of the household. We use both the frequent and occasional expenses. Self-consumption and self-supply expenses are excluded from the estimates. *Source.* Authors' calculations using data from the 2014 ECV and 2016-2017 ENPH.

References

- Ramírez, M. & Molina, D. (2003). Efectos distributivos del impuesto al valor agregado sobre el consumo de los hogares en Colombia. Una estimación no paramétrica. *Revista de Economía del Rosario*, 6(1), 23–52.
- Steiner, R. & Cañas, A. (2014). Tributación y equidad en Colombia. In Montenegro & Meléndez (ed.), *Equidad y movilidad social: diagnósticos y propuestas para la transformación de la sociedad colombiana*, Universidad de los Andes-Departamento Nacional de Planeación, 415–480.

B. Generating revenues and expenditures age profiles in the GEIH

The following list defines the variables used in the datasets derived from the GEIH data to generate the age profiles for taxes paid and benefits received. In addition, it describes source data, aggregates to which totals are normalized, and assumptions underlying tax revenue and various benefit and public cost flow calculations used in the fiscal impact estimates. Some flows are not attributable to individuals but instead can be assigned to everyone in the population on a per capita basis. Each measured flow is adjusted by a single multiplicative factor so that the population-weighted aggregate is consistent with totals of our budget estimates of government receipts and expenditures.

B.1. Individual and group characteristics

Variable	<i>year</i>
Definition	Year of pooled GEIH samples
Description	GEIH variable <i>year</i> .

Variable	<i>sex</i>
Definition	Sex
Description	0 Male 1 Female

Variable	<i>age</i>
Definition	Age
Description	GEIH individual-level variable <i>p6040</i> .

Variable	<i>immig</i>
Definition	Immigration groups
Description	0 Permanent natives 1 Returnees 2 Venezuelan-born, arrived less than 1 year ago 3 Venezuelan-born, arrived 1-5 years ago 4 Venezuelan-born, arrived more than 5 years ago 5 All other foreign-born

Variable	<i>educ</i>
Definition	Education group
Description	1 Less than HS 2 HS graduate 3 Some college 4 Bachelor's degree 5 Any post bachelors

Variable	<i>wgsal</i>
Definition	Wages and salary income
Description	GEIH individual-level variable <i>inglabo</i> .

Variable	<i>indep</i>
Definition	Independent person
Description	<p>0 Dependent 1 Independent</p> <p>We consider dependents any person (1) under the age of 18, (2) from 18 to 22 years old and enrolled full time in secondary education, or (3) from 18 to 22 years old in higher education or not, and who is working less than half time. If a person is married, they are considered independent, regardless of their age.</p>

Variable	<i>ndep</i>
Definition	Number of dependents
Description	Number of dependents for each independent person, excluding those not part of the household unit.

Variable	<i>emp</i>
Definition	Employment status
Description	<p>0 Not employed 1 Employed</p>

Variable	<i>fex12</i>
Definition	Individual sample weight
Description	Individual weight for the pooled sample, defined as GEIH individual-level variable <i>fex_c_2011</i> divided by 12.

B.2. General Government revenues

Variable	<i>inctx</i>
Definition	Income tax
Description	Own estimate using year-specific tax rates of the ordinary system applied to gross annualized taxable income. Our estimates include both the income tax for those individuals above the income threshold in each year and an estimate of tax withholdings for those not required to fil a tax return.

Variable	<i>ss_hlth</i>
Definition	Contributions to the contributory health care regime

Description	Own estimate using year-specific rates applied to the estimated Contribution Base Income for all employed or independent persons.
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Variable	<i>ss_colp</i>
Definition	social security contributions to COLPENSIONES
Description	Own estimate using year-specific rates applied to the estimated Contribution Base Income.

Variable	<i>ss_fgpm</i>
Definition	Social security contributions to the minimum pension guarantee fund (FGPM)
Description	1,5% of the estimated Contribution Base Income (IBC) for those enrolled in a private pension fund (RAIS).

Variable	<i>ss_fsp</i>
Definition	Social security contributions to the pension solidarity fund (FSP)
Description	Own estimate using year-specific rates applied to the estimated Contribution Base Income.

Variable	<i>ss_spr</i>
Definition	Social security contributions to special regimes (e.g., police and the national railway fund)
Description	Assigned equally to all employed or independent persons enrolled in a special regime.

Variable	<i>pt_sena</i>
Definition	Payroll taxes to SENA
Description	Own estimate using year-specific rates applied to the estimated base salary.

Variable	<i>pt_icbf</i>
Definition	Payroll taxes to ICBF
Description	Own estimate using year-specific rates applied to the estimated base salary.

Variable	<i>pt_esap</i>
Definition	Payroll taxes to ESAP
Description	Own estimate using year-specific rates applied to the estimated base salary.

Variable	<i>pt_inds</i>
Definition	Payroll taxes to industrial schools

Description	Own estimate using year-specific rates applied to the estimated base salary.
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Variable	<i>corptx_npo</i>
Definition	Corporate and capital taxes (national public ownership)
Description	Assigned equally to all natives.

Variable	<i>corptx_rhh</i>
Definition	Corporate and capital taxes (resident households)
Description	Assigned equally to all those receiving individual dividend and interest income.

Variable	<i>wlthtx</i>
Definition	Wealth tax (households)
Description	Assigned proportionately using our estimate of real estate values in the 90 th percentile for property owners.

Variable	<i>vattx</i>
Definition	Value-added tax (households)
Description	Own estimate using decile-specific effective VAT tax rates applied to households' gross income. We distribute each household's total payments in VAT to all members of the household using individual contributions to the household gross income.

Variable	<i>constx</i>
Definition	Consumption tax
Description	Own estimate using decile-specific effective consumption tax rates applied to households' gross income. We distribute each household's total payments in consumption tax to all members of the household using individual contributions to the household gross income.

Variable	<i>tobtx</i>
Definition	Tobacco tax
Description	Own estimate using decile-specific effective tobacco tax rates applied to households' gross income. We distribute each household's total payments in tobacco tax to all members of the household using individual contributions to the household gross income.

Variable	<i>alctx</i>
Definition	Alcohol taxes (beer, wine and spirits)

Description	Own estimate using decile-specific effective alcohol tax rates applied to households' gross income. We distribute each household's total payments in alcohol tax to all members of the household using individual contributions to the household gross income.
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Variable	<i>fueltx</i>
Definition	Fuel taxes (fuel tax, surcharge on gasoline and diesel, and carbon tax)
Description	Own estimate using decile-specific effective fuel tax rates applied to households' gross income. We distribute each household's total payments in fuel tax to all members of the household using individual contributions to the household gross income.

Variable	<i>impdut</i>
Definition	Import duties (households)
Description	Own estimate using decile-specific effective tariffs and import duties applied to households' gross income. We distribute each household's total payments in tariffs and import duties to all members of the household using individual contributions to the household gross income.

Variable	<i>mutx</i>
Definition	Motor vehicle tax
Description	Assigned equally to all households with ownership of a motor vehicle. The household's per capita contribution is split equally among all adult (18+) members.

Variable	<i>proptx</i>
Definition	Property tax (households)
Description	Own estimate using the real estate values for property owners. Each household's share in the property tax is distributed among the head of the household, his/her spouse or partner, and those members who report rental income and are classified as an independent person. We impute the average for all missing observations in each strata and bottom code to 1 million pesos.

Variable	<i>icatx</i>
Definition	Industry and trade tax (households)
Description	Assigned equally to all self-employed owning an industrial, commercial, or service business.

Variable	<i>gmftx</i>
Definition	Financial transactions tax (households)

Description	Own estimate using expenditures-to-income ratio by decile. We then allocate financial transactions tax using the share of each individual's expenditure among those with monthly expenditures above 350 units of tax value.
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Variable	<i>gos_avg</i>
Definition	Gross operating surplus, rents and royalties (average contribution)
Description	Assigned equally to all adults (18+).

Variable	<i>gos_mg</i>
Definition	Gross operating surplus, rents and royalties (marginal contribution)
Description	Assigned equally to all permanent natives.

Variable	<i>phtx</i>
Definition	Urban phones tax
Description	Assigned equally to all adults (18+) with access to a landline.

Variable	<i>edserv</i>
Definition	Educational services
Description	Assigned equally to all enrolled in higher education in public establishments.

Variable	<i>fomag</i>
Definition	National Teachers Pension Fund
Description	Assigned equally to all employees in the education sector classified as government workers.

Variable	<i>immcert</i>
Definition	Immigration certificates
Description	Assigned equally to all foreign-born.

Variable	<i>othtx</i>
Definition	All remaining tax payments, fees, fines and penalties, and other receipts
Description	Assigned equally to all adults (18+).

B.3. General Government expenditures

Variable	<i>ppgds_avg</i>
Definition	'Pure' public goods spending (average cost)
Description	Distributed on a per capita basis to the entire population.

Variable	<i>ppgds_mg</i>
Definition	‘Pure’ public goods spending (marginal cost)
Description	Distributed on a per capita basis to permanent natives.

Variable	<i>cpgds</i>
Definition	‘Congestible’ public goods spending
Description	Distributed on a per capita basis to the entire population.

Variable	<i>lawpri</i>
Definition	Law courts and prisons spending
Description	Distributed on a per capita basis by group. Per capita cost for each group (natives, Venezuelan-born, rest of foreign-born) is estimated using the share of each group in the prison population and applying these shares to total spending in <i>law courts and prisons</i> , then dividing equally among the total adult (18+) population in the GEIH in each case. Information on the nationality of prison inmates comes from the National Penitentiary and Prison Institute, INPEC.

Variable	<i>water</i>
Definition	Water supply spending
Description	Assigned equally to all households with access to water supply, divided equally among all household members.

Variable	<i>hcserv</i>
Definition	Health care services spending
Description	Assigned based on SGSSS enrollment (GEIH variable <i>p6100</i>) but weighted by total per capita personal health care cost by age group and regime from the Ministry of Health. We assign the complete value of the capitation payment unit (UPC) to those affiliated to either the contributory (including those affiliated to special regimes) or subsidized regime and 45% of the UPC for the subsidized regime as the cost of health services for those not affiliated.

Variable	<i>ed_comp_avg</i>
Definition	Education benefits: compulsory education (average cost)
Description	Assigned equally to all individuals [3,16] years old attending compulsory education in public institutions.

Variable	<i>ed_comp_mg</i>
Definition	Education benefits: compulsory education (marginal cost)

Description	Assigned equally to all individuals [3,16] years old attending compulsory education in public institutions, excluding those with residence less than 1 year.
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Variable	<i>ed_job</i>
Definition	Education benefits: job training
Description	Assigned equally to all enrolled in job training programs.

Variable	<i>ed_tert</i>
Definition	Education benefits: higher education
Description	Assigned equally to all enrolled in higher education in public establishments.

Variable	<i>sp_dis</i>
Definition	Social protection benefits: sickness and disability
Description	Assigned equally to all inactive population that left their last job within a year due to illness or accident.

Variable	<i>sp_pen</i>
Definition	Social protection benefits: pensions
Description	GEIH individual-level variables for pension income and Colombia Mayor (<i>p7500s2a1+p1661s3a1</i>). We impute the minimum wage for pension income for all missing observations that reported to have received the income, and the average for Colombia Mayor.

Variable	<i>sp_fch</i>
Definition	Social protection benefits: family and children
Description	GEIH individual-level variable <i>p1661s1a1</i> . We impute the average income (depending on the number of children in the household unit) for all missing observations that reported to have received the benefit. Allocation is made by adding all family and children benefits in a family unit and dividing evenly among all children 0-6 years old or 6-20 years that are enrolled in compulsory education. For those observations that report receiving the benefits but do not have children between those ages, we allocate the value evenly among all household members.

Variable	<i>sp_unem</i>
Definition	Social protection benefits: unemployment
Description	Assigned equally to all unemployment benefit recipients.

Variable	<i>sp_hous</i>
Definition	Social protection benefits: housing

Description	GEIH individual-level variables for income of all housing-related benefits claimants (2013-2015: p7500s2a1; 2016-2018: p1661s4a2). We impute the average subsidy for all missing observations that reported to have received the benefit. Allocation is made by adding all benefits in a family unit and dividing evenly among all household members.
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Variable	<i>sp_vul</i>
Definition	Social protection benefits: vulnerable population
Description	Assigned equally to all individuals classified as vulnerable (immigrants, internally displaced or in poverty).

Variable	<i>debt serv</i>
Definition	Interest payments on the debt
Description	Distributed on a per capita basis to the entire population. Allocation to immigrants (including returnees) is conditioned to the year of arrival to the country.

B.4. Summary variables

Variable	<i>totrev_avg</i>
Definition	Total revenues (average effect)
Description	Sum of the following variables: inctx, ss_hlth, ss_colp, ss_fgpm, ss_fsp, ss_spr, pt_sena, pt_icbf, pt_esap, pt_inds, corptx_npo, corptx_rhh, wlthtx, vattx, constx, tobtx, alctx, fueltx, impdut, mvtx, proptx, icatx, gmftx, gos_avg , phtx, edserv, fomag, immcert, ohtx

Variable	<i>totrev_mg</i>
Definition	Total revenues (marginal effect)
Description	Sum of the following variables: inctx, ss_hlth, ss_colp, ss_fgpm, ss_fsp, ss_spr, pt_sena, pt_icbf, pt_esap, pt_inds, corptx_npo, corptx_rhh, wlthtx, vattx, constx, tobtx, alctx, fueltx, impdut, mvtx, proptx, icatx, gmftx, gos_mg , phtx, edserv, fomag, immcert, ohtx

Variable	<i>totexp_avg</i>
Definition	Total expenditures (average effect)
Description	Sum of the following variables:

Variable	<i>totexp_mg</i>
Definition	Total expenditures (marginal effect)
Description	Sum of the following variables:

Variable	<i>totnet_avg</i>
Definition	Net total impact (average effect)
Description	Difference between revenues and expenditures in the <i>average</i> effect scenario= $\text{totrev_avg} - \text{totexp_avg}$

Variable	<i>totnet_mg</i>
Definition	Net total impact (marginal effect)
Description	Difference between revenues and expenditures in the <i>marginal</i> effect scenario= $\text{totrev_mg} - \text{totexp_mg}$

Variable	<i>rerat_avg</i>
Definition	Revenues to expenditures ratio (average effect)
Description	Ratio of revenues to expenditures in the <i>average</i> effect scenario = $\text{totrev_avg}/\text{totexp_avg}$

Variable	<i>rerat_mg</i>
Definition	Revenues to expenditures ratio (marginal effect)
Description	Ratio of revenues to expenditures in the <i>marginal</i> effect scenario = $\text{totrev_mg}/\text{totexp_mg}$

Variable	<i>defl</i>
Definition	GDP deflators
Description	Own estimate of GDP deflators (2018 prices) using information from the National Accounts reported by DANE