Appendix

The appendix contains five main sections:

1. The first section reviews the main data used in the research – data from the Household Expenditure Survey and administrative data on income and expenditure of the general government (henceforth also: the state).
2. The second chapter reviews the various attribution methods for every state tax and expenditure. Additionally, we review the research literature on tax incidence for each type of tax, i.e. who bears the tax burden among various actors: employers, employees, consumers etc.
3. The third chapter reviews state income and expenditure that were not attributed to households and discusses why.
4. The fourth chapter presents various sensitivity tests conducted to examine how consistent and durable the central analysis' estimates are when the research assumptions are changed.
5. The fifth chapter discusses the constraints of analyses of tax systems' progressivity and presents the distribution of transfers received by households and the taxes they pay as a proportion of their economic income.

1. Methods – Data

This chapter describes the data used for the various analyses presented in this paper - data from the Household Expenditure Survey and administrative data.

Household Expenditure Survey

The Household Expenditure Survey (hereinafter: the Survey) is one of the main surveys conducted by the CBS (Israel Central Bureau of Statistics). The CBS and the National Insurance Institute use it as the basis for calculating various key economic indicators: income from wages and other sources, expenditures on product consumption (which are also used to calculate price index weights), inequality indices, relative poverty rates, and more. During the survey response period, each household participating in the survey maintains a detailed expenditure diary for two weeks. Based on the diary data, the CBS calculates monthly expenditure estimates for the household (by inflating the expenditures). Additionally, the household is asked about larger expenditures (such as purchasing a refrigerator or a car) through a questionnaire, and is also asked about its income. Similar to the inflation of expenditures from the diary, the CBS estimates, for each household, large one-time expenditures from the questionnaire and spreads them over the months, so that a monthly expenditure estimate is obtained for these expenditures.

Sampling and Estimation Methods

The Survey's sampling method consists of two main stages: the localities sampling stage and the dwelling sampling stage within each area. After selecting the localities sample, the CBS sorts the dwellings within each area according to various geographic and demographic characteristics, so that the resulting sample has maximum geographic distribution and faithfully represents Israel's demographics. Since 2016, the Survey also includes residents of the Bedouin population, but does not include households in non-privatized *kibbutzim*. The Survey, in practice, covers 97% of the household population in Israel.

The estimation method is designed to reduce sampling errors and non-response errors. The CBS calculates an "inflation coefficient" (weight) for each household, defined as the inverse of the sampling probability, and indicates the number of households in the general population that the household in the Survey represents. For example, if the probability of sampling a particular household is 1/500, then its weight will be 500 and it represents 500 households in the Israeli population. The CBS calculates the inflation weights using various administrative data.

Consumption and Income Categories

The consumption data in the Survey is divided into categories by three levels of specificity:
1. Central Expenditure (Commodities) Items, consisting of two numerals, such as "c30 – food".
2. Secondary Expenditure Items, consisting of three numerals, such as "c302 – meat and chicken products".
3. Sub-items consisting of six numerals, such as "c302166 – chicken and turkey liver".

In the same manner, income data is divided into three levels of specificity:
1. Central Income Items, consisting of two numerals, such as "i24 – income from all allowances and support payments".
2. Secondary Income Items, consisting of three numerals, such as "i142 – income from other state institutions".
3. Sub-items consisting of six numerals, such as "i142042 – income from the Ministry of Construction and Housing".

The Household Expenditure Survey is based on a relatively large sample of households. The 2018 survey sampled 8,792 households in which 29,328 individuals resided, representing approximately 2.6 million households – and 8.5 million residents in the State of Israel. Despite the sample size, reporting on certain expenditures in the Survey is deficient and quite a considerable portion of households do not report on the consumption of certain items or the number of reporters is too low. Further breakdown of the sample into population or income groups may lead to too few observations.

In order to overcome these limitations and increase the statistical power, while maintaining the Survey's representativeness, we combined the files of the three years 2016-2018, so that our unified sample contains 26,664 households and 89,519 individuals. This sample allows us to estimate distributions of expenditures and income in a more reliable and accurate manner than when using a single annual survey. In order to combine the three surveys, we adjusted the inflation weights and monetary variables similarly to Karlinsky and Sarel (2019). We adjusted the weights according to the ratio between the number of households in the population in 2016 and 2017 and 2018, as described in Table 1. We then divided all weights by 3 in order to obtain the 2018 population.

We adjusted the monetary variables to 2018 terms by using the ratio of nominal GDP per capita between the years 2016 and 2017 to the year 2018 (Central Bureau of Statistics, 2022a). This correction also adjusts for changes in the prices of products and services over the years, as well as for quantitative (real) changes in the income and expenditure of households in Israel during the aforementioned period.

The adjustment ratios are depicted in Table 1.

Table 1 – Adjustment Ratios

Survey Year	Survey Weight Adjustment ratio	Monetary Amounts Adjustment ratio
2016	1.045	1.054
2017	1.027	1.029
2018	1	1

Administrative Data

This paper uses many sources for administrative data, detailed below:

1. National Expenditure on Health, and National Expenditure on Education (CBS, 2021a, 2021b) – to align the data from the Survey with the relevant administrative data on public funding of the health and education systems.
2. The National Insurance Institute's Monthly Bulletin of Statistics (National Insurance Institute 2018) – to attribute allowances and national insurance and health tax contributions to households in alignment with the administrative data. The National Institute's data include a breakdown of each allowance, as well as the total collection of National Insurance (tax) contributions. In addition, we used the Institute's 2018 financial report, to distinguish between monetary allowances and in-kind benefits.
3. The Government Finance Statistics (GFS) database. The GFS is the IMF's database, containing data on the income and expenditure of the member states' general governments. Using this database, we attributed some of the taxes paid by households, as well as some of the general government's expenditure to households.
4. Data from the Ministry of Education: the *Mabat LaChinuch* (a View of Education) data site that provides information on the number of students by age, and the *Shkifut B'Chinuch* (Transparency in Education) data site, that provides information of expenditure on education by various breakdowns (Ministry of Education, 2023a, 2023b).
5. The Finance Ministry's "fiscal digital" system website and other publications (Chief Economist Division, 2020, Ministry of Finance 2023). We attributed the fuel (blue) tax and tax on vehicle purchase according to these publications, since they include a wealth of detail on the relevant tax collection, such as the deduction of the fuel tax that the State of Israel collects on behalf of the Palestinian Authority, and breakdowns of various items in vehicle taxation. Additionally, we used this data to attribute to households the subsidy of public transportation.

A complete bibliographic list is found in the sources chapter of this appendix.

2. Methods – Elaboration on Tax and Expenditure Attribution

Taxes

The taxes included in this paper are: individual income taxes, VAT, National Insurance contributions and health tax, fuel tax, various consumption taxes (alcohol, tobacco, vehicle purchases), corporate tax, real estate taxes, financial VAT and non-profit VAT, property tax (residential and other, mainly business), customs duties and fees.

In order to attribute the tax burden of the various taxes to Israeli households, we must take into account the different distribution of the tax burden among the different actors in the market. For that purpose, we must distinguish between who is statutorily obliged to pay the tax and who pay it in practice. To answer this question of tax burden distribution, we made a thorough review of the literature, covering over 120 studies and position papers. In addition,

we were advised by leading researchers in the field who provided us with their views. The review literature divides the market into three main actors: consumers, workers, and capital owners (and employers). The aim of this review was to both empirically and theoretically examine what proportion of each tax is imposed on each of the different actors.

According to accepted economic theory, the economic tax burden varies according to the relative elasticities of the relevant demand and supply curves, so that the more elastic side bears a lower proportion of the burden. Empirically, a tax is considered a burden on consumers if its main effect is raising the prices of consumer products and services; a burden on workers if it reduces their income from wages; and a burden on capital owners if it decreases the income/return from capital.

It should be noted that many households take part in all these roles simultaneously: the individuals in the household are employed (and are therefore workers), they consume products and services (and are therefore consumers), and they possess capital assets (physical, financial, or business). Thus, finding that a certain tax is imposed mainly on workers or on capital owners does not mean that households do not bear the burden of this tax. In fact, every tax as such is paid by people. Even if the law imposes it on "products" or "companies" - the important question is who are the people who ultimately bear the tax burden, and not the language of the law regarding the identity of the taxpayer.

In this appendix, we present the findings regarding the distribution of the tax burden for the various taxes, according to the conclusions from the research literature review. In particular, we present the manner of distribution of the tax burden by income deciles as well as various sensitivity tests. In addition, we examine the alignment of the total tax estimated with the total tax collection according to the fiscal data, and correct the estimates so that they correspond to the external sources, as detailed for each tax.

Income and Capital Gains Taxes

Income tax is calculated on taxable income derived from the reports in the Household Expenditure Survey. The tax is calculated by the CBS on income from work, pensions and capital gains, and it appears directly in the household expenditure and income Survey data under item t211 - mandatory payments: income tax. This item also includes capital gains tax and other taxes imposed on income from capital; they cannot be separated in the Survey data.

Most of the research literature on the subject of income tax distribution among households (Bigot et al. 2014; Congressional Budget Office 2021; Falk 2018) assumes that it is imposed in its entirety on the taxpayer. However, there are empirical analyses showing that the tax burden is not entirely imposed on the taxpayer, but rather employers bear a portion, especially among high-wage workers (Bingley & Lanot, 2002; Hassett & Mathur, 2006). Since there is difficulty in empirically estimating the distribution of the income tax burden in a reliable manner, we chose to adhere to the assumption that the income tax burden is entirely transferred to the taxpayer. However, we also performed sensitivity tests that include different distributions of the income tax burden (as detailed later in the appendix). We found that the different assumptions we used for the sensitivity tests do not significantly affect the estimate of the tax burden distribution.

Similarly, we assume that capital gains tax is also entirely imposed on the taxpayer. The professional literature on the subject of the tax burden of capital gains taxes is sparse, and there are few studies dealing with the issue. A study in the United States, for example, on the stocks of real estate companies, used a change in the taxation that was relevant to some companies versus others in order to identify the actual tax burden (Sinai & Gyourko, 2004).

The study found that the burden falls almost entirely on the property buyer. In the absence of other evidence, we adopt this assumption.

According to the Survey, households paid a total of 73.334 billion shekels in income tax and capital gains tax in 2018. According to the Finance Ministry's "fiscal digital" system website's 2018 data, the total income tax stood at 91.4 billion shekels, and capital gains tax at 4.11 billion shekels. Together, these taxes came to 95.51 billion shekels in 2018. In order to reconcile between the Survey finding and the GFS data, we attributed the disparity according to the ratio of actual tax payment by households. That is, we multiplied the expenditure of each household by the ratio of 95.51/73.334.

The following Figures show the distribution of income tax and capital gains tax by household structure and resident children, as well as by income decile and population group.
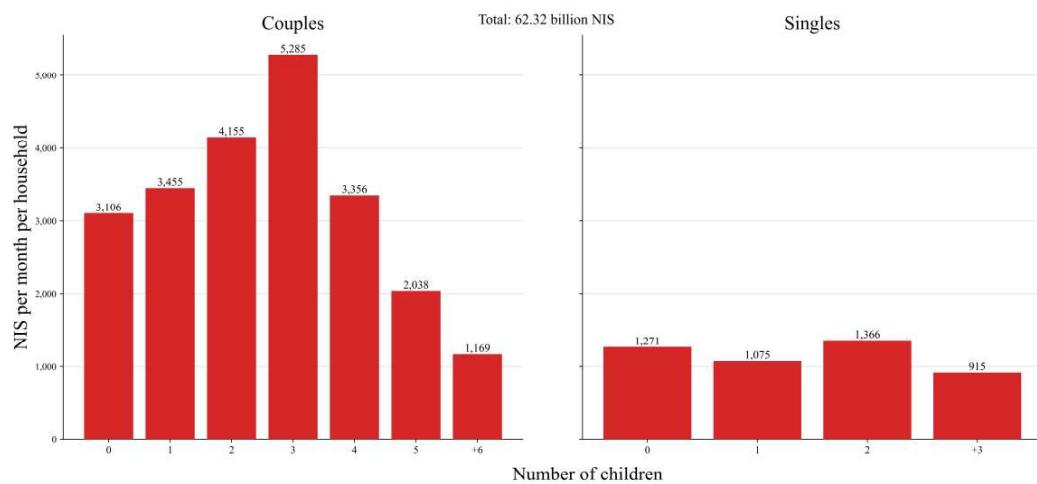
Figure 1

Figure 2
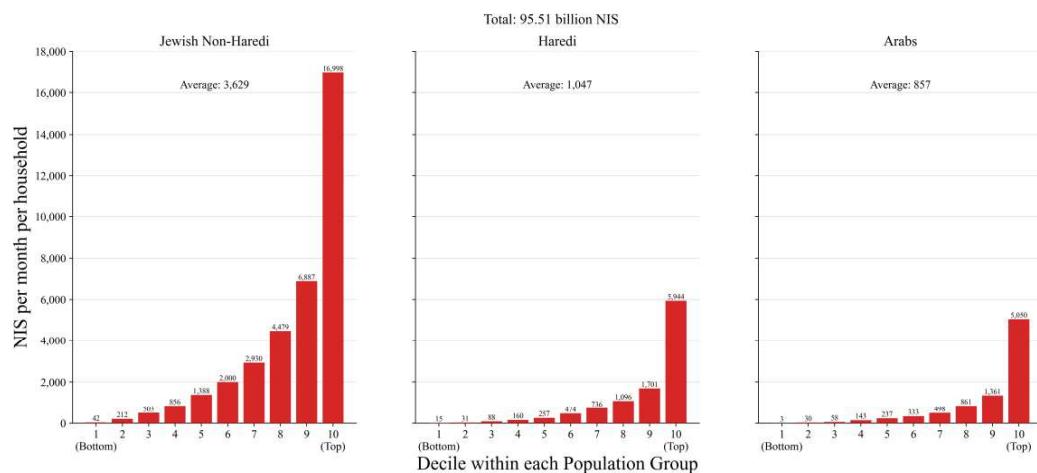
In addition to the papers mentioned above, our literature review included many papers that helped us attribute income tax and capital gains tax to households. ((Azémar & Hubbard, 2015; Gruber, 1997, 2000; Hamermesh, 1979).

Value Added Tax

Value Added Tax (VAT) is a tax imposed on the added value of a product or service. Producers and various parts of the production, supply, and sales chain offset the VAT they pay, and thus the actor considered to be the VAT payer is the entity at the end of the chain unable to offset it, and that is the final consumer. Indeed, although most of us have never visited the VAT offices and it is the sellers who transfer the payment to the tax authorities - it appears that the consumer is the one who bears the burden of payment while the sellers are merely a collection conduit.

The research literature that examines the distribution of the VAT burden at the macro level found that the VAT burden is imposed almost absolutely on the consumer (Benedek et al. 2015; Benzarti et al. 2020; Buettner & Madzharova 2021). In light of these conclusions, we continued to review the research literature regarding specific markets (Gaarder 2019; Montag et al. 2020). From these studies as well, it emerged that VAT is fully imposed on the consumer, especially when the VAT is uniform. There are several studies in which a reduction in the VAT rate on a certain group of products or services was not fully reflected in the consumer price - that is, the sellers took part of the reduction for themselves (Benzarti et al., 2020). The apparent conclusion arising therein is that sellers bear part of the VAT burden under a regular VAT regime as well - but these are short-term analyses, and under a non-uniform tax regime, with minimal relevance to Israel in the long term, where the VAT rate is uniform (aside from a few exceptions such as fruits and vegetables or a VAT exemption for the city of Eilat). In addition, we consulted with several leading researchers in the field: Felix Montag, Theiss Buettner, Dorian Carloni, George Obeng. In their assessment, the VAT burden falls entirely on the consumer, and this conclusion represents a certain consensus in the field.

On a theoretical level, the results of the empirical studies indicate that demand is much more rigid than supply. It is worth remembering that VAT is imposed on almost all consumption (generally and especially in Israel); therefore, the relevant market is not of any particular product (diapers, chairs, cellular services, etc.) but of "consumption" in general, wherein the demand for consumption is indeed quite rigid, while the supply is quite flexible. In other words, this is not a tax imposed on a specific product, in which situation consumers can shift their purchases to some substitute product, but rather on consumption in general, so that the only way to avoid the tax is through saving and/or deferring consumption - and therefore very limited (at least regarding products that cannot easily be purchased through VAT-exempt orders of personal packages from abroad or through duty-free purchases).

In summary, in our central examination we attribute the entire tax burden to consumers of products and services on which VAT is imposed. However, because this is a significant assumption that may substantially affect the results of this study, we also later performed sensitivity tests, examining how the results change if the assumption is that only part of the VAT burden falls on consumers.[1]

In order to calculate the VAT burden for each household according to the data appearing in the Survey, we used information about its total expenditure on consumption of products and services as well as the types of products and services consumed. Thus, we calculated a "VAT

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[1] To emphasize, the research assumption that the VAT burden (and other consumption taxes, as detailed below) is entirely imposed on the consumer is the clear conclusion emerging from the research literature. If this assumption is, in practice, incorrect, the distribution of VAT payment would be in fact more progressive – with households from the upper deciles paying more and households from the lower deciles paying less, when compared to the central estimate in this study, since the distribution of consumption among households is more equal than the distribution of income from work and from capital.

base" for each household reflecting the total purchases by the household of products and services on which VAT must be paid.

The VAT base was calculated for each household as the total of expenditure or monetary consumption, minus expenditure on fruits and vegetables, public housing fees, municipal taxes (like Arnona), union dues and donations (all these are exempt from VAT). Within the fruits and vegetables category are some subcategories of processed fruits and vegetables which incur VAT: frozen vegetables, pickled and preserved vegetables, pickled and preserved fruits and natural fruit juices. These expenditures were added back into the VAT base for each household. The savings section "Home Improvement" contains expenditures with VAT such as "kitchen cabinets" which were also added back into the VAT base. Furthermore, in order to take into account the VAT exemption in Eilat, we canceled the VAT expenditure for households residing in Eilat that can be directly identified in the Survey according to place of residence.[2]

Note that in order to account for VAT on the purchase of a new apartment, we added to the VAT base the attributed housing consumption - a calculation that allows us to "spread" the VAT payment on the purchase of a home in a regular monthly manner. Similarly, we included expenditures on rent in the VAT base, since the amount of rent is affected by the VAT collected when initially purchasing the apartment, even if there is no obligation to pay VAT on the rent itself.

Since the expenditure reported in the household expenditure and income surveys already includes VAT, the incidence of VAT on each household must be calculated in the following way:

$$\text{VAT Incidence} \ = \ \text{VAT Base} \times \frac{0.17}{1.17}$$

For example, if a household purchased clothing items totaling 100 shekels (including VAT) and the VAT rate is 17%, the total VAT paid amounts to 14.53 shekels.

Using this method, we estimate total VAT payments at 73.968 billion shekels in 2018, while the Finance Ministry's "fiscal digital" system website's 2018 data shows that the state collected 99.869 billion shekels from VAT. In order to reconcile between the expenditures found in the Survey and those in the GFS data, we attributed the gap according to the ratio of VAT expenditure, by multiplying the VAT expenditure of each household by a ratio of 99.869/73.968. A VAT estimate for households that is lower than the fiscal figure alongside a similar correction to the one we used is common in other countries as well, such as, for example, Britain (Crossley et al., 2011).

The following Figures show the distribution of VAT by household structure and resident children, as well as by income decile and population group.

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[2]To the best of our knowledge, these are all the items in the Survey that carry a VAT exemption.

Figure 3 Average Payment of VAT by Household Structure and Resident Children
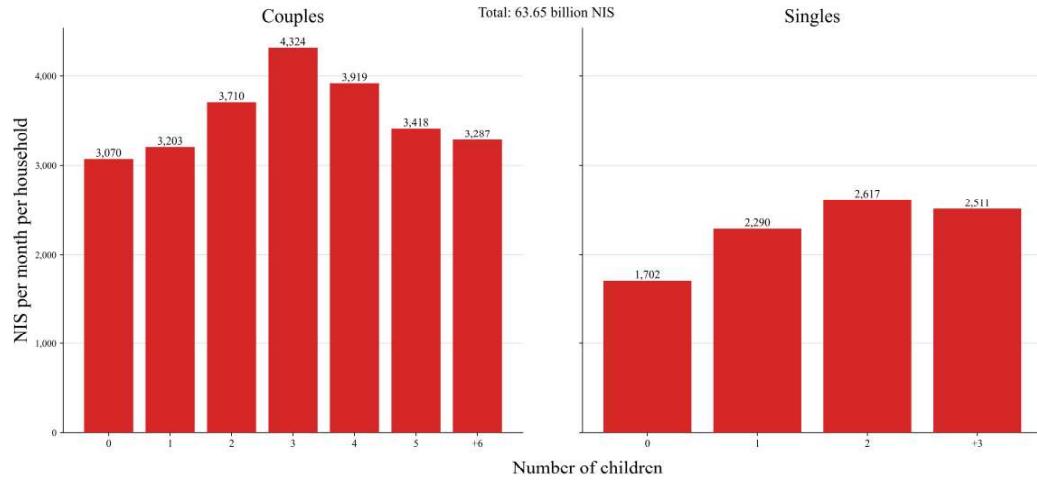

Figure 4 Average Payment of VAT by Income Decile and Population group
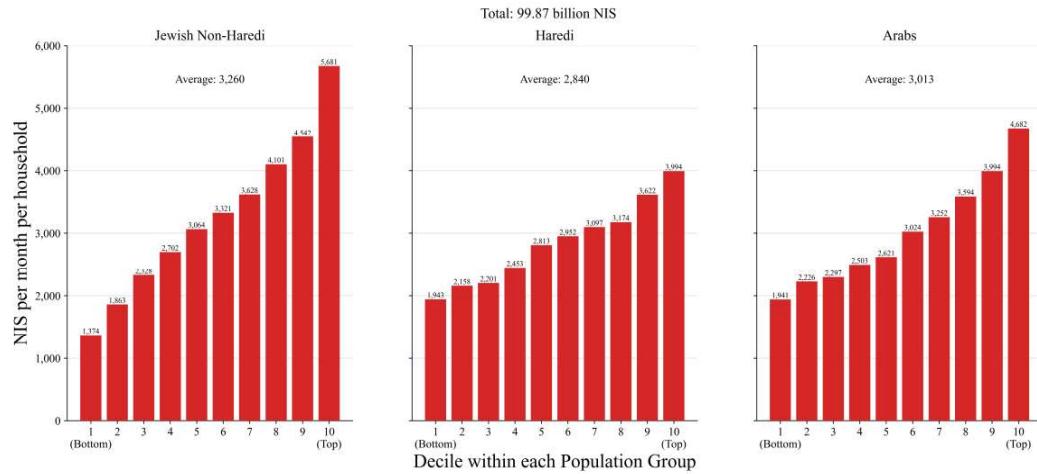
In addition to the papers mentioned above, our literature review included other papers that helped us attribute VAT to households. (Bezémar & Hubbard, 2015; Gruber, 1997, 2000; Hamermesh, 1979).

National Insurance and Public Health Insurance Contributions

National Insurance and health insurance contributions are calculated by the CBS and are available in the Household Expenditure Survey data file, under items t212 and t213 - mandatory payments: payments to National Insurance and state health insurance, respectively.

In Israel and many other countries, national insurance contributions and their equivalents for employees are divided into two parts: the "employee's portion" and the "employer's portion." For the self-employed no such separation exists, since employer and employee are one and the same. In 2018, for example, the high bracket for National Insurance contributions for the self-employed in Israel stood at 17.83% while for employees the high bracket stood at 19.5%,

divided into 12% "employee's portion" and 7.5% "employer's portion" (National Insurance Institute, 2019).[3]

In the literature, the accepted assumption regarding the distribution of the tax burden among households is to attribute to the self-employed the full insurance contributions, and to attribute to employees both employee's and employer's portions (Bigot et al. 2014; Congressional Budget Office 2021; Falk 2018). As in the case of income tax, it is important to note that this assumption is equivalent to the assumption that in the long term, the labor supply is much more rigid than the demand for labor, and employers can change the "gross" wage according to the tax portion they bear by law. As a result, the employment cost of a worker for the employer is identical whether they deduct the entire national insurance contribution for them or whether this deduction is separated into "employee's portion" and "employer's portion." According to the Congressional Budget Office (2012), those who, in practice, bear the burden of the "employer's portion" are the workers, and this division "reflects a broad consensus among economists" (Fullerton & Metcalf, 2002).

Several studies have found that the tax burden is divided in some way between workers and employers, but these studies use different tax rates imposed on different groups of workers and examine this only for the short term. For example, a review by Melguizo & González-Páramo (2013) suggests that workers bear between two-thirds and 90% of the tax burden of national insurance. From correspondence we had with senior economist Prof. Auerbach (UC Berkeley), he argues that these studies have limited relevance to the long term and to a system of uniform tax among different types of workers, as is the case in Israel's national insurance contributions; in his assessment, workers in Israel bear the entire tax burden of national insurance.

It should be noted that in cases of downward nominal wage rigidity (for example, workers at or near minimum wage), employers have limited ability to reduce workers' wages in accordance with the national insurance tax (Carloni, 2021), so it is possible that at low wage levels, the employer does bear a more significant part of the tax burden of national insurance contributions, or that the tax rate borne by workers increases as their income rises.[4] In addition, in many countries there is a state pension and part of the national insurance contributions serve as part of the pension system, so it is possible that not all of the payment can be defined as a "tax," since part of it constitutes forced savings - similar to mandatory pension deductions in Israel, which are not considered a tax (Avraham & Sarel, 2019).

In addition to the research findings, additional support for the fact that the burden of national insurance contributions is imposed on workers can be found in the tax and welfare systems of several developed countries, including Denmark, Australia, and New Zealand. Denmark's extensive welfare state, for example, is financed exclusively by income tax on individuals, with no separate tax for social insurance and no division between employee payments and employer payments. The tax rate out of the labor cost for a single childless employee with an average wage in Denmark and Norway is identical, despite the fact that the internal division in Denmark consists of income tax only, while in Norway the same tax rate is divided among income tax, employee national insurance contributions, and employer national insurance contributions.

In summary, based on the literature on tax distribution in various countries, theoretical considerations, and our impressions from empirical studies – we attribute all national insurance contributions to self-employed workers, and both employer and employee portions

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[3] The percentages are of gross income.
[4] In our correspondence with Dr. Carloni from the U.S. Federal Budget Office, he argued that even if in the short-to-medium term the employer's portion does not fall on workers, it does so in the long term; therefore, the Congressional Budget Office also uses this assumption in its publications.

of the contribution to employees, according to the National Insurance Institute's deduction tables (National Insurance Institute, 2019).

According to the Household Expenditure Survey, Israeli households paid 65.856 billion shekels in 2018 for National Insurance and health insurance contributions (after attributing employer payments to employees), while the administrative figure stands at 70.66 billion shekels (National Insurance Institute, 2018). To align the Survey findings with the fiscal data, we multiplied the expenditure on these taxes by a ratio of 70.66/65.856.

The following Figures show the distribution of national insurance contributions and public health insurance contributions by household structure and resident children, as well as by income decile and population group.

Figure 5 Average Payment of National Insurance and Health Contributions by Household Structure and Resident Children
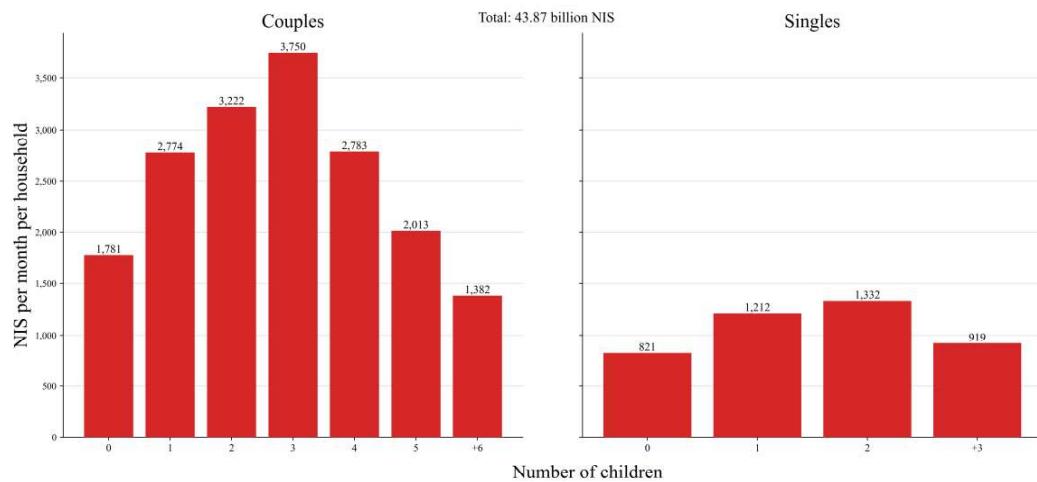

Figure 6 Average Payment of National Insurance and Health Contributions by Income Decile and Population group
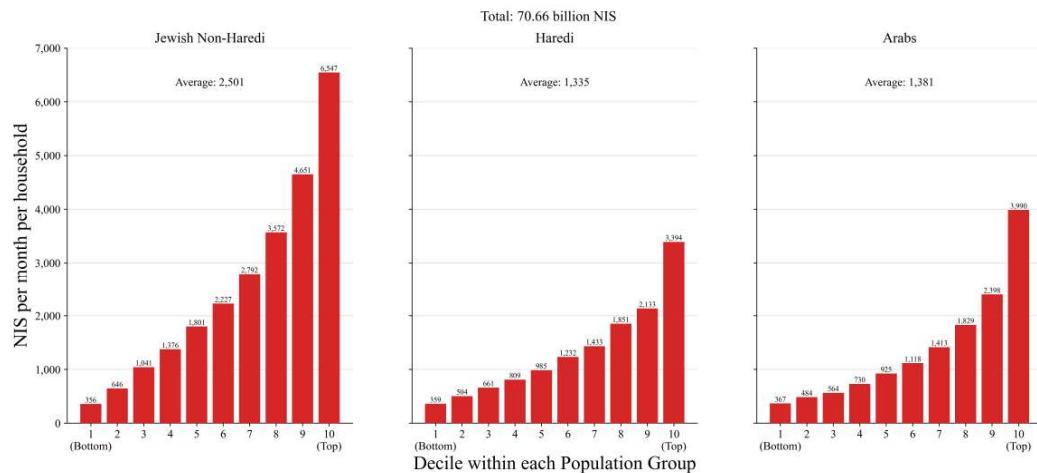
In addition to the papers mentioned, our literature review included othe papers that helped us attribute national insurance and health contributions to households. (Adam et al., 2019; M¨uller & Neumann, 1994; Nielsen & Smyth, 2008d).

Corporate Taxes

Corporate tax is perceived by the public as a tax imposed on companies or corporations, or at the very least on company owners. However, the question of the economic incidence of corporate tax across different economic actors has occupied economists for a long time (Auerbach 2006; The Economist 2021).

Early theoretical analyses found that the tax falls exclusively on capital owners, as did Harberger (1962), who analyzed an economic model of a closed economy.[5] More recent studies, both theoretical and empirical, have also estimated the burden of corporate tax on workers as manifested in lower wages, and found that part of the corporate tax burden indeed falls on workers (Fuest 2015; Suárez Serrato and Zidar 2016), with an ongoing debate regarding the extent to which workers bear the burden, estimates ranging from 30% (Suárez Serrato & Zidar, 2016) to 51% (Fuest et al. 2018). Following these and similar findings, studies on the distribution of the tax burden across households attributed 75% of the tax burden to capital and 25% to workers in the United States (Congressional Budget Office, 2021) and 67% (two-thirds) to capital and 33% to labor in Israel (Falk, 2018).

Although these studies advanced our understanding of who bears the corporate tax burden compared to the simplistic assumption that it is company owners or capital owners in the economy in general, they neglected the other major actor in the economy: the consumers. Slemrod (2014) found considerable similarity between corporate tax (imposed on corporate profits, after deducting wage expenses) and VAT (identical to corporate tax, only without deducting wage expenses). Our review's finding that VAT is imposed almost entirely on consumers suggests that corporate tax should also fall on them to some extent. Indeed, in recent years several studies have also examined the burden of corporate tax on consumers (Baker et al. 2020; Jacob et al. 2021) and found that a significant proportion of corporate tax is indeed imposed on them, with estimates ranging from 31% to 60%.

In summary, our conclusion from the literature and the range of estimates is that the burden of corporate tax falls equally on the three sectors of the economy: capital, work, and consumption – so that each carries a third of the burden.

In 2018, total government income from corporate tax stood at 42.93 billion shekels. In order to distribute this total among households, we calculated each household's share of total capital income, total labor income, and total consumption, and divided the tax burden according to this share. That is, if a particular household holds 10% of total capital income, 3% of total income from work, and 4% of total consumption, then it bore 10% of one-third of total corporate tax collection (the capital component), 3% of the second third (the work component), and 4% of the final third (the consumption component).[6]

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[5] An important point regarding Harberger's model is that it finds corporate tax to be imposed on all capital owners (including, for example, homeowners), and not only on corporate owners (Auerbach, 2006).

[6] The effective corporate tax rate in Israel is not uniform - exporting companies pay lower corporate tax than non-exporting companies (such as banks and insurance companies). The above calculation is an approximation that does not take into account the distribution of corporate tax by industry, and the possible effects this distribution has on bearing the tax burden (Mazirov et al., 2021). Additionally, part of the corporate tax in Israel is paid by foreign residents who own capital in Israel, just as a portion of corporate taxes around the world are paid by Israeli residents who own capital in other countries. We assume, in this paper's analysis, that these effects roughly balance each other out.

The following Figures show the distribution of corporate tax by household structure and resident children, as well as by income decile and population group.

Figure 7 Average Payment of Corporate Tax by Household Structure and Resident Children
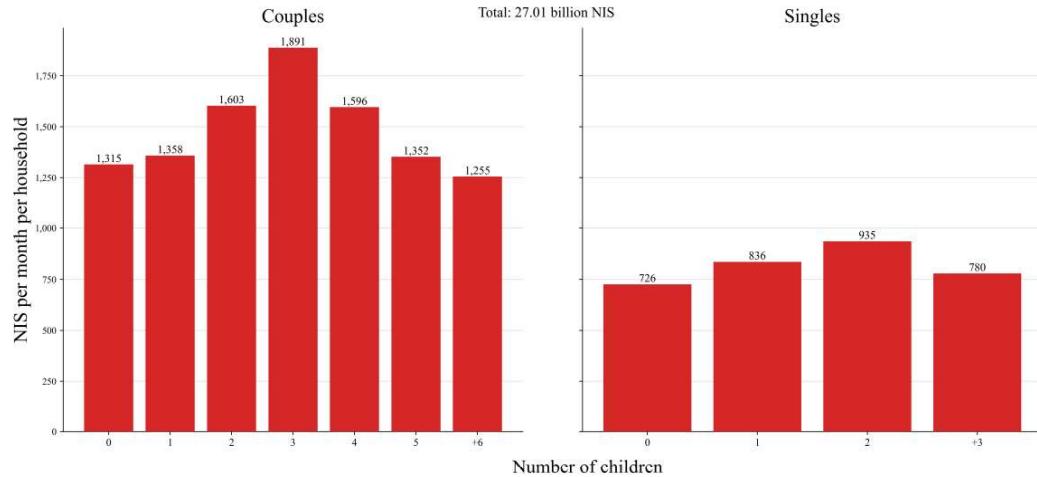

Figure 8 Average Payment of Corporate Tax by Income Decile and Population group
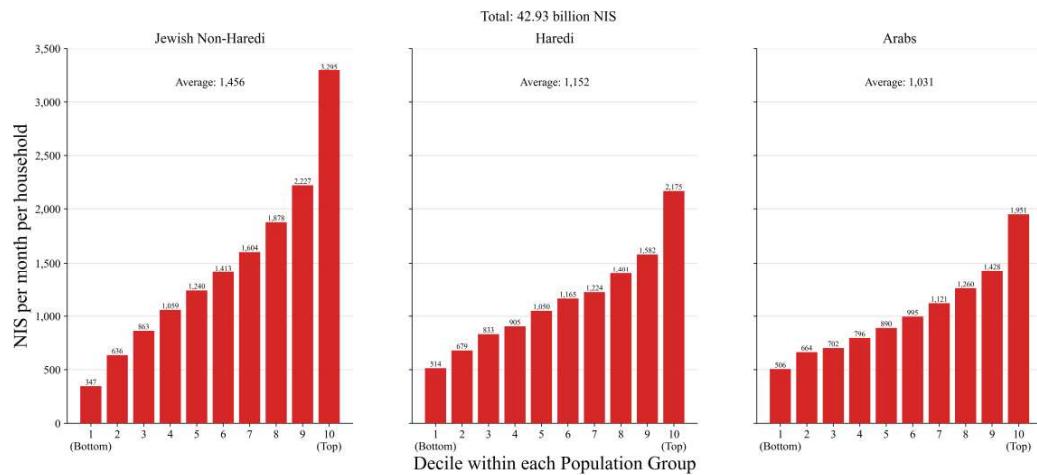
In addition to the papers mentioned above, our literature review included many papers that helped us attribute corporate tax to households. (Arulampalam et al., 2012; Clausing, 2012; Dedola et al., 2021; Felix & Jr., 2022; J. Gravelle, 2013; J. G. Gravelle & Hungerford, 2011; Joint Committee on Taxation, 2013; Knaisch & Pöschel, 2021; Milanez, 2017).

Financial VAT and Non-Profit VAT

In addition to corporate tax, Israel collects taxes called financial VAT and non-profit VAT. Financial VAT is a payroll tax imposed on financial companies (banks, insurance companies, investment houses, etc.) at a rate of 17% of employees' gross wages. The tax is imposed in an attempt to equalize tax conditions between financial companies and real companies (other companies in the economy), since VAT is not collected on financial companies' services in Israel due to the complexity of calculation and collection. In other words, financial VAT is collected from financial companies in order not to favorably discriminate the taxation of

financial companies compared to real companies. Non-profit VAT is a payroll tax at a rate of 8.5% of the gross wages of employees in non-profit institutions (non-profits).

The literature on financial VAT is extremely sparse, partly because this is a tax that very few countries apply. Despite this difficulty, the IMF has a position paper dealing with worldwide taxation of the financial sector (Claessens et al., 2010). Within this review there is a discussion regarding financial VAT, or the Financial Activities Tax (FAT). According to the review, the burden of financial VAT should on the one hand be similar to that of regular VAT, and on the other hand have characteristics more similar to the burden of the corporate tax. In our view, the burden of financial VAT is similar to that of corporate tax. Furthermore, it is not possible to identify consumers of financial services in the Survey, since many of them are not households but rather business entities and the like, so that distribution according to total capital and income from work and total consumption expenditure is the optimal way to account for this tax.

According to the Finance Ministry's "fiscal digital" system website's data, we attributed to households a payment of 3.11 billion shekels for financial VAT, as well as approximately 12.208 billion shekels for non-profit VAT. In the study, we assumed that the burden of financial and non-profit VAT is divided similarly to corporate tax. That is, one-third on workers, one-third on capital owners, and one-third on consumers.

The following Figures show the distribution of financial VAT and non-profit VAT by household structure and resident children, as well as by income decile and population group.

Figure 9 Average Payment of Financial VAT and Non-Profit VAT by Household Structure and Resident Children
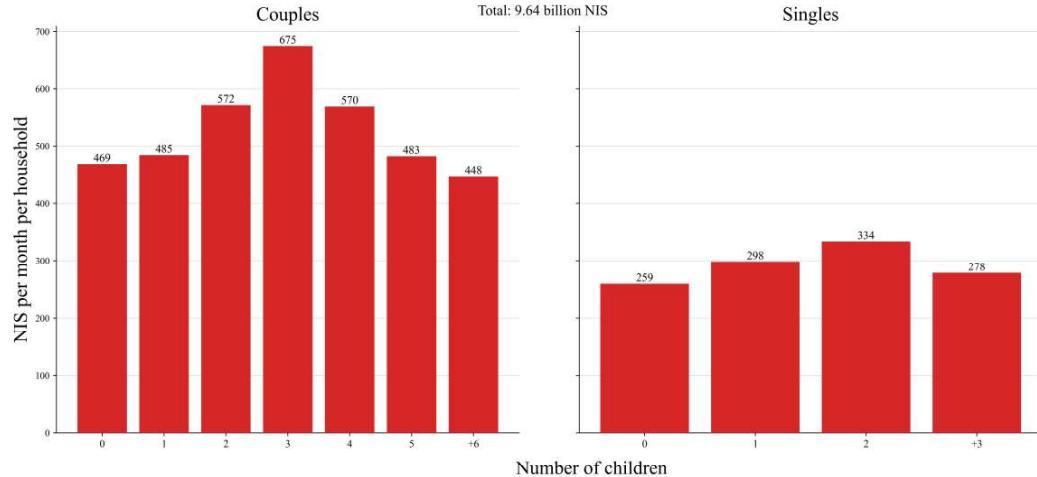

Figure 10 Average Payment of Financial VAT and Non-Profit VAT by Income Decile and Population group

Total: 15.32 billion NIS

Jewish Non-Haredi — Average: 520

Haredi — Average: 411

Arabs — Average: 368

NIS per month per household

Decile within each Population Group
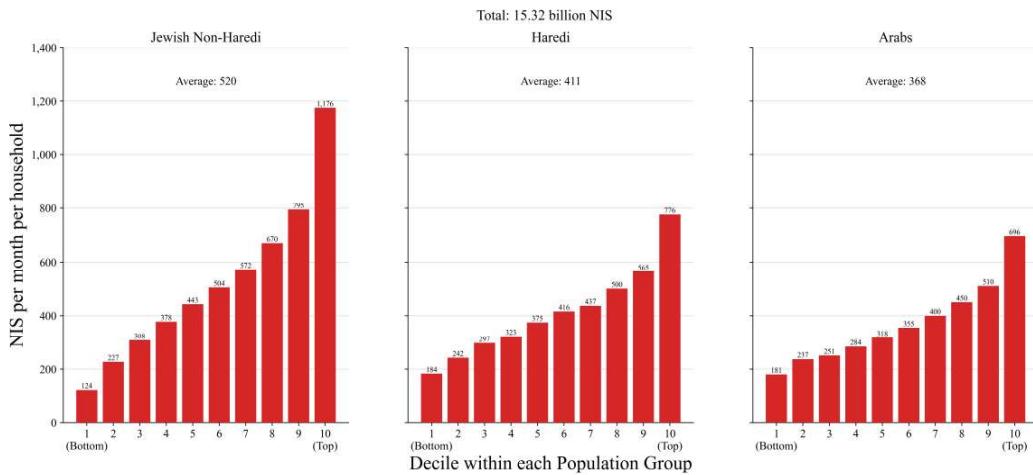
Municipal Taxes (Arnona)

Municipal property taxes (Arnona) in Israel are divided into two main components: residential Arnona and other Arnona (primarily collection from businesses and the broader public sector). The research literature on the incidence of local property taxes is limited, and mostly deals with theoretical modeling of the tax burden, without significant empirical examination (Oates and Fischel 2016; Zodrow 2007). Theoretically, there are two main approaches to analyzing local property taxes: as payment for municipal services or as a capital tax.

In our view, the main consumers of municipal services are residents, and the model of Arnona as a capital tax corresponds more to other Arnona. However, the model of payment for municipal services means that it is a fee and not a tax. A fee requires some correspondence between the amount of payment and the cost of services. In practice, in Israel this is a tax the amount of which does not vary according to the scope of services, and is sometimes even inversely correlated with it. For example, a family with multiple children receives extensive education services from the local authority, but due to its size is likely to be entitled to a discount on Arnona based on per capita income. In addition, the amount of residential Arnona is not sufficient to cover the cost of municipal services (Fitoussi, Yakir and Sarel 2015), even for households that are not entitled to any discounts at all. On the other hand, other Arnona in Israel is higher than residential Arnona, despite the fact that the scope of municipal services granted to businesses is much lower.

Considering this, we chose to classify residential Arnona as a tax imposed on property holders – renters or those who live in a home they own. We divided other Arnona (business Arnona) in a manner similar to corporate tax, because it contains elements of tax on capital and consumption, and is therefore likely to be divided in a similar manner.

Payment of municipal taxes (Arnona) for residential purposes is reported in the Household Expenditure and Income Survey under item c336 – municipal taxes (Arnona), which payment includes any Arnona discounts the household received (that is, if the gross charge was 400 shekels per month and the household received a discount of 200 shekels per month, item c336 will be 200 shekels). We take the total collection of other Arnona from the local authorities file (Central Bureau of Statistics, 2019) and divide it among households according to their relative share of total labor income, capital, and consumption (similar to the distribution of the corporate tax burden).

Total residential Arnona reported in the Survey is 12.17 billion shekels, while the fiscal figure from the local authorities file is slightly lower, and stands at 11.388. Other Arnona totals approximately 14.15 billion shekels. We correct residential Arnona collection according to the ratio 11.388/12.17.

The following Figures show the distribution of residential Arnona by household structure and resident children, as well as by income decile and population group.

Figure 11 Average Payment of Residential Arnona by Household Structure and Resident Children
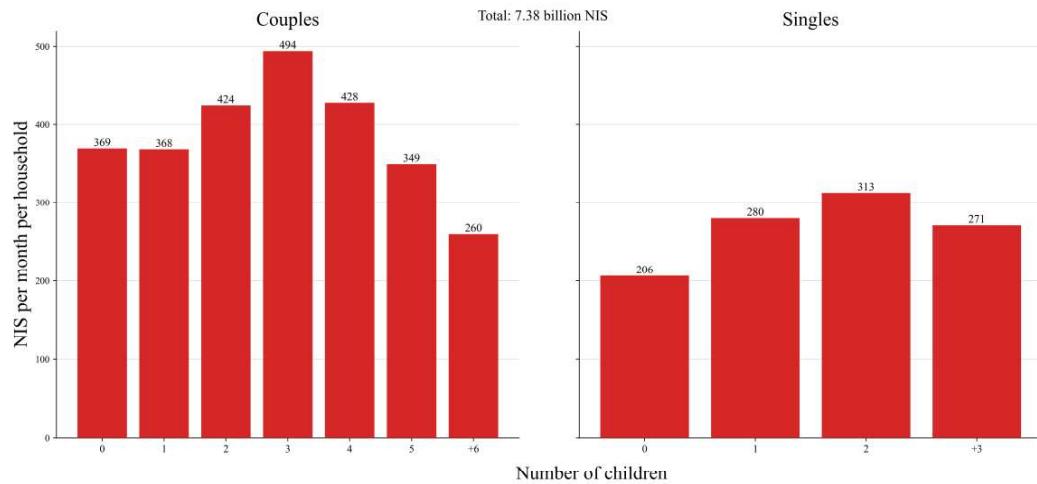

Figure 12 Average Payment of Residential Arnona by Income Decile and Population group
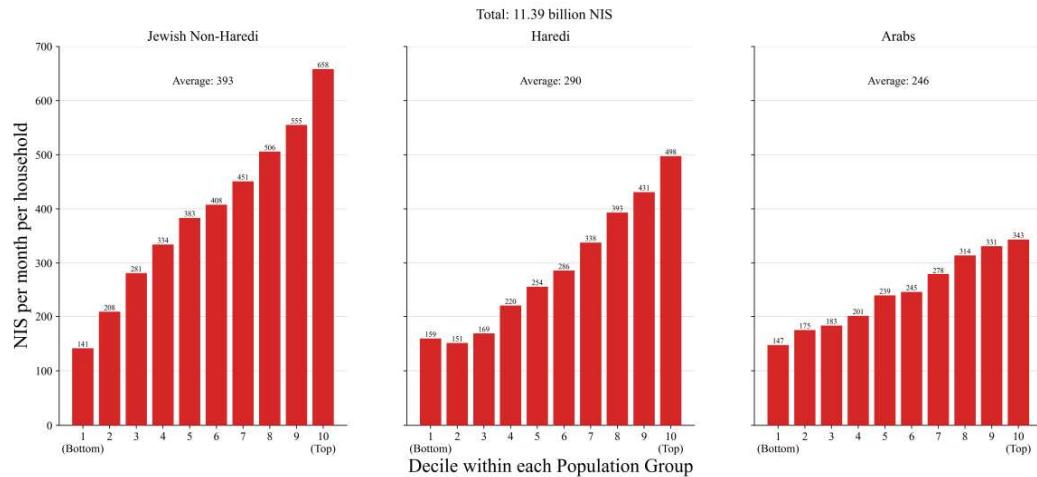
The following Figures show the distribution of business Arnona by household structure and resident children, as well as by income decile and population group.

**Figure 13** Average Payment of Business Arnona by Household Structure and Resident Children
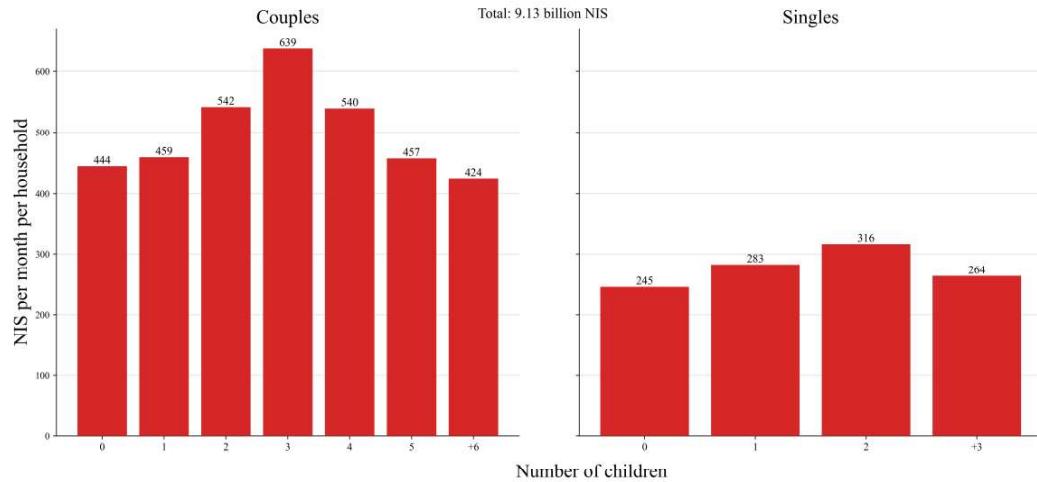
Figure 14 Average Payment of Business Arnona by Income Decile and Population group
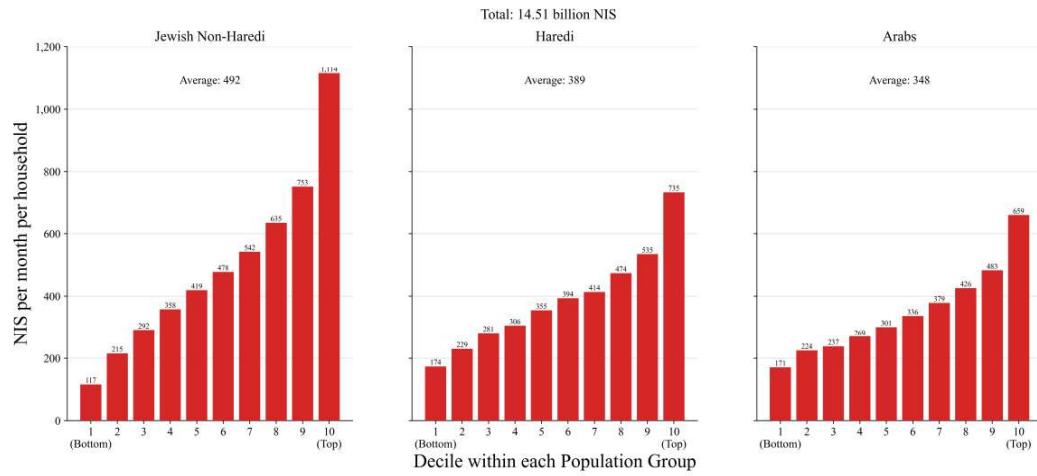
Other Purchase Taxes

In addition to VAT, there are several other purchase taxes in Israel: fuel tax (blue), tobacco tax, alcohol tax, and vehicle purchase tax. The literature review included several studies for each tax (Gehrsitz et al. 2020; Gruber and Koszegi 2004; Kenkel 2005; Marion and Muehlegger 2011, Schweitzer and Taylor 2008) as well as the characteristics of these markets in Israel (Agmon 2012; Patal 2016, 2017; Israel Tax Authority 2019).

The literature review reveals that the burden of these taxes passes almost entirely to consumers, except in specific cases that can be explained by unique characteristics and consumer behavior (for example – proximity to a border and different tax rates on its different sides, etc.), which are less relevant to Israel. Moreover, based on the fact that VAT is the

main purchase tax, and we found it to be imposed entirely on the consumer, it is reasonable to conclude that other consumption taxes will behave similarly. However, it should be noted that the research literature regarding the distribution of purchase tax burden in its various forms is relatively scarce.

In conclusion, we attributed the entire tax burden to consumers of products and services on which a specific purchase tax is imposed. In order to check the correspondence between the Survey estimates and the fiscal data, we compared the estimates to the total collection according to the state revenue reports for 2017-2018, which details the various purchase taxes.

Below is the delineation of the calculation and attribution of each sales tax:

Fuel Tax (Blu)

Households report "Expenditure on fuel and oils" to the CBS, and "fuel and oils attribution for an unowned vehicle" is calculated for those with a car owned by another. However, there is significant underreporting on fuel expenditure in the CBS data – close to 37% of households with a vehicle do not report on fuel expenses at all, while according to the 2019 social survey (CBS 2020b), 94% of households with a vehicle use it at least once a week, and 87% at least three times a week (the proportion of electric cars was miniscule in the relevant years). Therefore, it seems that fuel expenditure is underreported in the Survey for a variety of reasons, some unknown.

 To counter this limitation, we estimated the missing data on fuel expenditure using a regressive linear model (weighted by inflation weights). The model predicted the fuel expenditure as a proportion of the income of households with a vehicle as a function of: number of breadwinners, children, population group (non-Haredi Jewish/Jewish Haredi/Arab), net income decile per standardized person, and residential area. Using this model, we attributed fuel expenditure to households with a vehicle that did not report on fuel expenditure. Before attribution, the total private expenditure on fuel in 2018 stood at 16.31 billion shekels. After attribution, the total expenditure of households on fuel reached 24.64 billion shekels.

Table 2 – Fuel Expenditure Prediction Regression Table

Dependent variable: Ratio of fuel consumption to net income	
	Coefficient (SE)
Number of Income Earners	-0.009*** (0.001)
Number of Persons Aged<18	-0.012*** (0.001)
Haredi Household	-0.015** (0.007)
Arab Household	0.001 (0.004)
Subdistrict (Nafa) Fixed Effects	✓
Income Decile Fixed Effects	✓

Observations	12,208
Weighted Observations	1,211,980
R^2	0.178

Notes: The estimation was conducted on households that own a vehicle and reported fuel expenses. The regression prediction is for households that own a vehicle and did not report fuel expenses. * $p<0.1$, ** $p<0.05$, *** $p<0.01$

Since the fuel tax is denominated in shekels per liter, total expenditure (reported and attributed) in shekels must be converted to quantity in order to calculate its incidence. Fuel (95 octane gasoline) is subject to price controls, and the Ministry of Energy publishes the controlled price per liter as well as the fuel tax denominated each month (Ministry of Energy and Infrastructure, 2022). In 2018, the average controlled price of fuel for consumers stood at 6.4 shekels per liter (including fuel tax and VAT), and the fuel tax at 3.04 shekels per liter.

Households report expenditure on fuel and oils together. Similar to Falk (2016), we assume that oils constitute approximately 5% of "fuel and oil expenses" and deduct this expenditure before calculating the incidence of the fuel tax. We divided the total expenditure on fuel by the average price per liter of fuel in order to obtain the quantity of fuel the household purchased. We multiplied this quantity by the amount of the fuel tax in order to obtain the total fuel tax the household paid, according to the following formula:

$$\text{Fuel Tax Incidence} = \frac{0.95 \times \text{Expenditure on Fuel \& Oils}}{6.4} \times 3.04$$

Thus, for example, if a household reports an expenditure of 100 shekels on fuel and oils, it purchased 14.844 liters of fuel, and paid a fuel tax of 45.125 shekels.

This method showed that Israeli households paid, in total, 12.09 billion shekels in fuel tax in 2018. According to the chapter on fuel taxation in the Government Revenue Report for 2017-2018, net revenues from fuel tax on gasoline stood at 12.428 billion shekels, and revenues from diesel taxation stood at 6.056 billion shekels, with gas and kerosene taxation accounting for part of the gap. In other words, we identified nearly all of the fuel tax on gasoline in Israel (12.09 compared to 12.43).

As we detailed above, the burden of fuel tax on gasoline falls entirely on consumers. In contrast, fuel tax on diesel is mostly not paid directly by households, but primarily by business companies. Therefore, an increase in fuel tax is expected to raise the production costs, transportation, etc. of firms, which will be reflected to one degree or another in product prices. In effect, while other consumption taxes refer to a finished product that the consumer purchases, fuel tax on diesel affects the entire supply chain, not just a specific product. Due to this unique nature of the fuel tax on diesel, it can be considered a type of corporate tax, which raises production costs to some extent (and not necessarily uniformly) for the various companies operating in the economy. Due to this similarity, we decided to attribute fuel tax on diesel as we attributed corporate tax in the economy (with an equal division among consumers, capital owners, and workers).

However, there may be situations in which fuel tax on diesel functions like VAT, including situations in which demand for consumption is completely inelastic or situations in which the aggregate supply in the economy is completely elastic. In our assessment, these are very strong and unreasonable assumptions, we therefore kept to distribution of the burden in the manner of the corporate tax, detailed above.

**Figure 15** Average Payment of Fuel (blue) Tax by Income Decile

Ratio of top three deciles to bottom three: 2.7
Total: 17.18 billion NIS
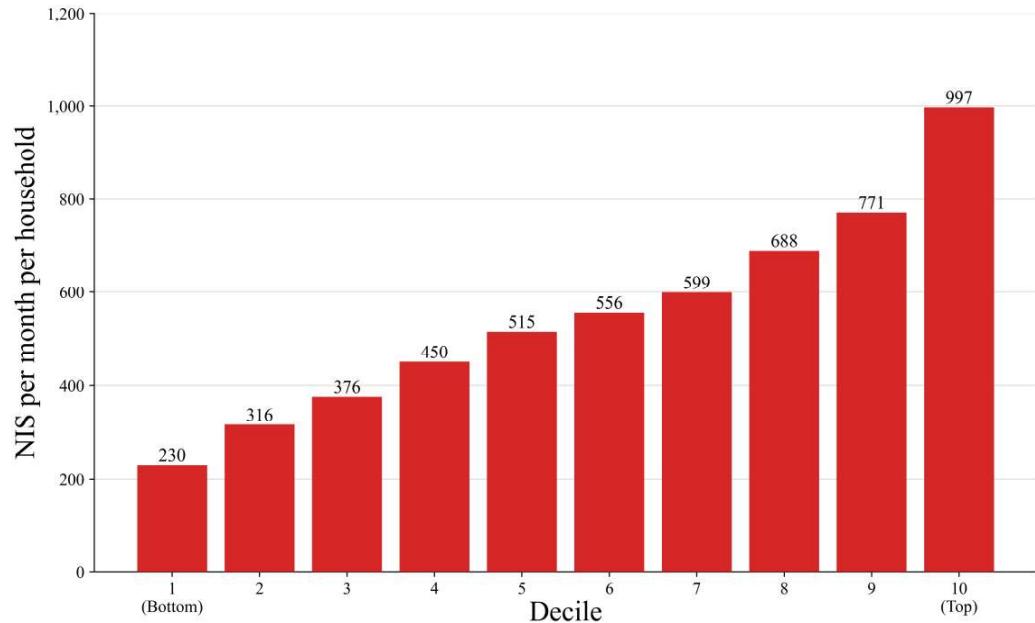
Figure 16 Average Payment of Fuel (blue) Tax by Household Structure and Resident Children

Total: 10.78 billion NIS
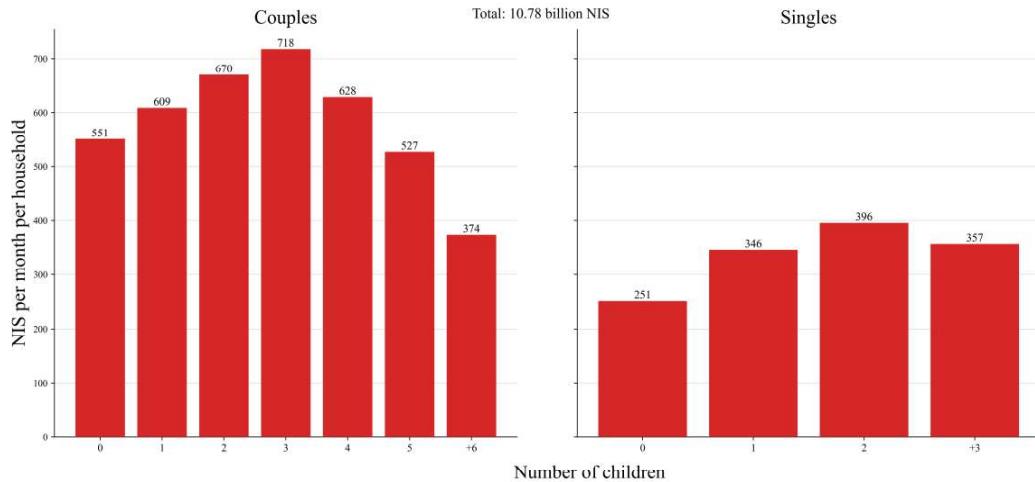
Figure 17 Average Payment of Fuel (blue) Tax by Income Decile and Population group
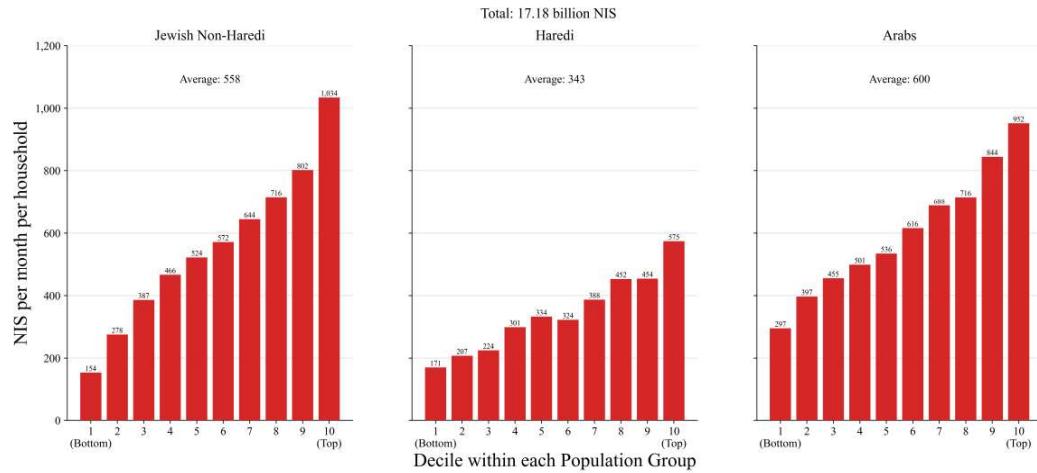
In addition to the papers mentioned above, our literature review included many papers that helped us attribute fuel consumption tax to households. (Alm et al., 2009; Chouinard & Perloff, 2007; Doyle & Samphantharak, 2008; Harju et al., 2016; Parry & Small, 2005).

Vehicle Purchase Tax

Households participating in the Survey are asked by the CBS whether they purchased a vehicle in the past 12 months, and what was the sum paid if they did. In addition, the CBS attributes the consumption for an unowned vehicle, a vehicle, for instance, provided by one of the household's residents' employer.

The vehicle purchase tax in Israel is complex and takes into account, among other things, the vehicle's pollution level ("green grade"), which does not appear in the Household Expenditure and Income Survey data. Therefore, we used the Israel Tax Authority table that presents the average effective purchase tax (purchase tax as a percentage of total vehicle cost) by air pollution level, and calculated the average effective tax for all vehicle purchases as an average of the average effective purchase tax, weighted by the share of total sales in 2018 (Israel Tax Authority, 2019). For example, vehicles with pollution level 2 (hybrid) bore an average effective purchase tax of 28% and constituted 12.8% of the total vehicle sales in Israel in 2018, while vehicles with pollution level 15 bore an average effective purchase tax of 84% and constituted 4.8% of total vehicle sales in Israel in 2018. In total, we found an average effective purchase tax of 53.37% for all new vehicle purchases in Israel.

To calculate the total payment of the vehicle purchase tax by households, VAT must be deducted in the following manner, since VAT is also imposed on the purchase of a vehicle:

$$\text{Vehicle Purchase Tax Incidence} = \text{Vehicle Purchase Cost} \times \frac{0.5337}{(1.17 \times 1.5337)}$$

Thus, if a household purchased a vehicle at the cost of, for example, 100,000 shekels, it paid, in practice, a VAT of 14,530 shekels, and a vehicle tax of 29,490 shekels.

In total, using this method we found that Israeli households paid 7.45 billion shekels in 2018 in vehicle purchase tax. The Ministry of Finance's Government Revenue Report for 2017-2018 reports revenues from this tax of approximately 10.5 billion shekels in 2018. Therefore, there is a disparity of approximately 3.05 billion shekels between our estimate and the administrative figure, a gap that is mainly explained by tax payment by businesses. In the CBS annual publication on motor vehicles for 2018, it is noted that in this year, 257,162 vehicles were first used in the State of Israel in 2018, of which 62,868 (24.4%) were leasing vehicles, 27,421 (10.7%) were company vehicles, and 7,717 (3%) were rental or tourism vehicles. In total, vehicles not held by private ownership constituted 38.1% of all new vehicles in Israel. According to a naive calculation, it is possible to estimate the business share of the tax at approximately 4 billion shekels (similar to and even slightly higher than the total gap of 3.05 billion).

Therefore, it appears that the disparity between the administrative data and the Survey data stems entirely from payments of this tax by businesses. We consequently attributed this disparity as we did corporate tax: equally divided between consumers, capital owners and workers.

The following Figures show the distribution of vehicle tax payment by household structure and resident children, as well as by income decile and population group.

**Figure 18** Average Payment of Vehicle Tax by Income Decile
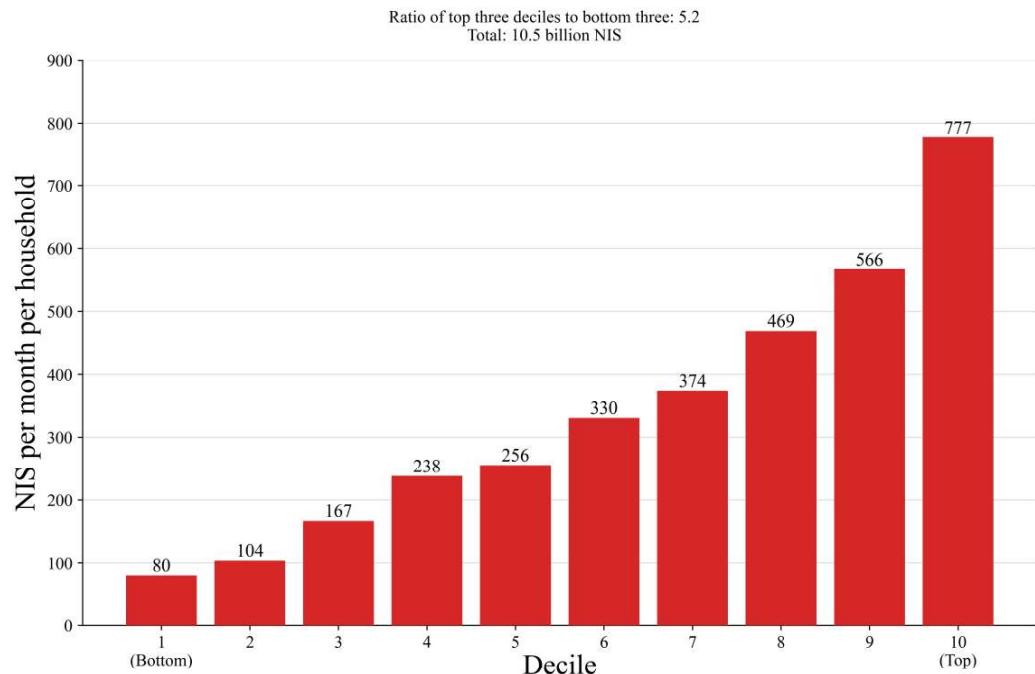
**Figure 19** Average Payment of Vehicle Tax by Household Structure and Resident Children
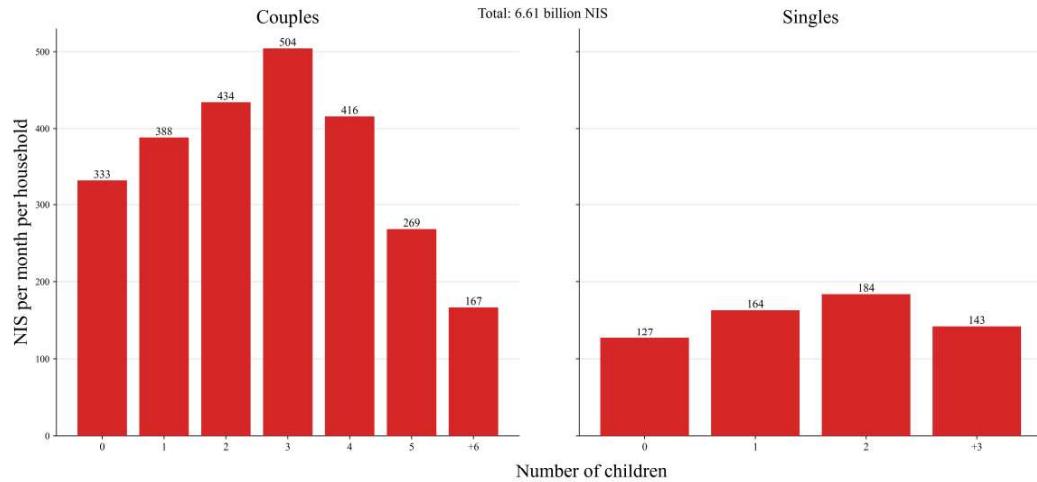

Figure 20 Average Payment of Vehicle Tax by Income Decile and Population group
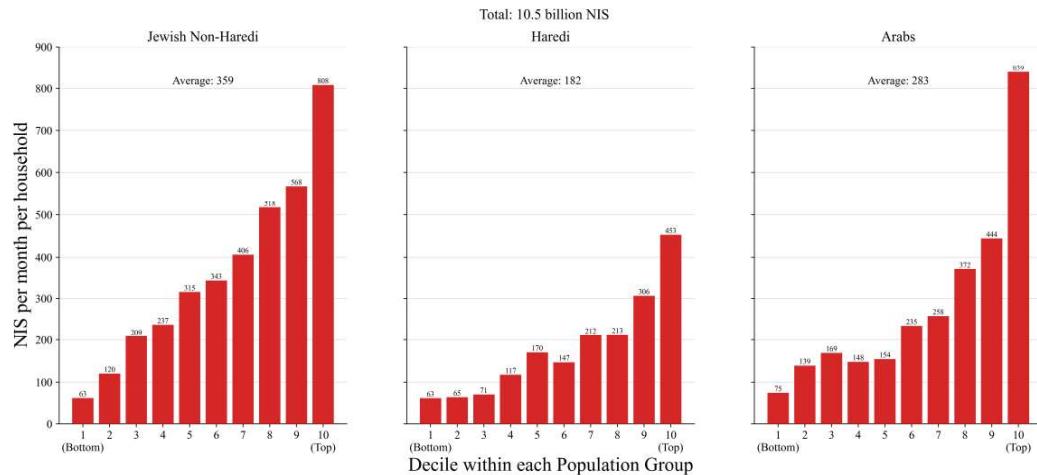
Tobacco and Cigarettes Tax

Households report their total expenditure on "foreign-made cigarettes" and "domestically-made cigarettes" to the CBS. The tax is imposed on cigarettes as an amount per cigarette pack. In order to calculate the quantity of cigarette packs, we divided the total reported expenditure by the average price per cigarette pack, which stood at 30 shekels per pack in 2016 (Amir, 2018). We adjusted the price per pack to 2018 using the Consumer Price Index (Central Bureau of Statistics, 2022b) for cigarettes and tobacco products (an increase of 4.5%).

We multiplied the resulting quantity of cigarette packs by the total purchase tax amount per pack, which stood at 22 shekels per pack (Chief Economist Division, 2020). The calculation is described in the following formula:

$$\text{Tobacco Tax} = \text{Expenditure on Tobacco} \times \frac{22}{31.35}$$

For example, if a household reported an expenditure of 124.5 shekels on cigarette packs, it purchased 4 packs and thus a cigarette tax of 88 shekels.

In addition to the tax on cigarette packs, there is a tax on tobacco in other forms (such as rolling tobacco). Households reported expenditure on "cigars and tobacco for pipes and cigarettes". Similar to the Chief Economist (2016), we assume that the tax constitutes 60% of this total expenditure. For example, if a household reported an expenditure of 20 shekels on rolling tobacco, it paid a total tobacco tax of 12 shekels.

According to the Survey data, we found that households in Israel paid a total of 2.8 billion shekels in 2018 in tobacco and cigarette taxes, while according to the State Revenue from Taxes Report, tax collection on tobacco and cigarettes stood at 6.13 billion shekels.

Similar to other specific expenditures, it appears that there is significant under-reporting or non-reporting in the Household Expenditure Survey for cigarettes. To align the Survey amount with the amount that appears in the state revenue report, we divided the disparity (3.31 billion shekels) uniformly among all households according to the number of adults (18+). This calculation takes into account both non-reporting and under-reporting, since we do not know which of them is more acute.

The following Figures show the distribution of tobacco and cigarettes tax payment by household structure and resident children, as well as by income decile and population group.

**Figure 21** Average Payment of Tobacco and Cigarettes Tax by Income Decile

Ratio of top three deciles to bottom three: 0.8
Total: 6.13 billion NIS
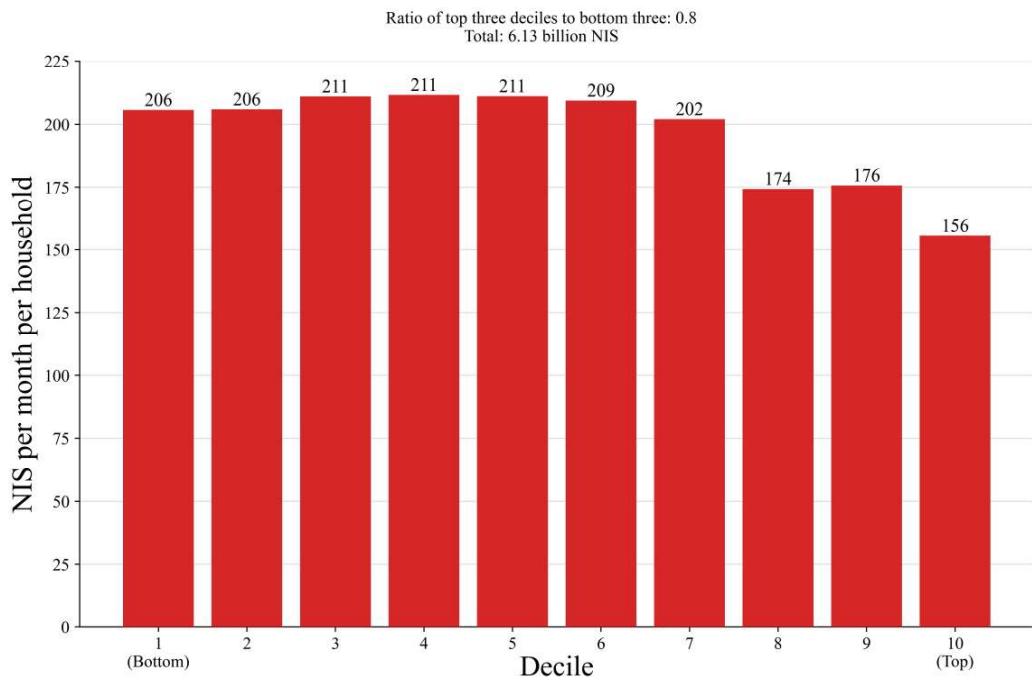
Figure 22 Average Payment of Tobacco and Cigarettes Tax by Household Structure and Resident Children
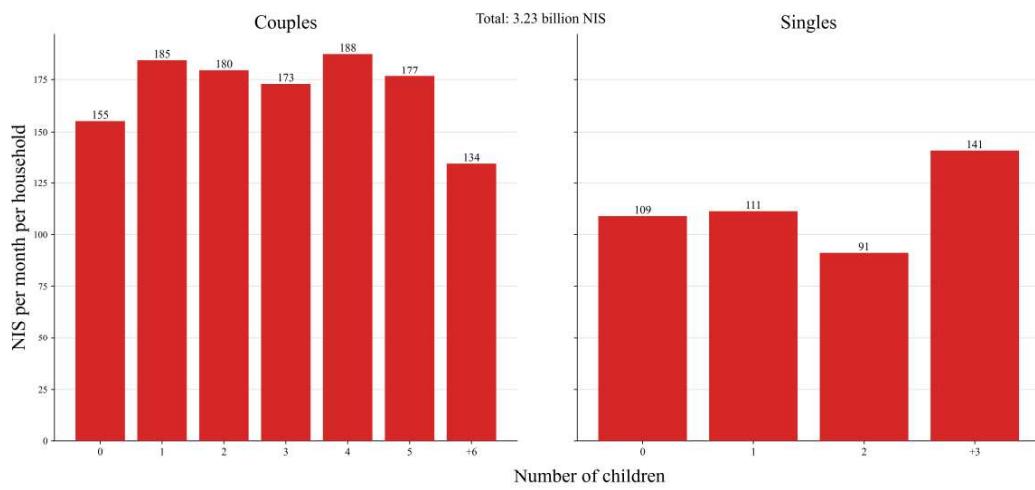
Figure 23 Average Payment of Tobacco and Cigarettes Tax by Income Decile and Population group
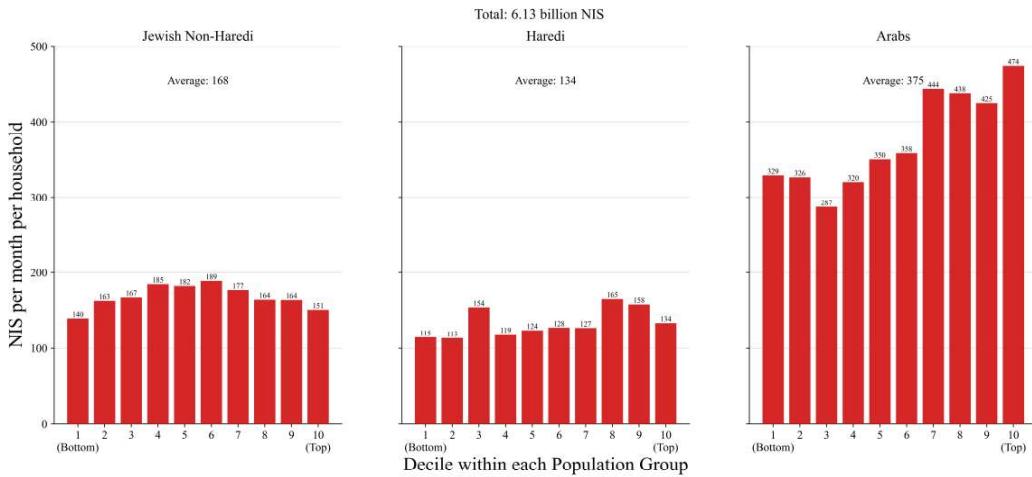
Total: 6.13 billion NIS

In addition to the papers mentioned above, our literature review included other papers that helped us attribute tobacco and cigarettes tax to households. (Cevik, 2018; Chaloupka & Warner, 2000; Delipalla & O'Donnell, 2001; Evans et al., 1999; Gruber, 2001; Keeler et al., 1996).

Alcohol Tax

Alcohol tax in Israel is divided into two types: tax on beer and tax on alcoholic beverages with high alcohol content (such as cognac, vodka, whiskey, etc.); in contrast, wine is exempt from this tax (Chief Economist, 2018).

The tax on beer is denominated in shekels per liter of beverage. In 2018, it stood at 2.33 shekels per liter of beverage. The tax on other alcoholic beverages is denominated per liter of alcohol, and stood in 2018 at 85 shekels per liter of alcohol.
In order to calculate the incidence of the tax on beer, we took the total expenditure on "lager beer" and divided it by the consumer price for beer from the Consumer Price Index (7.5 shekels per half liter), thus obtaining the total liters of beer purchased by each household. This quantity was multiplied by the stated tax in order to obtain the incidence of the beer tax for households:

$$\text{Beer Tax} = \text{Expenditure on Beer} \times \frac{2.33}{15}$$

The tax on alcoholic beverages with high alcohol content is denominated, as mentioned, according to the volume of alcohol in the beverage. We therefore summed households' total expenditures on "brandy, liqueur, cognac", "vodka" and "other alcoholic beverages". According to the Chief Economist (2018), an average price per liter of beverage purchased by households is 80 shekels, and we assumed an average alcohol percentage per liter of beverage of 40%. The result was the quantity of alcohol purchased by the household, which we multiplied by the tax rate in order to obtain the incidence of the alcohol tax on the household, according to the following formula:

$$\text{Alcohol Tax} = \text{Expenditure on Alcohol} \times \frac{40\%}{80} \times 85$$

In total, we found that in 2018, households in Israel paid 250 million shekels in tax on alcohol (beer and other beverages combined), while according to the state revenue from taxes report, total collection was 960 million shekels. Similar to the tobacco tax, there is also under-reporting for the alcohol tax. Part of the under-reporting may stem from consumption of alcoholic beverages outside the home (restaurants, pubs, etc.). In order to account for alcohol consumption that does not appear in the expenditure survey, the disparity is attributed to all households according to the number of resident adults (18+).

The following Figures show the distribution of alcohol tax payment by household structure and resident children, as well as by income decile and population group.

**Figure 24** Average Payment of Alcohol Tax by Income Decile
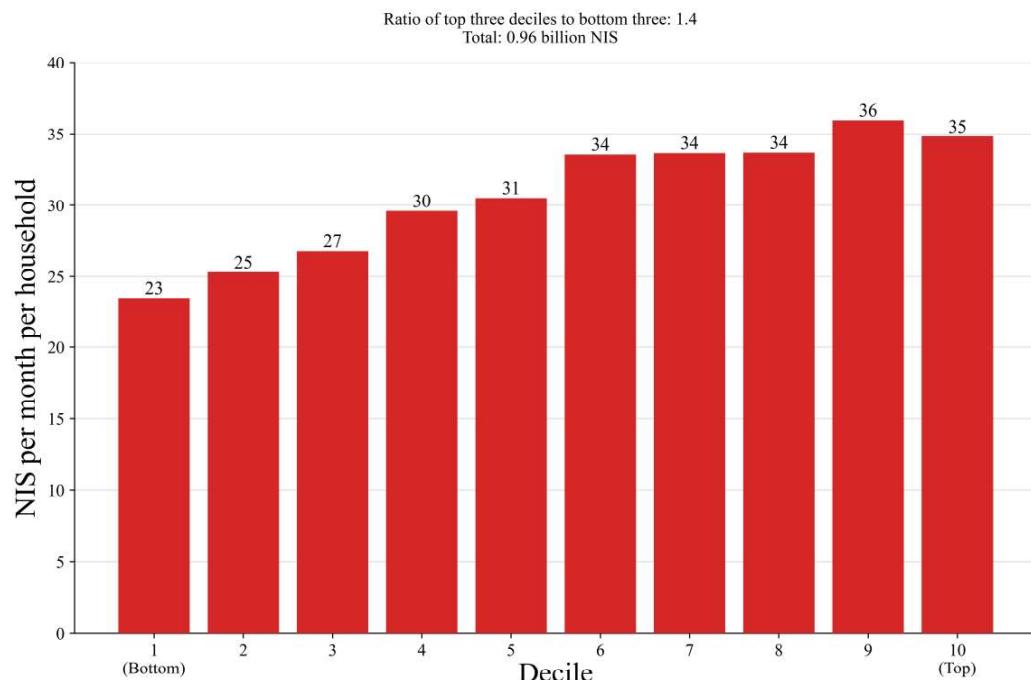
Figure 25 Average Payment of Alcohol Tax by Household Structure and Resident Children
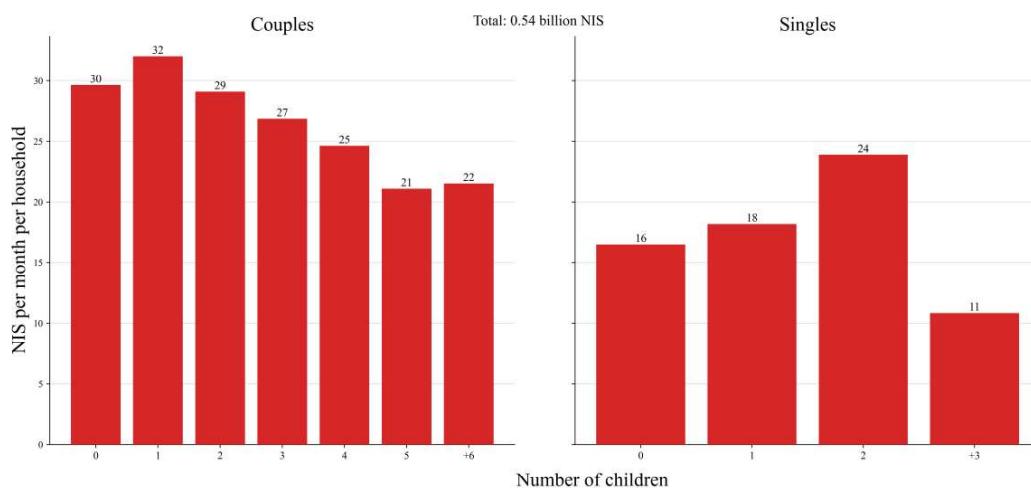
Figure 26 Average Payment of Alcohol Tax by Income Decile and Population group
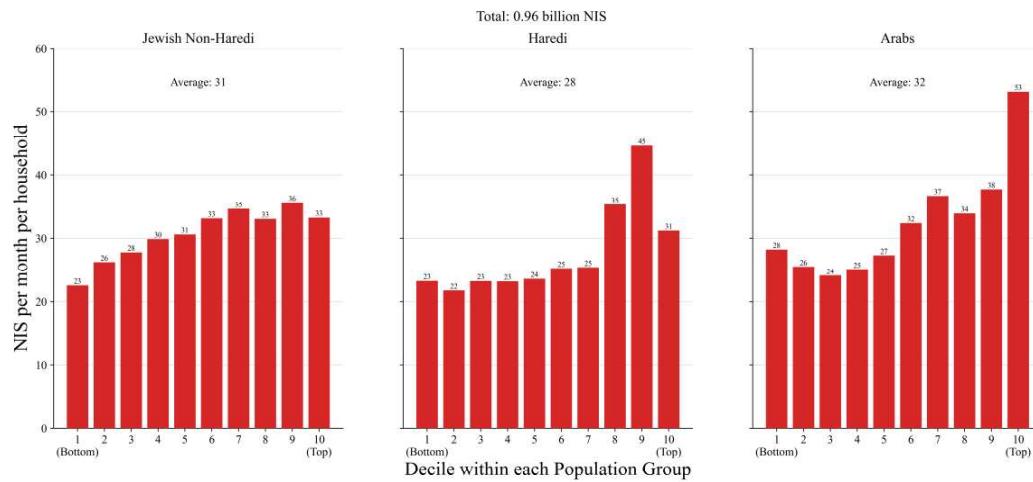
In addition to the papers mentioned above, our literature review included other papers that helped us attribute alcohol tax to households (Hanson & Sullivan, 2016; Ngo et al., 2021; Young & Bielińska-Kwapisz, 2002).

Real Estate Tax

According to the Finance Ministry's "fiscal-digital" files, income from land appreciation tax, sales tax, and purchase tax stood at approximately 11.5 billion shekels in 2018. Of this, approximately 8 billion shekels are land appreciation tax revenues. In the Household Expenditure Survey, no households reported on the item of land appreciation tax or purchase tax, which apparently stems from a scarcity of observations; therefore, the CBS consolidates expenditures on similar sub-items into one item above them on the list.[7] In addition, there is an expenditure item for purchase tax on non-residential apartments that is separate from these sub-items and the item that consolidates them. The total of these taxes, which include the land appreciation tax and purchase tax that we identify in the survey, is approximately 1.8 billion shekels.

We made up the disparity between the Survey's estimate and the administrative data by attributing the gap in proportion to capital income (including attributed rent for owner-occupied housing). This attribution is made under the assumption that real estate taxes are substitute taxes for capital taxes and their burden is similar. Accordingly, if a household holds 1% of the total capital income of all households, then it is attributed a payment of 1% of the total of these taxes, while taking into account the Survey's inflation weights. It is important to emphasize that although we identified in the Survey only a relatively small portion of the total tax payment in comparison with the fiscal data, it is still important to attribute the remainder to households and align the administrative data with the Survey data, since ignoring this tax means making unreasonable assumptions about how it is distributed.

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[7] The items for land appreciation tax and land purchase tax are c321067 and c321034, respectively. These are included in Category c321 alongside lease fees and capitalization, payment to the Land Registry, and consent fees to the Israel Land Authority. The item for purchase tax on non-residential apartments is c394049.

The following Figures show the distribution of real estate tax payment by household structure and resident children, as well as by income decile and population group.

**Figure 27** Average Payment of Real Estate Tax by Income Decile

Ratio of top three deciles to bottom three: 4.2
Total: 11.54 billion NIS
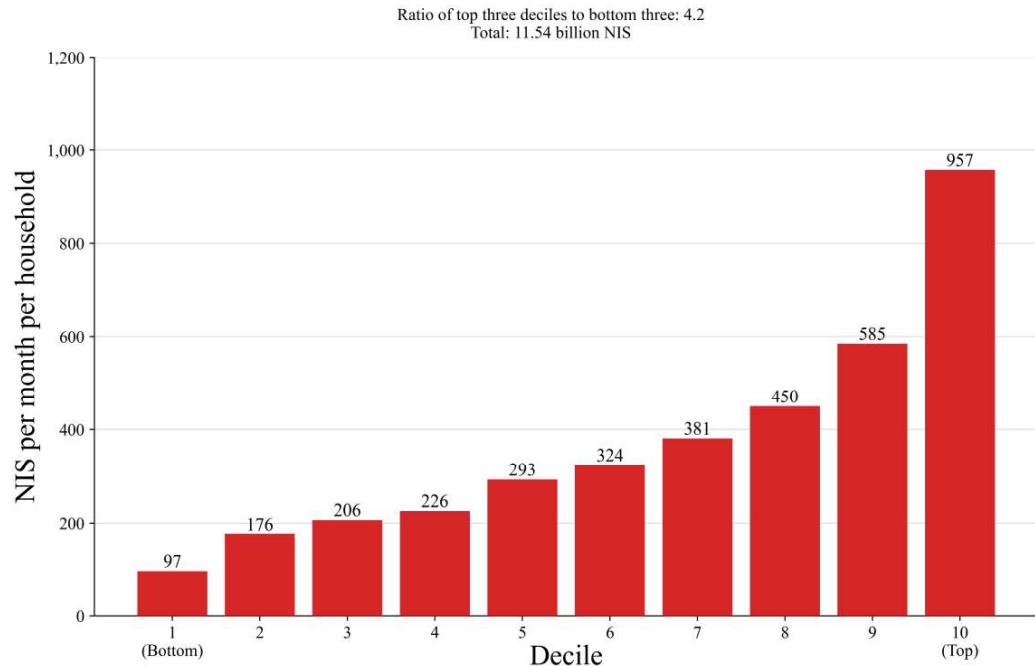
Figure 28 Average Payment of Real Estate Tax by Household Structure and Resident Children
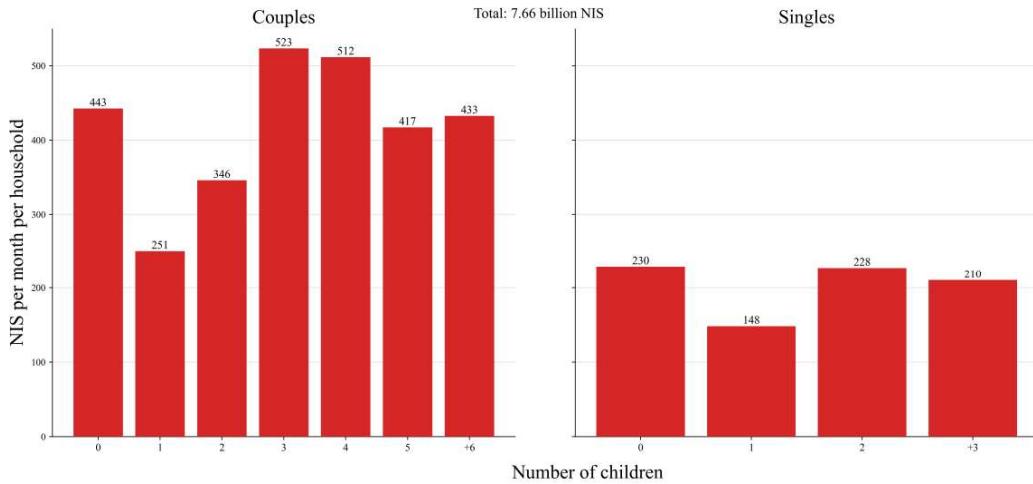
Figure 29 Average Payment of Real Estate Tax by Income Decile and Population group
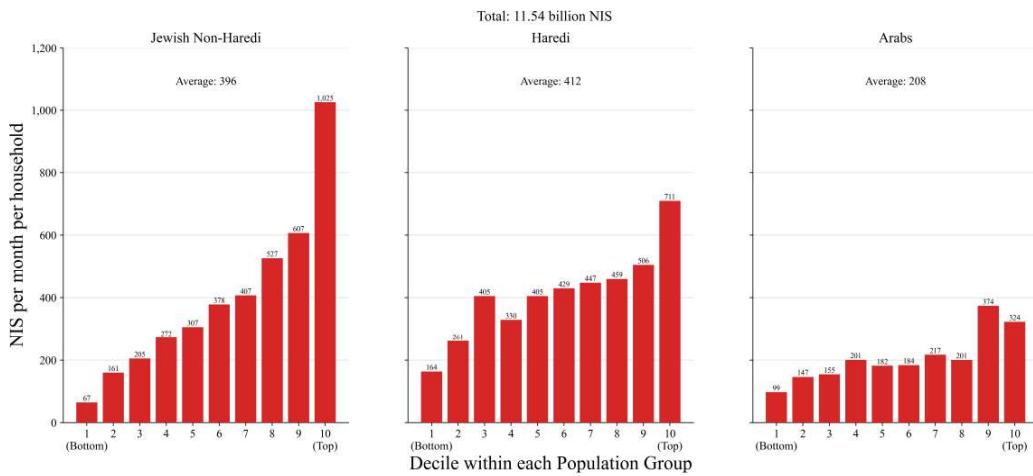
Customs

We attributed the state's income from customs duties to households according to their relative consumption of consumer products on which customs duties are imposed. While the research literature discusses the effects of customs duties on the equilibrium price of certain products, there is almost no reference in the literature to how the burden of customs payments is divided among the various actors in the economy. Therefore, and based on the fact that customs duties are imposed on specific products, thus raising their prices, we assume that customs payment is similar to purchase taxes, which are also imposed on specific products. That is, a customs duty is similar to a purchase tax imposed on imported products rather than on domestic ones. Accordingly, the entire burden of the customs duty passes to the consumer; therefore, if a household consumed 0.2% of the total consumption of products subject to customs duties, then we attribute to it 0.2% of the total customs duties, while taking into account the inflation weights and the specific products subject to customs duties that it consumed. To account for this, we performed the attribution according to the rate of state revenues from customs duties by category. For example, if products such as agricultural and food products constitute 46.1% of the state's total revenues from customs duties, then these products received this weight when attributing the customs duties (Chief Economist Division,

2022).[8] The breakdown of products and their weight in the attribution can be found in the following table:

Table 3 – Details of Customs Duties in the Household Expenditure Survey and Their Weights in Attribution

Product Name	Corresponding Items in Expenditure Survey	Percentage of Total Customs Duties
Agriculture and food	c30, c31	46.1%
Vehicles and their parts	c383265, c383174, c383182, c383190, c383208, c383216, c383224	27.9%
Electrical and electronic appliances, wood, paper and furniture	c34, c375	19.8%
Alcohol and vinegar	c309336, c307	2.3%
Leather and textiles	c35	1.4%
Miscellaneous	c395, c396, c376	1.4%
Pharmaceuticals and cosmetics	c335, c393	0.6%
Tobacco and its substitutes	c391	0.3%

It is important to note that the monetary expenditure of households (due to the tax burden) does not constitute the main burden with regard to customs duties, but rather only the tip of the iceberg. Unlike indirect taxes on consumption (such as VAT), customs duty is imposed only on imported goods, thereby affecting the Israeli economy's relationship with the global market. As a result, customs duties may limit the exposure of certain markets in the Israeli economy to international trade, which often manifests in comparatively high prices and low efficiency internationally (in foodstuff, for example). Thus, the "visible" burden of customs duties represents only a small part of the full burden of customs duties.

In fact, examining the actual monetary burden may be misleading. If a certain product has such a high customs duty that it prevents its importation, causing households to avoid purchase or to purchase it in the domestic market at a much higher price than the international price, the calculated monetary burden of the customs duties will be zero, while the true economic burden is high.

The following Figures show the distribution of customs payment by household structure and resident children, as well as by income decile and population group.

Figure 30 Average Payment of Customs by Household Structure and Resident Children

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[8] The data on income from customs duties by category are from 2020.
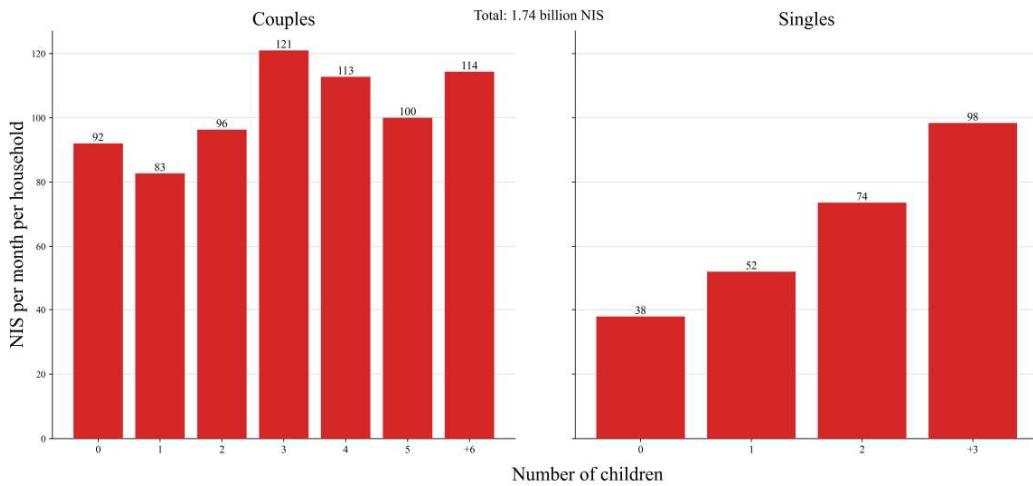
Figure 31 Average Payment of Customs by Income Decile and Population group
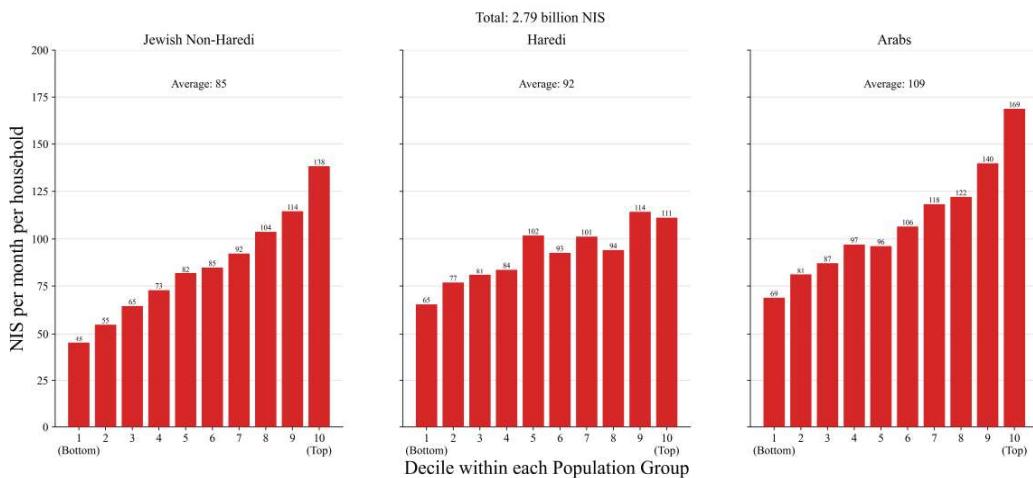
Fees

A fee means a payment that the state imposes in return for the consumption of some government service, usually with the aim of pricing its costs. According to this logic, there is no need to attribute fees to households as a tax, since they constitute payment for a product or service chosen by the households. Nevertheless, the connection between the cost of the fee and the cost of the service appears to be weak (for example: vehicle license fees); therefore, it is reasonable to assume that a fee is mostly a tax imposed on the consumers of various government services.

The Survey contains a number of expenditure items of fees as described in the following table:

Table 4 – Fee items in the Household Expenditure Survey

Item Name	Item Code
Education fee	c336032

Item Name	Item Code
Radio and television fee	c375170
Registration and ownership transfer fee (of vehicle)	c383083
Road travel fee (toll)	c384065
Fees and payment for permits	c394130
License for motorcycle, scooter, etc.	c383067
License for car	c383075
Driver's license renewal	c383349
Passport expenses	c382051
Rabbinate services, marriage registration	c394031

In the Survey, the total expenditure on these items stands at 3.839 billion shekels in 2018, while the total income from fees according to the GFS is 6.189 billion shekels. For some of these items there is no data in the files at the six-digit level in the expenditure survey, and these are empty items:

1. Education fees.
2. Passport expenses.
3. Rabbinate services, marriage registration.
4. Driver's license renewal.

The most significant fee among the fees identified in the Survey data is the vehicle license fee (approximately 3.511 billion shekels out of 3.839 billion fees in total). We could not locate a reliable source of state revenues reporting income from fees with a breakdown by type of fee. Nevertheless, reports written before or after 2018 can be used to obtain an indication of the order of magnitude involved: according to the state revenue report from 2015-2016, approximately 4.7 billion shekels of the total fees paid in these years were fees collected by the Ministry of Transportation (Chief Economist Division, 2016). Similarly, in the years 2019-2020 the same report reported similar values (Chief Economist Division, 2022).

In addition, a significant portion of state fees is paid by businesses (fees paid to local authorities, for example). The burden of these fees is placed on consumers and business owners, according to the relative elasticities of supply and demand, so that these fees can be treated as another purchase tax, which is rolled mostly or entirely onto consumers. Alternatively, it can be argued that the burden of fees falls in a manner more similar to corporate tax.

In our estimation, the burden of fees identified in the Survey (approximately 4 billion shekels) falls entirely on the household that pays the fee. Regarding the burden of the remainder (approximately 2 billion shekels, which is the gap between the GFS and the Survey data), we assume that it is distributed similarly to corporate tax: one-third consumption, one-third labor, and one-third capital; according to this assumption, we attribute the remainder to households.

The following Figures show the distribution of payment of fees by household structure and resident children, as well as by income decile and population group.

Figure 32 Average Payment of Fees by Household Structure and Resident Children
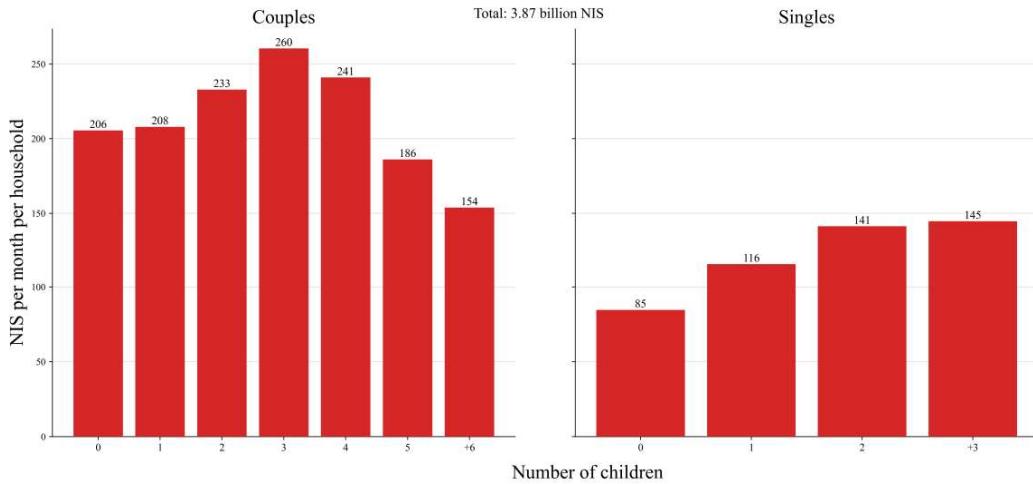
Figure 33 Average Payment of Fees by Income Decile and Population group
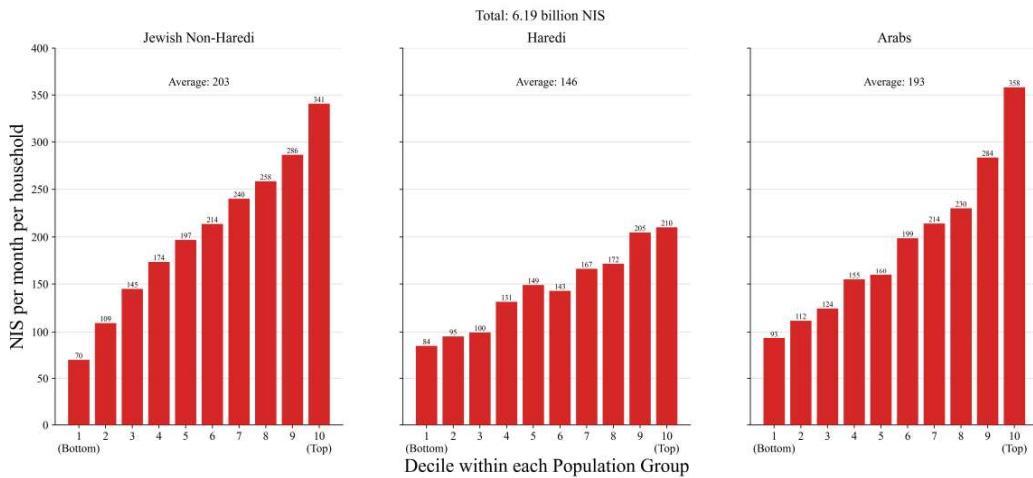
## Transfers and Public Services

The transfers and services attributed to households in the central analysis of this paper are: health care, education services, social allowances and other direct transfers, welfare services, public transportation subsidies, cultural and religious services and public housing.

Public Health Care Services

The total expenditure in public financing for health in 2018 was 64.682 billion shekels (Central Bureau of Statistics, 2021b). From this amount we deduct 1.933 billion shekels, which constitute the state's investment in health infrastructure (this is discussed under infrastructure). A naive estimate of the value that households receive from public health services could be the public expenditure on health per capita. However, health services usage profile changes sharply across age, with infants requiring more resources than young adults, and the elderly requiring more resources than both of these combined. For example, the budget that the government transfers to the health maintenance organizations (*kupot cholim*) takes into account the different age and gender composition of the insured in each HMO (the capitation formula), and recently (2017) the capitation formula was updated to include an additional "compensation" (transfer of additional resources), according to the number of

insured residing in areas considered periphery. The following chart presents the equivalence scale of public expenditure on health by age group in Israel (capitation formula).

Figure 24 Capitation Formula by Age Group and Residential Area in Israel
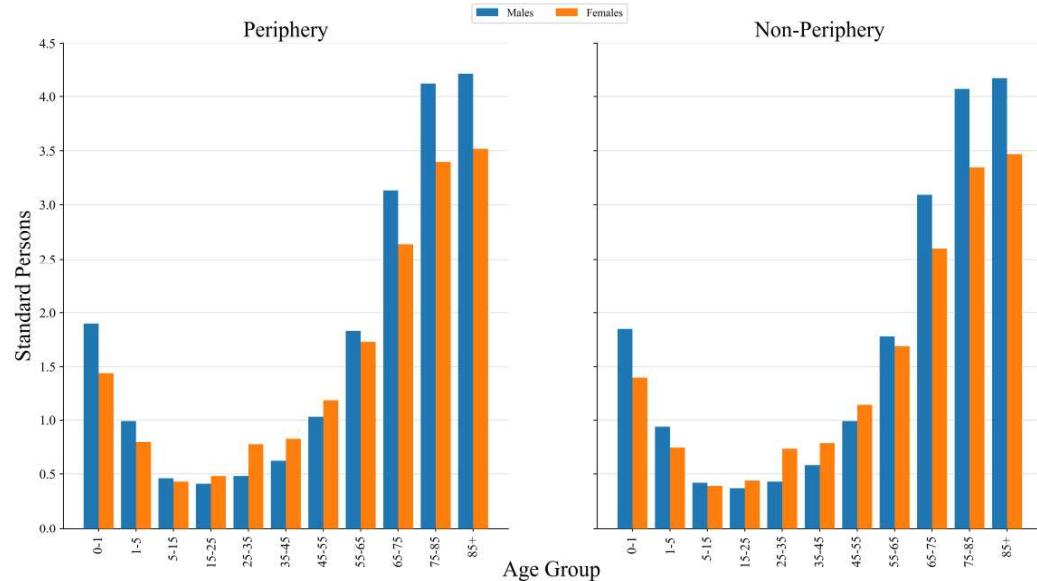
As shown in the figure, men in the periphery aged 1 to 5 were normalized to 1 and all other groups receive a certain weight relative to them – so that women in the periphery aged 85+ receive 3.5 times more than them, and men aged 5 to 15 receive less than half. In addition to the capitation formula, there are other equivalence scales. Achdut, Ben-Nun and Pulitzer (2016) estimated the profile of public expenditure on health by age in Israel, also conducting an international comparison of public health expenditure while adjusting for the different age composition in different countries. This scale yields almost identical results to the better-known capitation scale. We therefore used the capitation formula as the relevant scale, the unit of measurement of which is "public health standard".

The estimate is an insurance estimate: public health services constitute insurance for Israel's residents. Every resident in Israel has the right to use public health services, and thereby receives "insurance value" from their existence, even if they did not use them at all. In the absence of public health services, it is reasonable to assume that families would purchase some health insurance or pay directly for medical service. Within the framework of public health, this payment is saved, and therefore it constitutes imputed income (Verbist & Förster, 2019).

In 2018, there were 8,586,448 people in Israel, equivalent to 9,448,474 standardized persons of public health. We divided the total public expenditure on health by the total standardized persons and found that the public expenditure on health per standardized person in 2018 stood at 6,627 shekels (552.25 shekels per month). This in-kind income was attributed to households according to the number of people in each age cohort, by gender and by the household's place of residence.

As an example, if a household in the periphery has three resident persons, aged 8, 42 and 80 – we attributed the total value of monthly health services thus:

$$(0.46 + 1.03 + 3.4) \times 552.25 = 2,696.15$$

In total, we attributed 62.62 billion shekels in health expenditure to households.

The following figures show the distribution of the value of public health services by household structure and resident children, as well as by income decile and population group.

Figure 35 Average Value of Public Health Services by Household Structure and Resident Children
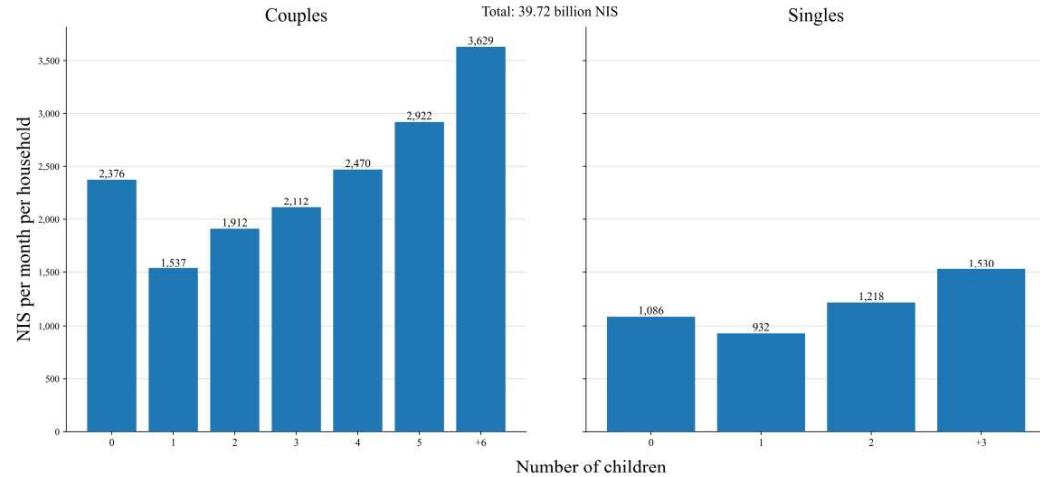
Figure 36 Average Value of Public Health Services by Income Decile and Population group
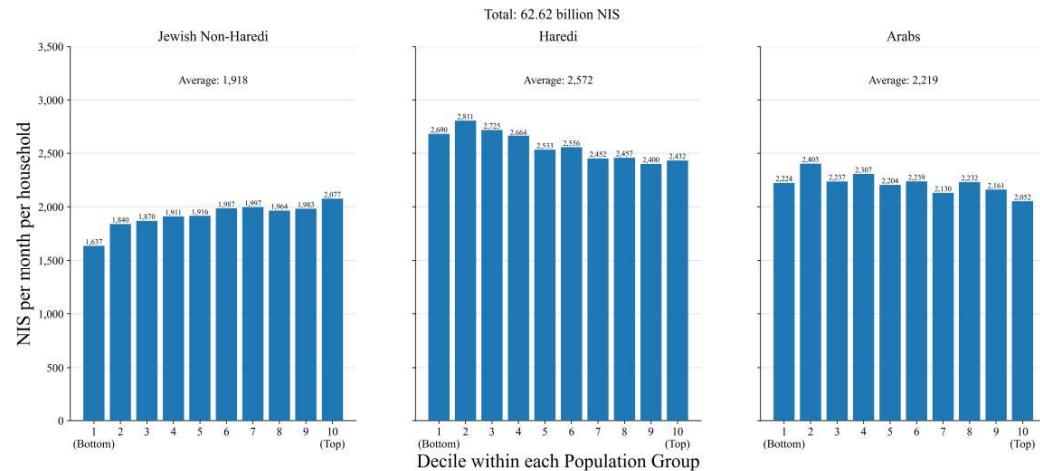
Public Education Services

In order to attribute to households the value of the public education services they received, we used the Actual Consumption approach (Verbist & Förster, 2019). The beneficiaries of public education services are the students themselves, and the value of services differs between educational stages (the cost per student in elementary school is lower than the cost per student in high school) and is directly aligned with the age of the children (except for exceptional cases such as skipping grades and grade retention). The number of children per household is identifiable in the Survey data, and through their age, also the educational stage they are in. In

addition, the vast majority of education in Israel is public, therefore the public expenditure on education can be attributed to all households with children at the relevant ages. The accepted division in the research literature is into the main educational stages according to ISCED-97:

1. Pre-Primary – age 0 to 5: daycare centers, public preschool, pre-mandatory preschool, mandatory preschool.
2. Primary – age 6 to 11: grades 1 through 6.
3. Lower-secondary – age 12 to 14: grades 7 through 9.
4. Upper-secondary – age 15 to 17: grades 10 through 12.
5. Tertiary – (academic, engineering, etc.).

We perform the attribution of tertiary education subsidies separately in the next chapter. In order to obtain an estimate of the cost per student in the other educational stages in Israel, we used three main sources:

1. The National Expenditure on Education from the CBS (Central Bureau of Statistics, 2021a).
2. The Ministry of Education's "*Mabat Rachav – Misparim B'Chinuch*" (A Broad View – Numbers in Education) data site (Ministry of Education, 2023a).
3. The Ministry of Education's "*Shkifut B'Chinuch*" (Transparency in Education) data site (Ministry of Education, 2023).

From the publication of the National Expenditure on Education, we calculate the general government's net funding for education by educational level in 2018. The net funding calculation allows us to overcome double counting of expenditures and to account only for expenditures that go directly to the provision of education services, without intermediate stops. For example, if the Ministry of Education spends 20 billion shekels and local authorities 20 billion shekels, but 10 billion shekels of the Ministry of Education's expenditure are transfers to local authorities for education services – the total net funding is 30 billion shekels and not 40 billion shekels. In total, the general government's national expenditure on education in 2018 was 64.478 billion shekels.

From the "Numbers in Education" system, we took the number of students in each educational level in the 2017/18 academic year, as well as the number of students in each stage and population group. In order to merge this data with the Survey data according to the main population groups in Israeli society analyzed in this study (Haredi Jews, Arabs, and non-Haredi Jews), we aligned the classifications to the different groups. The Arab sector includes the Arab, Bedouin, and Druze groups and the Circassian group was integrated into the non-Haredi Jewish sector.

Combining the expenditure on education in public funding and the number of students by educational stage yields the average expenditure per student by stage. However, this is a naive estimate that assumes uniform distribution among groups within each educational stage – that is, that the public expenditure on an Arab high school student is identical to that of a Haredi Jewsih or non-Haredi Jewish one.

In order to account for these differences among groups, we use data from the "Transparency in Education" system, which maps the lion's share of public expenditures in the education system. According to the Ministry of Education (2019), "Transparency in Education" maps 50.324 billion shekels that include "budgets that can be directly attributed to educational activities in local authorities and in educational institutions." This budget includes "salaries of teaching staff" (from preschools through upper secondary) as well as payments other than teachers' salaries – payments to local authorities and proprietors, procurement and allocations. The system does not map the participation of local authorities in school funding, parental

payments, and third sector budgets. Using data from the "Transparency in Education" system, we calculated the distribution of expenditure per student by educational stage and population group, so that at the end of the process we obtained a budgetary equivalence scale that expresses the ratio in budgeting across these dimensions. For example, the expenditure on a Haredi student in upper secondary compared to an Arab student in primary school. Further details on calculating the distribution are described below.

We then aligned the distributions we calculated using the administrative data above with the national expenditure in net public funding by educational stage so that the total calculated expenditure would be identical to the national expenditure, while preserving the distribution. The national expenditure in net public funding is given by educational stages: pre-primary, primary, post-primary, and general administration. However, for the purpose of inflation, we needed to combine the total expenditures in the primary and post-primary educational stages, since there are many "mixed" educational institutions that include students from different stages. For example, approximately 20% of middle school students (grades 7-9) study in educational institutions defined as "primary only." Finally, we added the remainder of 2.763 billion shekels in the "general administration" educational stage to all students at all stages uniformly.

The following figure shows the results of this calculation per month by sector and education stage, followed by an explanation of the process.

Figure 37 Monthly Expenditure per Student by Sector and Education Stage
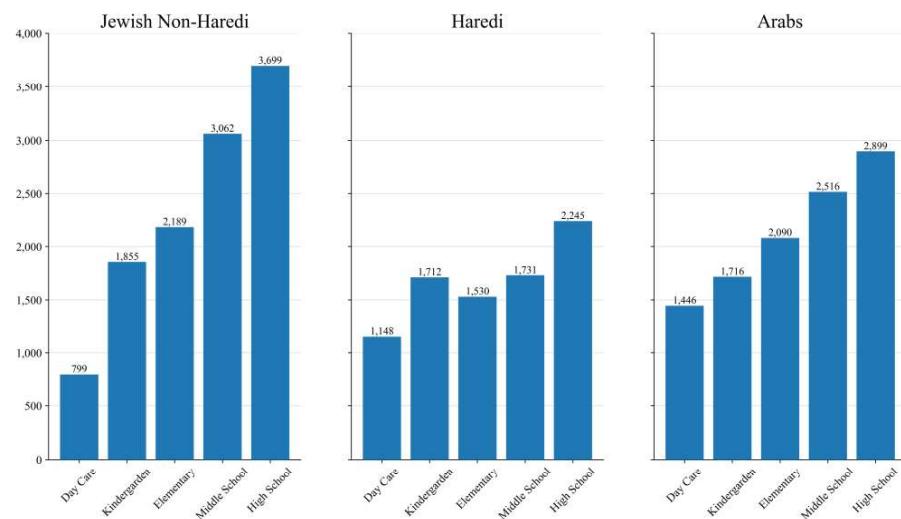
Calculating the Distribution of Public Expenditure on Education by Sector and Educational Stage

In order to obtain an estimate of the cost per student at each educational stage (the figure above), we used data from the Ministry of Education's "Transparency in Education" data site for the 2017/18 academic year. The "Transparency in Education" data breaks down the cost per student by educational stage (pre-primary, primary, middle school, upper secondary); by track (state, state-religious, or Haredi supervision); or by sector (Jewish, Arab, Druze, Bedouin, Circassian). In order to obtain an estimate of the cost per student by educational stage and sector (non-Haredi Jewish, Haredi Jewish, and Arab), we used the Ministry of Education's report generation system within the "Transparency in Education" and "A Broad

View - Education in Numbers" data sites. Many schools mix educational stages – for example, elementary schools including grades 1-8, or high schools that include both middle school and upper secondary. Therefore, in order to obtain an estimate of the cost per student at each educational stage separately, we performed the following calculation:

For each school (4,966 educational institutions in the 2017/18 academic year, excluding preschools), we identified the sector, the track, the figure for "total budget for salaries and payments" (from "Transparency in Education"), the total number of students, and also the number of students in each grade (from "A Broad View - Education in Numbers"). In order to obtain an estimate of the cost per student by educational stage, sector, and track – in each school we calculated the average cost per grade, under the assumption that the cost is distributed equally among grades within each school, and then divided that by the number of students in the grade to obtain the cost per student in each grade.

We then summed the total costs and total students in each combination of educational stage-sector-track across the entire country, and thus obtained an estimate of the cost per student in each group-track-grade.

We will illustrate using the example of the state-Hebrew elementary school "Aran" in Tel Aviv-Yafo (institution symbol 513077). The total budget of "Aran" in the academic year 2017/18 was 6,904,197 shekels. The educational grades in this school are 1- 6, and it had 18 classes, making the total budget per class 383,566.5 shekels. In 1st grade there were 3 classes and 61 students, and in 6th grade 3 classes and 87 students. By dividing the budget per class by the average number of students per class in each grade, we find that the budget per student in 1st grade was 18,864 shekels and in 6th grade was 13,226 shekels.

For preschools (ages 3 - 5, a total of 18,712 preschools in the 2017/18 academic year), we proceeded in a slightly different way. The Ministry of Education's "Transparency in Education" data does not present the total budget for each preschool because they are operated by the local authorities, making it impossible to obtain an estimate of the cost per student in preschool by group, only at the local authority level.

In order to obtain an estimate of the cost per student in preschools in each group, we proceeded as follows: for each local authority, we identified the number of preschools, number of preschool classes, students in preschools, and the total budget of all preschools in the local authority from the "Transparency in Education" data site. We merged this data with data from "A Broad View - Education in Numbers", which has the option of breaking down preschool children into different sectors and tracks. Under the assumption that within each local authority the budget is divided "proportionally" to each preschool class in each grade level (pre-mandatory versus mandatory, etc.), it is possible to attach a cost to each child in each group, to sum the total costs across groups (at the national level), and then divide by the total children in each group.

We will illustrate using the example of Jerusalem. The total budget for preschools in Jerusalem stood at 861,466,476 shekels for 58,097 preschool children, of which - 7,003 are in the state-religious education, 26,451 are in Haredi education, 6,154 are in state-Hebrew education, and 18,489 are in state-Arab education, and the average expenditure for a child in preschool in Jerusalem is 14,828 shekels. We sum the total preschool children and total budget for each group across the entire country, and thus obtain an estimate of the cost of a preschool child in each group.

For children in daycare centers and early childhood facilities (ages 0 - 3), the data are not found in the administrative sources above. For this calculation, we used data from a Freedom of Information request to the Ministry of Labor regarding the number of subsidized toddlers

by group as well as the total funding (Attia 2021). According to the response we received, the general government subsidized frameworks for 125,442 toddlers at a total cost of 1.12 billion shekels in 2018. The number of subsidized 0-3 year olds and the average budget per toddler in each group is: 88,537 non-Haredi Jewish toddlers (7,650 shekels per year), 30,831 Haredi Jewish toddlers (11,455 shekels per year), and 6,074 Arab toddlers (14,695 shekels per year).

In addition to the cost per student in schools and preschools, there are also "budgets that are not transferred or attributed directly to an educational institution by institution symbol; for example, student transportation budgets transferred to the local authorities and not directly to institutions".[9] The total budget for salaries and payments in 2017/18 stood at 50.282 billion shekels, and the total budget for educational institutions with students stood at 43.479 billion shekels – a disparity of 6.803 billion shekels.

In order to also attribute this gap to students (and subsequently to households), we calculated the disparity between "total budget for salaries and payments" and "total budget for educational institutions with students" in each local authority; then calculated the number of students and preschool children in each group in each local authority. Under the assumption that within each local authority this excess budget is divided "proportionally" to each student and preschool child, we included this cost within each group and educational stage.

Finally, as we described above, we align the total distributions we calculated with the fiscal data from the National Accounts for net public funding by educational stage. The following tables present the relevant data for the alignment:

Key Data for Attribution of Public Expenditure on Education, 2017/18 Academic Year

Educational Level	Total Expenditure According to Ministry of Education Data (billions of shekels)	General Government Financing (billions of shekels)	Students
Pre-primary	10.612	11.696	639,209
Primary	17.71	50.019	936,144
Post-primary	22.929		821,648
General administration		2.763	
Total	51.25	64.478	2,397,001

Notes: Students in pre-primary include 125,442 toddlers aged 0 to 3 who are partially subsidized. State financing for primary and post-primary together stands at 50.019 billion shekels. It is not possible to separate the amounts within these levels. Additional details in the text.

Key Data for Attribution of Public Expenditure on Education: Students by Educational Stage and Sector, 2017/18 Academic Year

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[9] The note on the data site in full: "There is an inherent disparity between the data on the total budget for educational institutions with students and the data on total budget for salaries and payments, due to budgets transferred to the local authority for organizational frameworks that are not schools or preschools with children, and budgets that are not transferred or attributed directly to an educational institution by institution symbol - for example, student transportation budgets transferred to the local authorities and not directly to institutions, despite the allocation to institutions with students".

Educational Level	Educational Stage	Haredi Jews	Arabs	Non-Haredi Jews	Total
Pre-primary	Daycare/Toddlers	30,831	6,074	88,537	125,442
Preschools		120,068	106,655	287,044	513,767
Primary	Primary	183,003	225,488	527,653	936,144
Post-primary	Middle school	74,193	112,579	243,184	429,956
Upper secondary		64,075	101,685	225,932	391,692
Total		472,170	552,481	1,372,350	2,397,001

Attribution to Households

After we estimated the cost for each sector and educational stage, we attributed this value to households using the ages of children resident in the household. The ages of children in the Household Expenditure Survey are listed in 4 age groups: 0-4, 5-9, 10-14, 15-17. Public education in preschool begins at age 3 and continues until age 5, in primary the ages are 6 to 11, in middle school age 12 to 14, and in upper secondary 15 to 17. Due to the incomplete overlap of these age groups, we assumed uniform distribution within each age group (that is, in the 0-4 age group, 20% of the children are aged 0, 20% are aged one 1, and so on) and then attributed accordingly.[10] For example, a household with a child aged 0 to 4 received 40% (the probability that they are 3 or 4 years old) of the total monthly cost of a preschool child. A child aged 5 to 9 received 20% (the probability that they are 5 years old) of the total monthly cost of a preschool child and 80% (the probability that they are 6 to 9 years old) of the total monthly cost of a primary school-aged child. A child aged 10 to 14 received 40% (the probability that they are 10 or 11 years old) of the total monthly cost of a primary school-aged child and 60% (the probability that they are 12 to 14 years old) of the total monthly cost of a middle school-aged child. The 15-17 age group corresponds exactly to upper secondary, and therefore children in this age group received 100% of the total monthly cost of an upper secondary-aged child.

For toddlers in subsidized daycare centers, we identified the number of toddlers in each household whose current educational institution is "daycare/toddler facility." Unfortunately, from the available data it is not possible to distinguish between toddlers in private versus subsidized toddler facilities. Therefore, we attributed the toddler subsidy to households probabilistically: we used data from the Ministry of Labor regarding the number of toddlers in subsidized frameworks and the subsidy per toddler by group (as detailed above) in order to calculate the probability that a toddler in a facility from a certain group is in a subsidized framework. According to our calculation, the probability of an Arab toddler in a framework being in a subsidized framework stands at approximately 33%, and the annual expenditure for subsidy per toddler is 14.7 thousand shekels. For non-Haredi Jewish toddlers, the probability is approximately 60%, and the annual expenditure is 7.7 thousand shekels; for Haredi Jews the probability is 64%, and the annual expenditure per toddler is approximately 11.5 thousand shekels.

The following figures show the distribution of the value of public education services by household structure and resident children, as well as by income decile and population group.

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[10] In a check we performed on more detailed data of the respondents in the Household Expenditure Survey in the CBS research room, we found that the distribution within each age group is indeed very close to uniform.

Figure 38 Average Value of Public Education Services by Household Structure and Resident Children
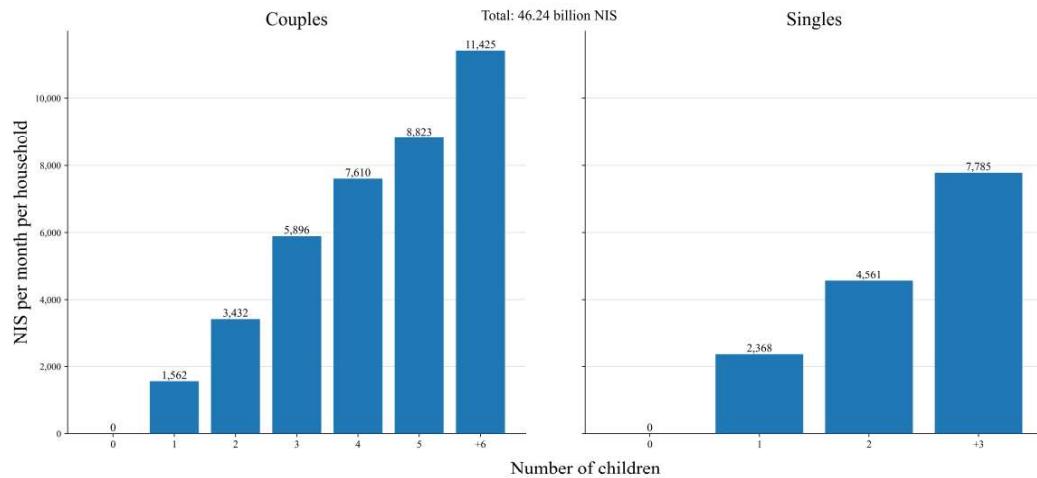

Figure 39 Average Value of Public Education Services by Income Decile and Population group
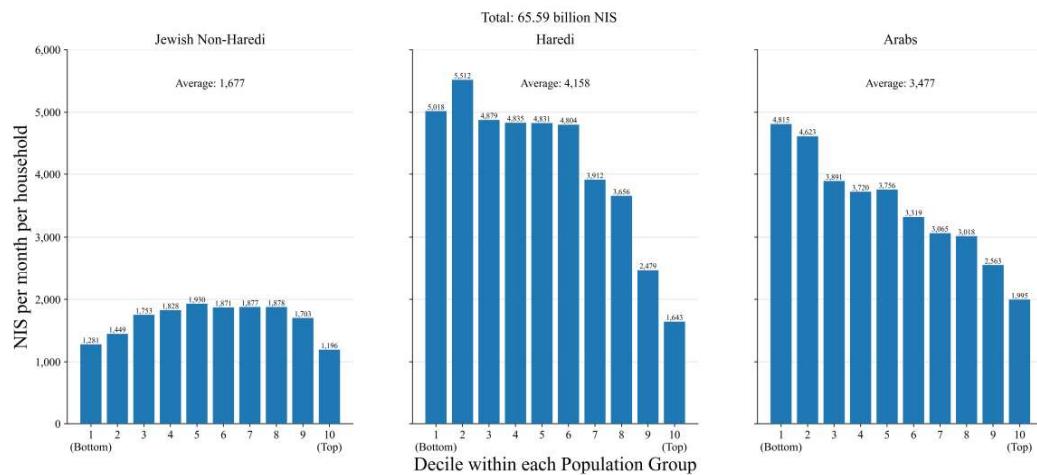
Higher Education Services

Academic Education

Students in Israel who study at universities and public colleges pay tuition in accordance with their choice of degree and extent of study, but this payment is determined by the Council for Higher Education (henceforth: CHE) and does not cover the costs of what they receive; the state pays the difference directly to the institutions. According to Verbist & Forster (2019), the amount of public expenditure on academic education that should be attributed to households is the total public expenditure on higher education, excluding expenditures on research and development. According to the CHE's regular budget booklet for 2018/19 (Council for Higher Education, 2017), the total CHE budget in 2018 stood at 11.078 billion shekels, with expenditure on research and development reaching an additional 1.380 billion shekels. Since higher education institutions have substitutability between research and development budgeting and other budgeting, and since the quality of training and teaching is

also related to the quality of research, we chose the position that the total expenditure (including research and development) should be attributed to students; therefore, we attributed the total of 12.46 billion shekels to students.

The beneficiaries of academic education subsidies are the students themselves. According to the CHE, there were, in 2017/2018, 308,338 students in all academic institutions in Israel, with 15% of them studying in institutions that are not publicly funded (private colleges). According to our unified Survey data, the number of students is larger and stands at 364,512 students.[11]

There are several possible methods to attribute public expenditure on academic education to households – the first option is a simple estimate, which attributes to each student the average expenditure per budgeted student. The public Survey data do not allow us to distinguish between students studying at a private college and those at a publicly budgeted academic institution; therefore, our estimate of the annual subsidy per student is 34,179 shekels per year, or 2,848 shekels per month.[12] This estimate by its nature will be a slight underestimate of the extent of subsidy for a student at a state funded institution and a significant overestimate for a non-funded student.

Another option is to use a method similar to that employed in attributing pre-academic public education, also taking into account the known differences in the rate of students attending different types of academic institutions by decile and sector (Zussman, Lipiner and Rosenfeld 2019). This calculation yields similar results, and due to its complexity we preferred the simpler method.[13] In addition, although there are known differences between sectors in the rate of students attending funded versus private institutions, there are also differences in the level of funding for different sectors (Karlinsky, 2021a) and between fields of study (Council for Higher Education, 2020), and these may offset each other.

The following figures show the distribution of the value of higher education services by household structure and resident children, as well as by income decile and population group.

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[11] An individual in the Household Expenditure Survey was classified as a student if they reported that they are "currently studying" and that their current educational institution is an "academic institution." We sent an inquiry to the CBS regarding the disparity between the two figures but at this stage we have not received a response.

[12] In the Survey questionnaire, an individual reporting to be a higher education student also reports the name of the institution they study at. This information is not publicly available, and our request from the CBS to obtain the data or at least the type of institution in terms of budgeting was denied.

[13] The results of this estimation are available upon request from the authors.

Figure 40 Average Value of Higher Education Services by Household Structure and Resident Children
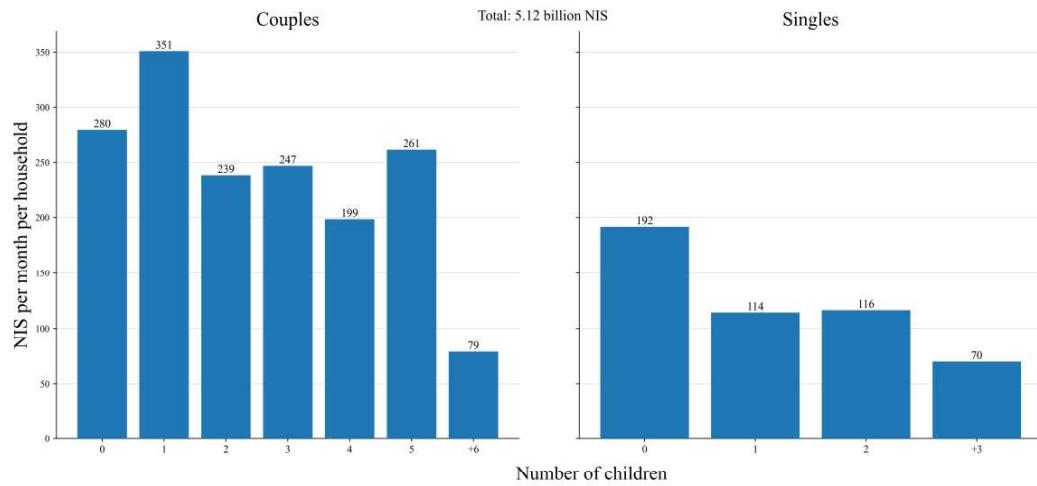

Figure 41 Average Value of Higher Education Services by Income Decile and Population group
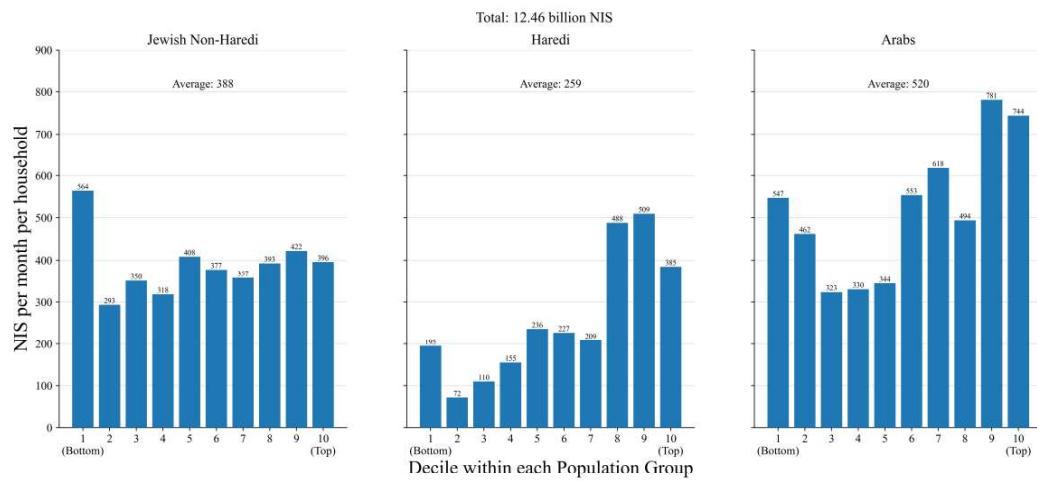
Non-Academic Tertiary Education

In addition to subsidizing academic higher education, the state also subsidizes non-academic post-secondary (or tertiary) studies. According to the unified Survey data, 87,881 individuals self-reported as studying at a "post-secondary (not towards an academic degree)" educational institution. Non-academic post-secondary education in Israel is divided into several main fields of study: teacher training seminaries and colleges; practical engineering students in grades 13-14 under the supervision of the Ministry of Education; and practical engineering students under the supervision of the Institute for Technological Training (MAHAT). In total, there were 59,085 students registered in these frameworks in 2017/18. In addition to these, it appears that those studying in vocational training for adults reported a non-academic post-secondary educational institution. According to CBS data, there were 51,606 students in vocational training in 2018 – of which 6,047 were funded.

According to the fiscal data from the National Accounts regarding net public financing by educational stage, the total budget in 2018 for non-academic tertiary education stood at 571

million shekels. Unfortunately, it is not possible to separate between fields of study in non-academic post-secondary institutions in the Survey data, nor between these studies and shorter vocational training courses. Therefore, we attributed to households the subsidy for non-academic post-secondary education by identifying individuals who self-reported as studying at a "post-secondary (not towards an academic degree)" educational institution and attributing the average budget of $\frac{571,000,000}{65,132} = 8,767$ shekels with the probability that it is indeed publicly funded (74%). That is, each individual identified in the Survey received $\frac{571,000,000}{87,881} = 6,497$.

The following figures show the distribution of the value of non-academic tertiary education services by household structure and resident children, as well as by income decile and population group.

Figure 42 Average Value of Non-Academic Tertiary Education by Income Deciles
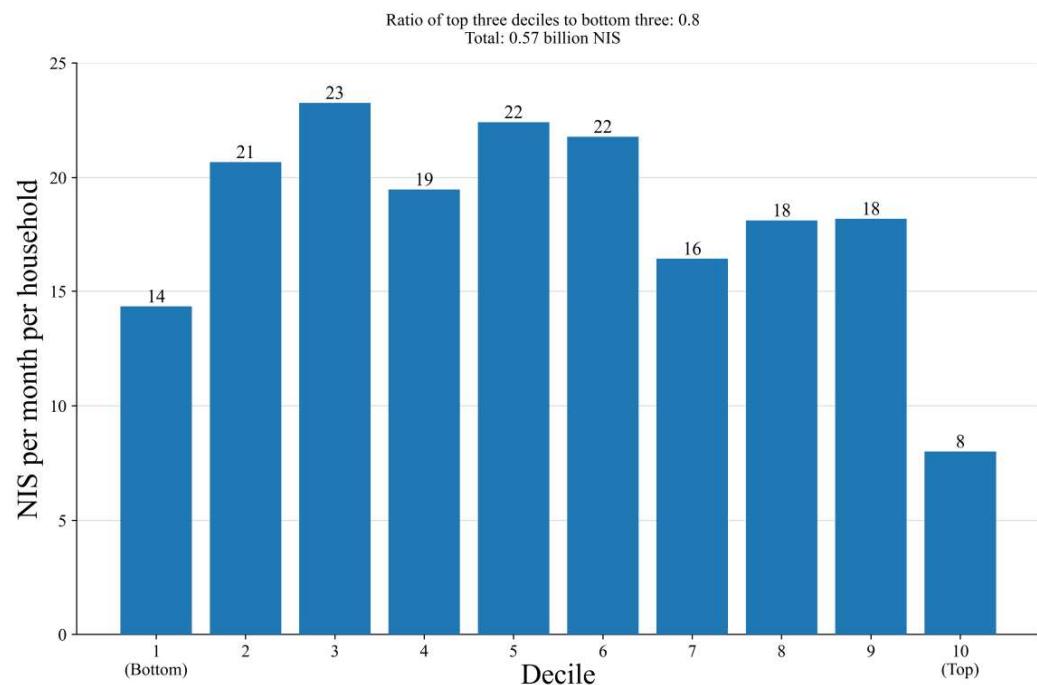
Figure 43 Average Value of Non-Academic Tertiary Education by Household Structure and Resident Children
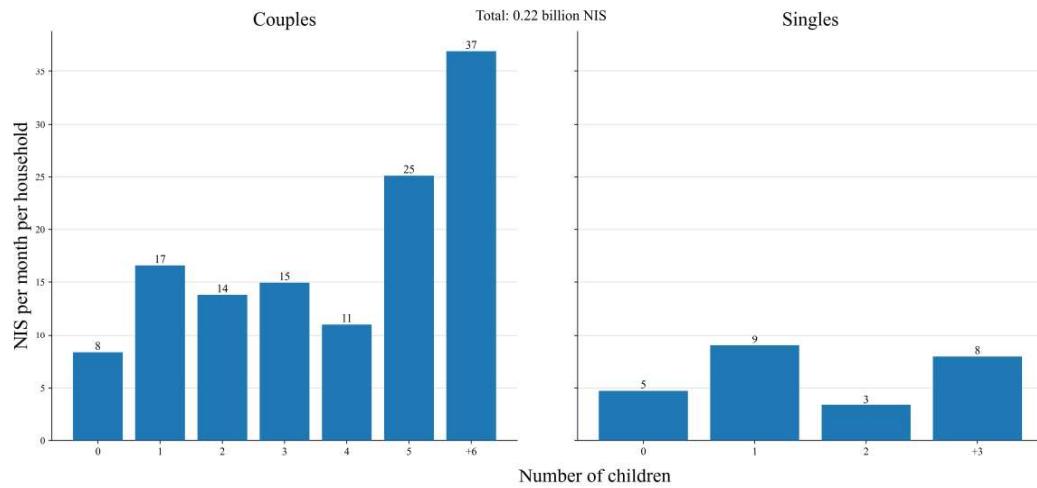
Figure 44 Average Value of Non-Academic Tertiary Education by Income Decile and Population group
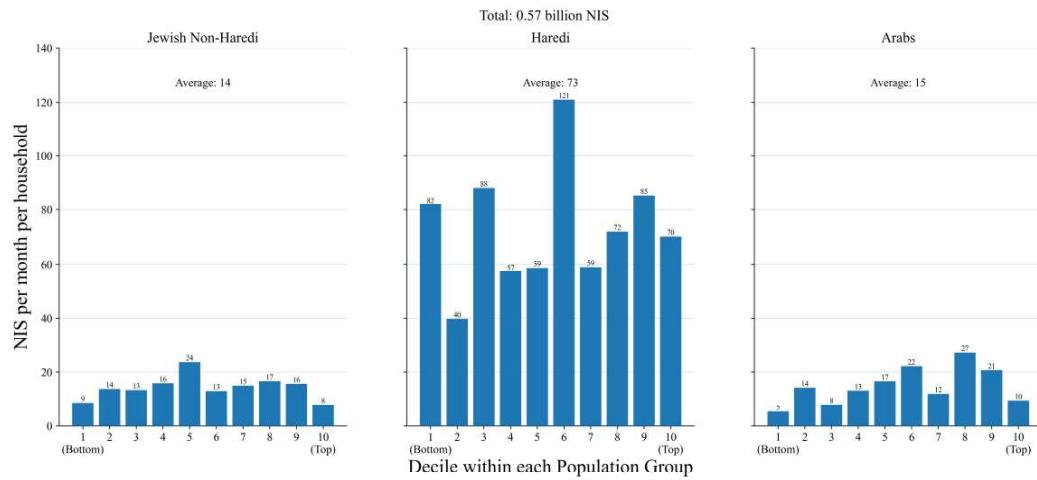
The following figures show the distribution of the value of all public education services (from early childhood to higher learning) by household structure and resident children, as well as by income decile and population group.

**Figure 45** Average Value of All Education Services by Income Deciles

Ratio of top three deciles to bottom three: 0.7
Total: 78.62 billion NIS
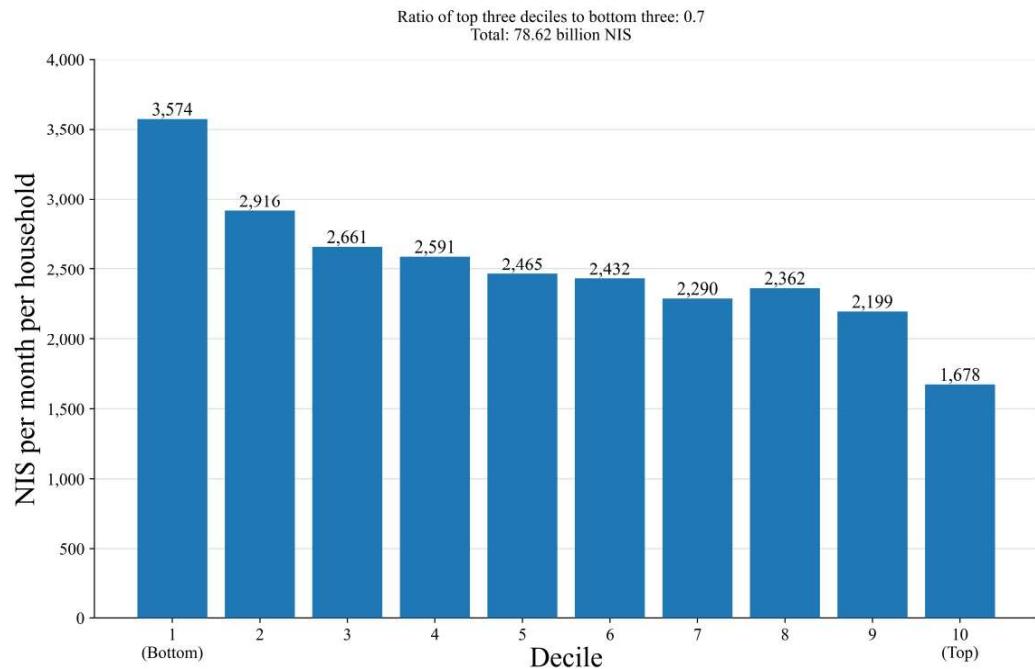
Figure 46 Average Value of All Education Services by Household Structure and Resident Children

Total: 50.32 billion NIS
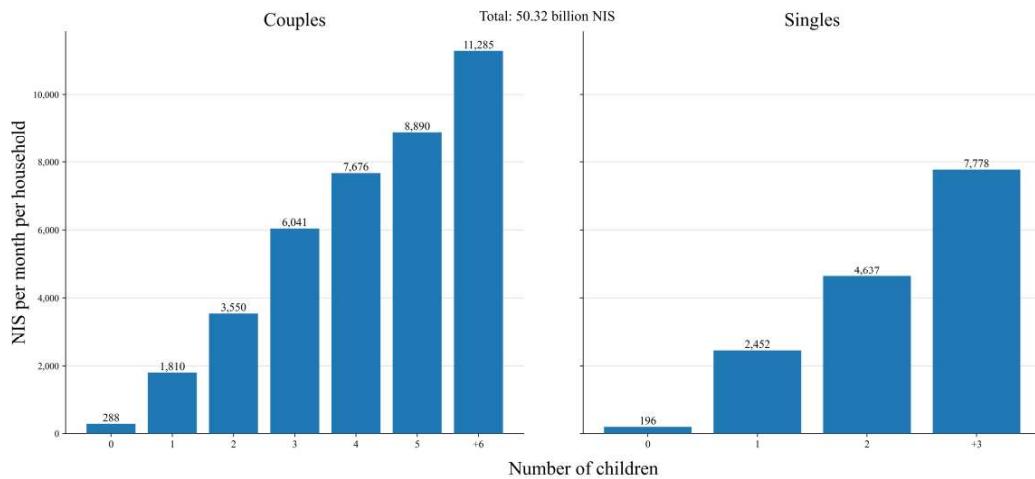
**Figure 47** Average Value of All Education Services by Income Decile and Population group

Total: 78.62 billion NIS

Jewish Non-Haredi — Average: 2,079
Haredi — Average: 4,490
Arabs — Average: 4,012

NIS per month per household

Decile within each Population Group
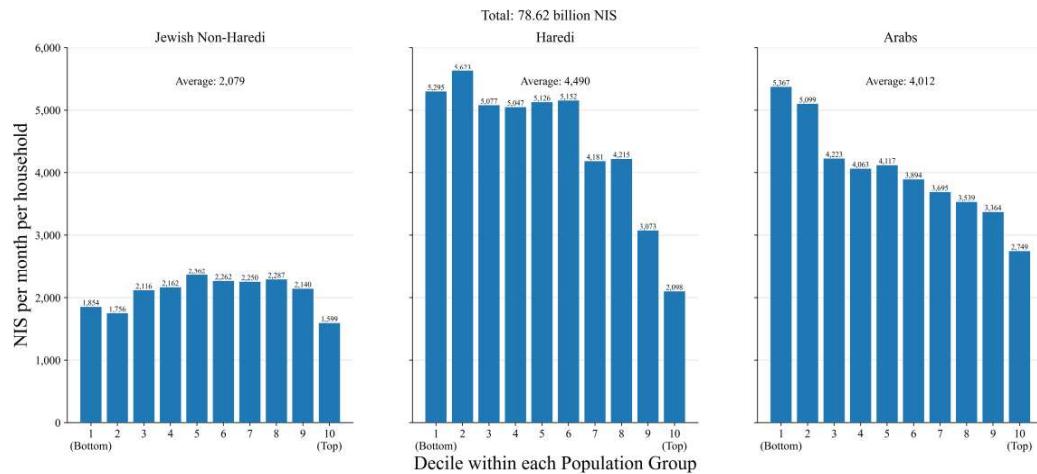
Welfare: Allowances and In-Kind Transfers

National Insurance Institute Transfers

National Insurance Institute allowances appear in the Survey as household income (item i141). The total allowances in our unified file reached 53.27 billion shekels. In contrast, the total allowances and pensions distributed by the National Insurance in 2018 stood at 83.89 billion shekels (National Insurance, 2019). Expenditure on service provision stood at 12.46 billion shekels, so that the administrative figure for National Insurance Institute allowances (that is, direct transfers to households) stood at 71.44 billion shekels (the value of in-kind services is discussed extensively later). In order to bridge the gap between the administrative fiscal figure (71.44 billion) and the Survey figure (53.27 billion), we performed several tests and adjustments.

First, the "Savings Plan for Each Child" government program is not included in the expenditure survey, and these transfers are not included in the Survey's calculation of child allowances. Therefore, we credited households with the transfers from this program, whereby each child in every household received a credit of 50 shekels per month, the amount that the state deposited for children in 2018. There is a disparity between the total amount of this program according to our attribution per the Survey (1.6 billion), versus the administrative figure (2.1 billion). The reason for this disparity is that some of these allowances were granted retroactively to older children starting from a certain year.

Second, we examined the average allowance amount and the number of beneficiaries for the various allowances according to the Survey and according to the administrative data. For some allowances, the average amount was lower in the Survey compared to the administrative figure, and the number of beneficiaries similar. For others, mainly allowances where a significant portion of the expenditure is not in direct transfers but in providing services (for example, nursing care), the average between the Survey and the administrative figure is similar, and the number of beneficiaries differs.

In light of all this, we aligned the Survey data with the administrative figure by multiplying household income from National Insurance allowances by the ratio of 71.44/54.89.

The Survey data also includes "transfers from other state institutions" (item i142). This item includes transfers from the Ministry of Defense, the Ministry of Finance, the Ministry of

Construction and Housing, from yeshiva institutions, and more. The total transfers in the unified file amounts to 8.86 billion shekels. The income item "from yeshivas" (1.67 billion shekels), is dealt with this later in the chapter on religion, so that the remaining expenditure items amount to 7.19 billion shekels. It is not possible to identify which fiscal figure they should be matched to, and there are also sub-items within this item that do not belong to welfare but to other areas of the general government's budget. Therefore, we left this item as is and did not perform a fiscal adjustment for it.

The following figures show the distribution of the value of National Insurance direct transfers by household structure and resident children, as well as by income decile and population group.

Figure 48 Average Value of National Insurance Direct Transfers by Household Structure and Resident Children
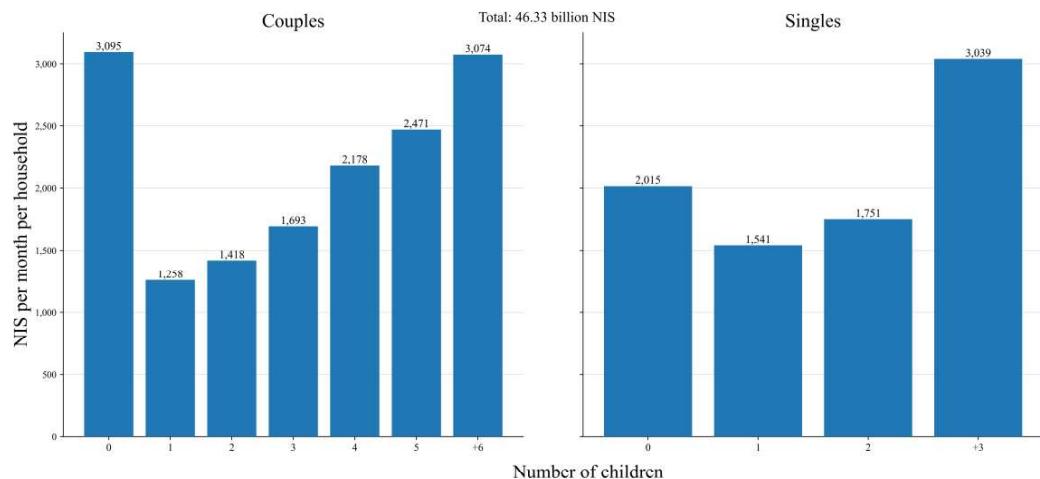

Figure 49 Average Value of National Insurance Direct Transfers by Income Decile and Population group
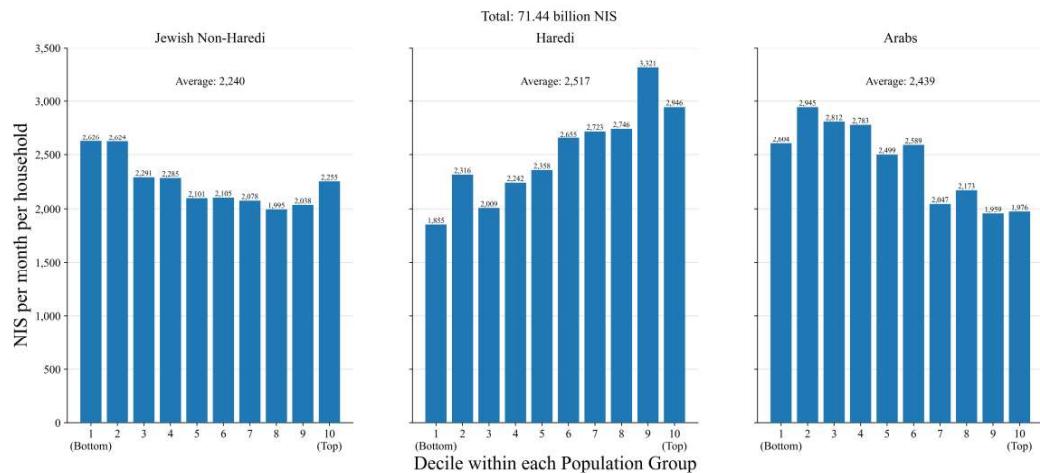
The following figures show the distribution of the value of National Insurance direct transfers by household structure and resident children, as well as by income decile and population group.

Figure 50 Average Value of Other Direct Transfers by Household Structure and Resident Children
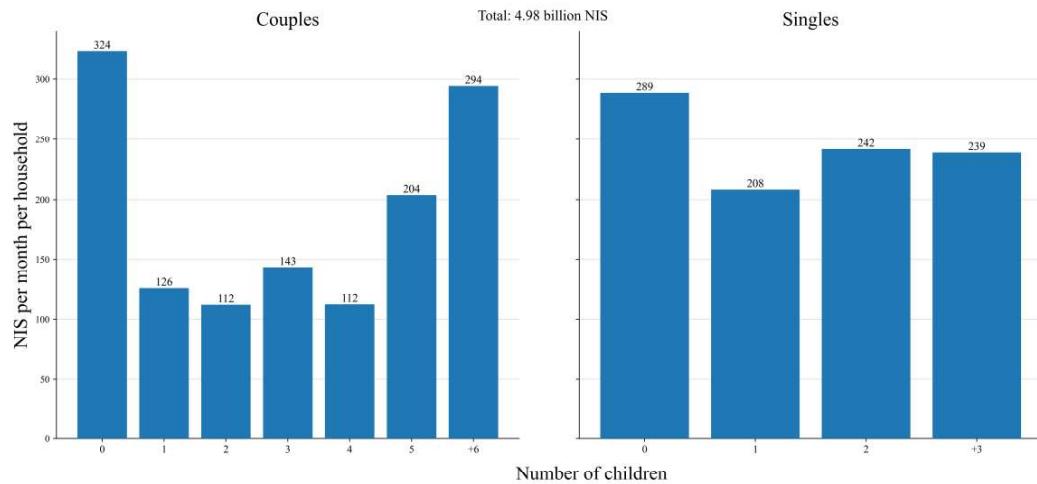

Figure 51 Average Value of Other Direct Transfers by Income Decile and Population group
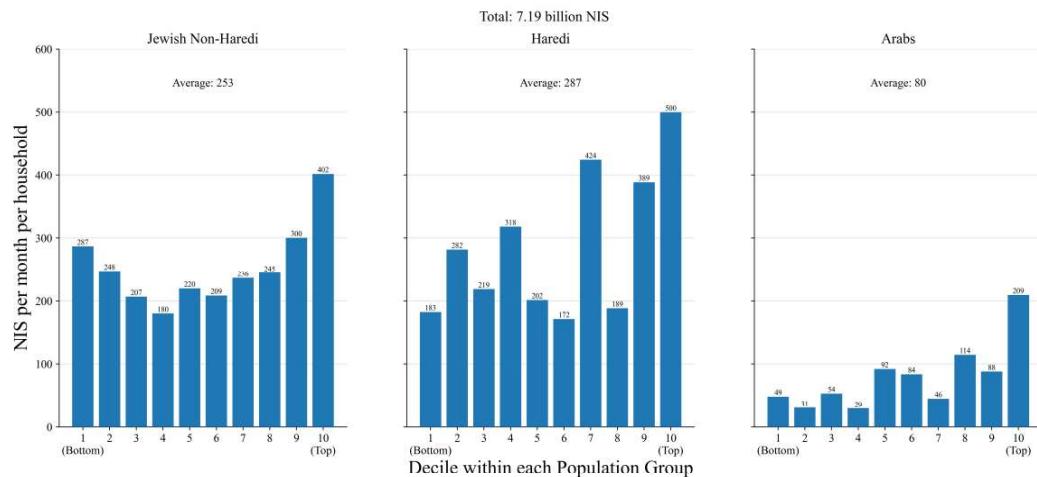
In-Kind Transfers

In addition to cash transfers, the State of Israel provides its citizens with in-kind welfare services (in-kind transfers). In 2018, the total amount of these transfers stood at 22.95 billion shekels. The distribution of these services among households in the Survey was estimated by the CBS, and this item is found in the Survey (stik_from_welfare). These data include in-kind transfers from the National Insurance (12.46 billion shekels), welfare services provided by local authorities, services from the Ministry of Welfare, and more. The transfers were attributed to households according to their characteristics (Shabo 2020) using the expenditure of the general government on welfare services according to the OECD's Classification of the Functions of Government (COFOG). The calculation of the attribution was performed by the CBS taking into account different household characteristics. For example, attribution of expenditure on "old age" in COFOG (mainly nursing care) was done according to the age of individuals in the household, whether they receive a municipal tax discount, old age allowances, BEG pensions from Germany, and other ways to identify households that may receive these services. We used this item as it was calculated by the CBS without inflation to fiscal data, since the data are already themselves included in the fiscal data of the general government's expenditure on welfare services.

The following figures show the distribution of cash transfers by household structure and resident children, as well as by income decile and population group.

Figure 52 Average Value of In-Kind Welfare Transfers by Household Structure and Resident Children
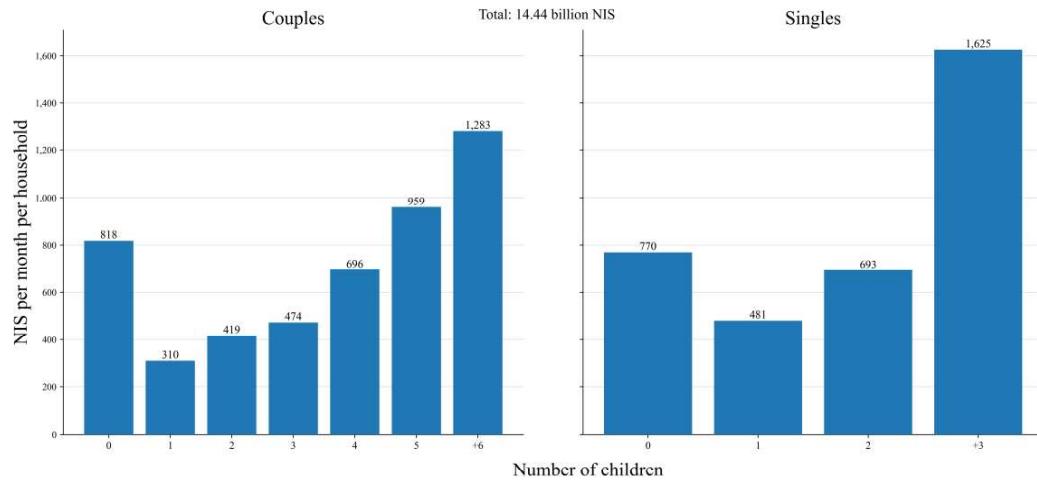
Figure 53 Average Value of In-Kind Welfare Transfers by Income Decile and Population group
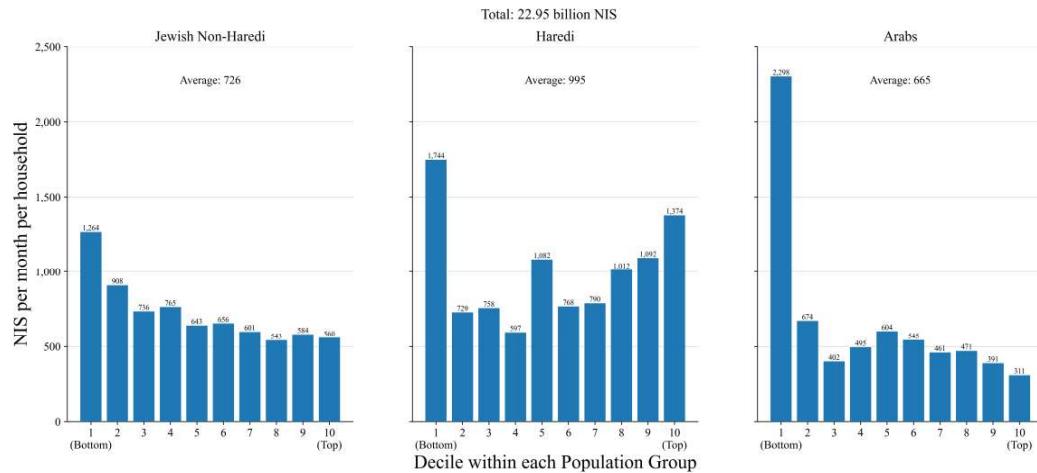
Sports, Culture and Leisure

The total expenditure on sports, culture and leisure funded by the public sector in 2018 stood at 10.16 billion shekels (CBS 2019). These expenditures can take the form of subsidies and wages for holding paid events (meaning, events the price of tickets to which would be higher in the absence of the subsidy) and free or nominally priced events. In order to attribute these expenditures to households, we divided the total fiscal expenditure into two halves – each of them totaling 5.08 billion shekels.

For the first half, we calculated the total expenditure on "cultural performances, sports and entertainment" (item c373) for each household in the unified file and attributed to it according to its relative share of the total consumption. That is, if a household spent 1% of the total expenditure on "cultural performances, sports and entertainment," we attributed to it 1% of

this half of the fiscal expenditure. This attribution is based on the assumption that households that consume more paid culture, sports and entertainment receive more subsidies.

For the second half of the total fiscal expenditure, we used data from the CBS's social survey for 2014 in which respondents were asked "In the past 12 months, how many times did you: go out to a cultural, art or sports event?"[14], which question reflects consumption of cultural events, both paid and free or nominally priced. The possible answers are 0 for "not at all," 1 for "once to 9 times," and 2 for "10 times and above." We defined the frequency of going out to events in a given period as equal to the numerical value of the answer and calculated the average frequency of going out to events by population group (non-Haredi Jews, Haredi Jews, Arabs) and net total income quintile of the household.[15] For example, in the top quintile, the average frequency for Arabs is 0.71, for Haredi Jews 0.36, and for non-Haredi Jews 1.02. The following chart presents the estimation results:

Figure 54 Culture and Leisure Consumption Estimate According to the 2014 Social Survey
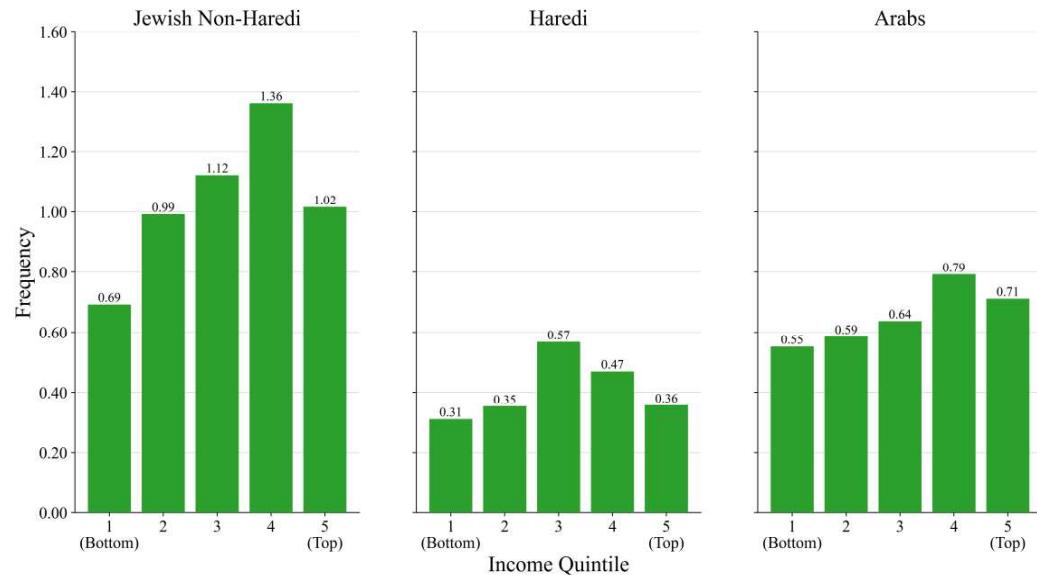
We matched the estimates from the Social Survey to the households in the unified file by sector and income quintile, so that all household members received the corresponding cultural event frequency from the Social Survey. We then attributed half of the fiscal expenditure to households according to their relative share of the total frequency. That is, if a household constituted 1% of the frequency of going out to cultural events, we attributed to it 1% of the second half of the fiscal expenditure.

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[14] This question was also asked in the 2021 social survey, but the frequency of going out to cultural events was much lower than in 2014 due to the COVID pandemic.

[15] The social survey data on income are in categories for total income. For per capita income there are only 3 categories. In addition, due to the relatively small sample of the social survey, especially among Haredi Jews and Arabs, we used income quintiles instead of the number of categories that appears in the original. For the purpose of matching the unified Survey data to that in the social survey, we calculated the total income quintile for each household.

The following figures show the distribution of the value of sports, culture and leisure services by household structure and resident children, as well as by income decile and population group.

Figure 55 Average Value of Sports, Culture and Leisure Services by Household Structure and Resident Children
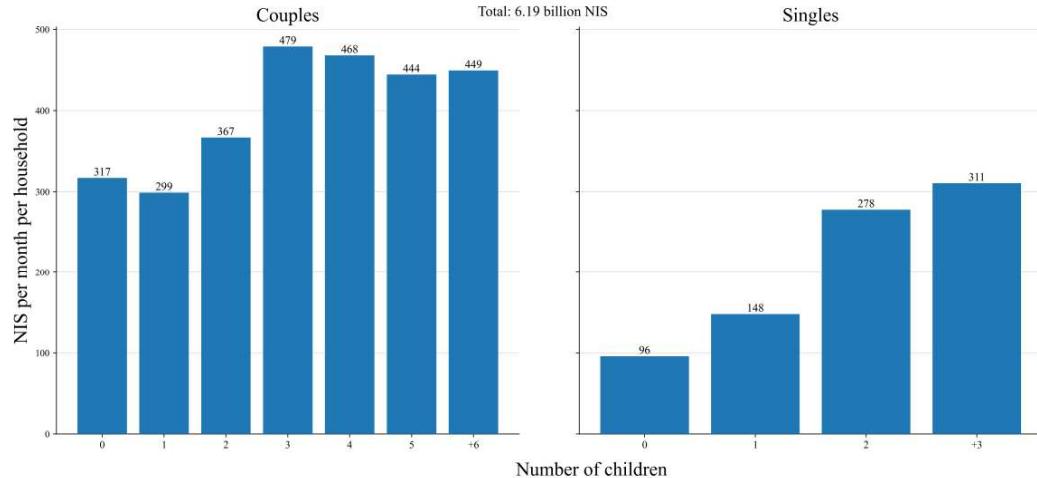
Figure 56 Average Value of Sports, Culture and Leisure Services by Income Decile and Population group
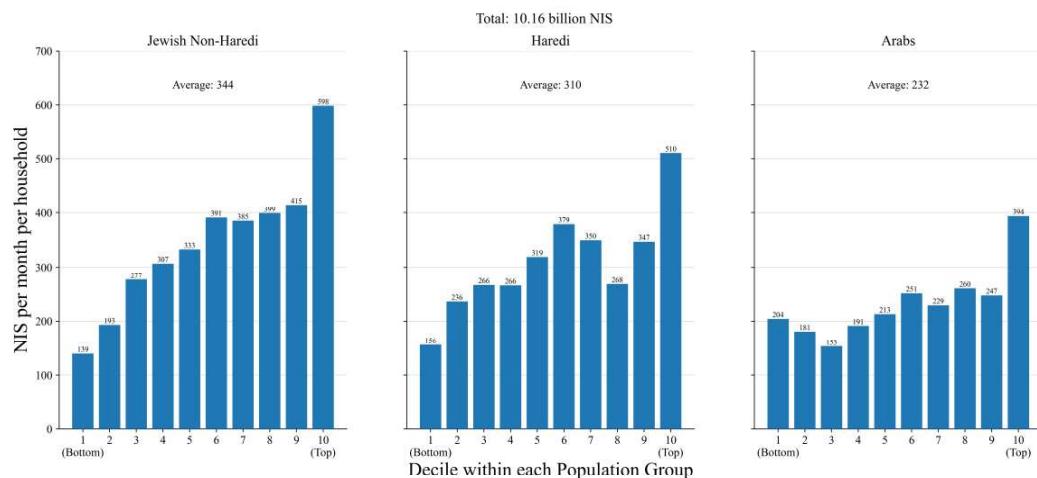
Religious Services

According to the GFS, the total expenditure of the general government on religion in 2018 stood at 5.94 billion shekels. This total includes two types of expenditures: expenditures on religious institutions in Israel, such as the Ministry of Religious Services, the rabbinical, Sharia and Druze courts, the Chief Rabbinate, the religious councils, and more (Finkelstein, Goldberg and Ravitzky Tur-Paz 2022); and expenditures on yeshivas that are not classified under expenditure on education, and religious expenditures of local authorities and of government ministries other than the Ministry of Religious Services.

We attributed this expenditure to households in two stages: first, the Survey data reports income from yeshivas (item i142067), so households receiving income from a public source

in a yeshiva are directly identified. The total income from yeshivas in the unified file stands at 1.67 billion shekels. In the second stage, we attributed to households the remainder of the public expenditure on religion (4.27 billion shekels) in a similar manner to the attribution of expenditure on culture, sports and entertainment detailed above. We used data from the CBS social survey for 2009, in which respondents were asked "How frequently do you usually visit a synagogue\mosque\church\ *khalwa* [Druze prayer house]?" The answers range from 0 for "in the past year, I did not visit a synagogue at all" to 5 for "every day or almost every day." We calculated the average frequency of visits to a house of prayer by sector (non-Haredi Jews, Haredi Jews, Arabs) and level of religiosity (ranging from "secular\not religious" to "Haredi\very religious").[16] For example, the average frequency for religious Arabs is 2.71, for Haredi Jews 4.07, and for religious non-Haredi Jews 3.93.[17] The following chart presents the estimation results:

Figure 57 Religious Services Consumption Estimate According to 2009 Social Survey
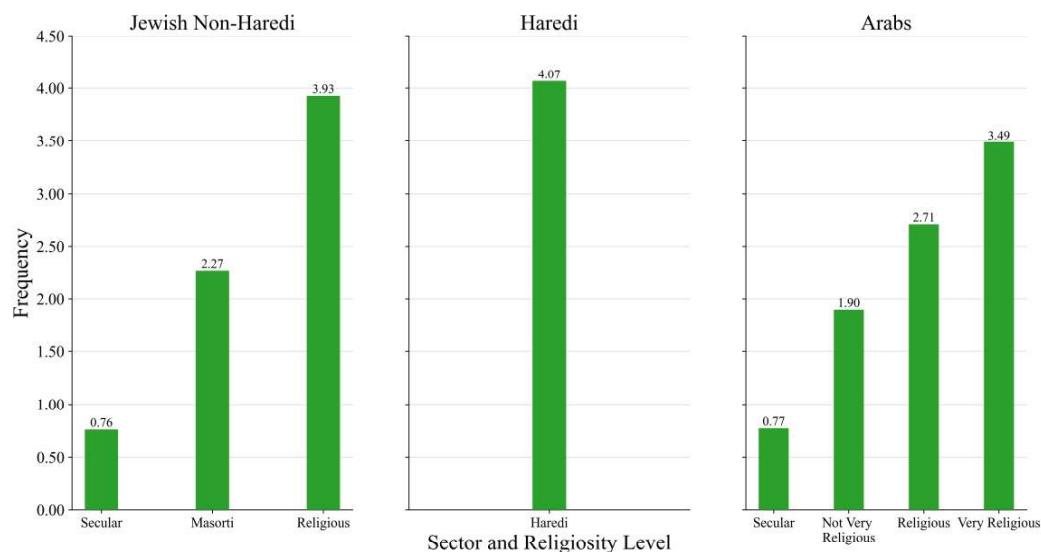
We matched the estimates from the social survey to the households in the unified file by sector and level of religiosity, so that all household members received the corresponding frequency of visits to a house of prayer from the social survey. We then attributed the total remainder of religious expenditures (4.27 billion shekels) according to their relative share of the total frequency. That is, if a household constituted 1% of the frequency of visits to houses of prayer, we attributed to it 1% of this total.

The following figures show the distribution of the value of religious services by household structure and resident children, as well as by income decile and population group.

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[16] We did not find that the frequency of visits to houses of prayer correlates with income within sectors; therefore, the calculation does not include the income variable. A calculation that includes income within each sector and religious level leads to very similar but noisier results due to the small sample in each cell.

[17] The group of non-Haredi Jews includes secular\non-religious, traditional\not very religious and religious, as well as a very small number of non-Jews whose level of religiosity is "very religious." The group of Haredi Jews includes Jews at the religiosity level of "Haredi" only.

Figure 58 Average Value of Religious Services by Household Structure and Resident Children
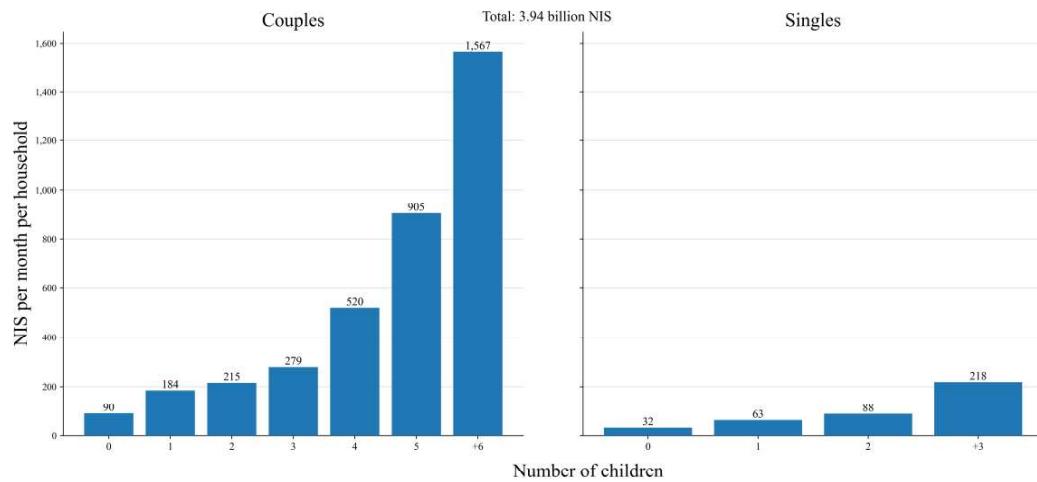
**Figure 59** Average Value of Religious Services by Income Decile and Population group
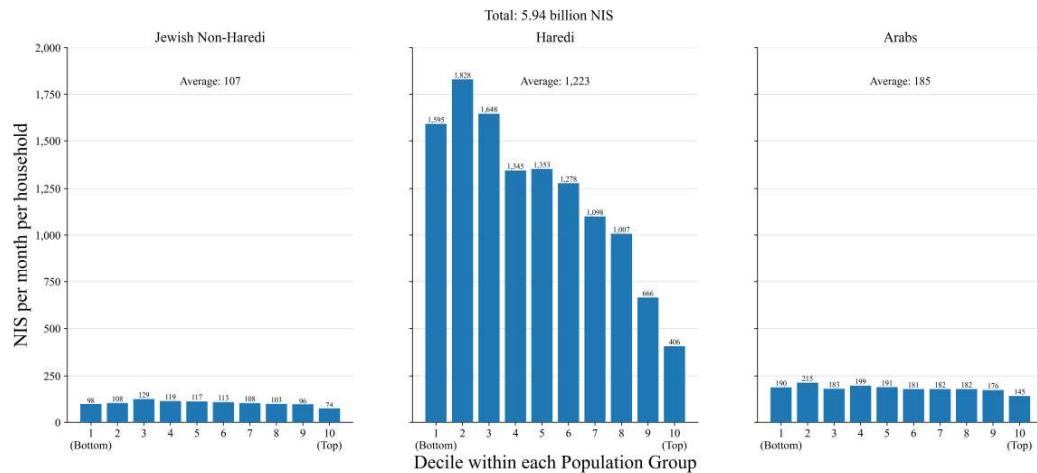
Public Housing

There are two public housing benefits in Israel: a rental benefit and a purchase benefit. Households living in public housing pay rent to a public housing company, where the value of the benefit is the difference between the rent they would pay in the free market and the rent they actually pay. For example, if a family lives in public housing in Haifa in a 3-room apartment and pays 500 shekels a month in rent, while a family living in a similar apartment nearby in private housing pays 3,000 shekels per month in rent – the value of the benefit stands at 2,500 shekels. In order to calculate the value of the benefit for public housing tenants, we need estimates of the free market rent rates in apartments similar to the public housing apartments. However, most households in Israel do not rent but live in an apartment they own. Therefore, we used the "imputed rent" that the CBS attributes to households living in owner-occupied housing based on a broad database that includes three sources (Central Bureau of Statistics, 2023):

1. An ongoing rental survey conducted as part of the Consumer Price Index.
2. Rental data of households living in rented apartments from the Household Expenditure Survey itself.

3. External sources.

Using these sources, the CBS attributes to households in owner-occupied housing the imputed rent based on the locality of the residence and the number of rooms.

Households renting an apartment in public housing can be directly identified in the Household Expenditure Surveys by those who answered the question "From whom did you rent your home?" with the answer: "a public housing company (such as Amidar, Aminor etc)". In the years 2016-2018, 590 households in the Household Expenditure Surveys, representing 57,810 households, answered that they rent their home from a public housing company.

For each household, the rent they would have paid in the free market was calculated as follows: the "typical" rent was estimated separately for the large localities (localities with 50 thousand residents and above) revealed in the Survey data, while for other localities we used a combination of the district of residence with the type of locality (population group and size of locality) – a total of 101 localities and district-locality combinations. Then we calculated the difference between the "typical" rent and the rent actually paid. This gap is the economic value of the rent discount received by households living in public housing.

For the purchase benefit, we used data on sales of public housing apartments between the beginning of 2014 till mid-2018. The data are from a report tracking apartments sold under the Law of Sale (Apartments) (Ministry of Housing 2018), and include 5,308 apartments, in which the price and the discount given on it are provided for each apartment. All apartment prices and discounts were converted to 2018 terms using the housing price index and the year of sale of each apartment. The average discount per apartment in these data stands at 414,145 shekels. We divided this total by 12 in order to translate the discount into monthly terms. Households that purchased an apartment from a public housing company in the past year can be directly identified in the Household Expenditure Surveys by those who answered the question "From whom did you buy your home" with "a public housing company (such as Amidar, Aminor etc)" and also indicated that they made a purchase in the past year. In total, our unified Survey data showed 13 households representing 1,334 households in the population that reported purchasing their home from a public housing company in the past year, similar to the number of purchases of public housing apartments in 2018, which stood at 1,457, as reported by the Ministry of Construction and Housing, according to the State Comptroller (2020).

According to our estimates, the total benefit for public housing rentals in Israel in 2018 is estimated at 1.264 billion shekels, and the total benefit for public housing purchases is estimated at 552.38 million shekels. The total value of the public housing benefit in Israel in 2018 is estimated at 1.82 billion shekels.

The following figures show the distribution of the value of public housing by household structure and resident children, as well as by income decile and population group.

Figure 60 Average Value of Public Housing by Household Structure and Resident Children
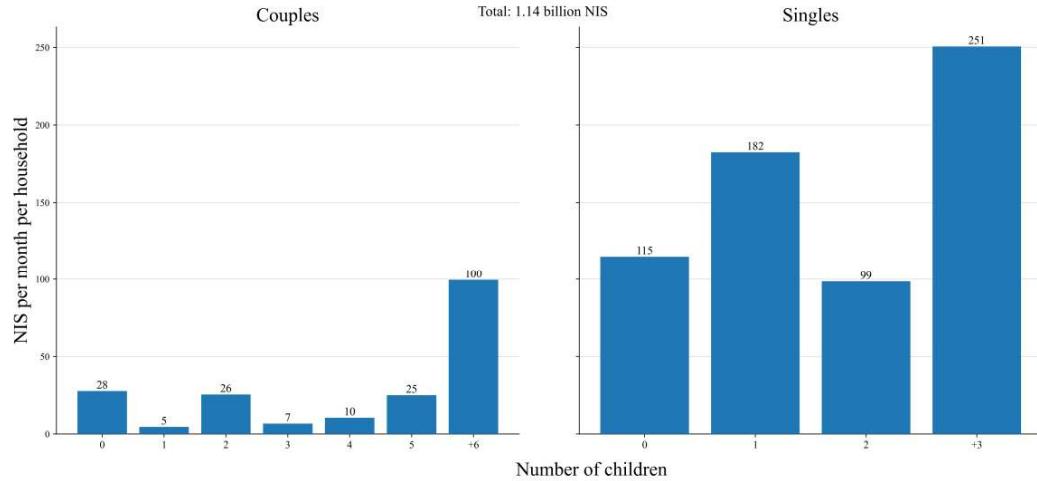
Figure 61 Average Value of Public Housing by Income Decile and Population group
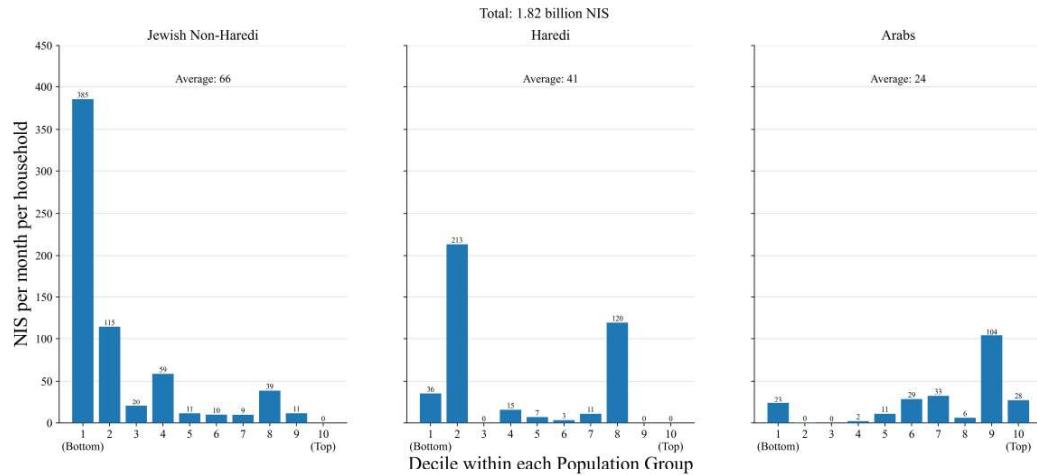
In addition to the papers mentioned above, our literature review included another papers that helped us attribute services value (Meir & Sorotzkin, 2019).

Public Transportation

The two main components of public transportation in Israel are buses and trains. Users of public transportation pay for the trips they take (whether on an occasional basis or through various subscriptions and other arrangements), but in order to compensate the operators and encourage the use of public transportation, it is heavily subsidized by the Ministry of Transportation.

Households that reported in the Survey purchasing public transportation services were identified by expenditure on the consumption items "bus travel" and "train travel," and their number of trips was estimated by dividing the total expenditure by the average trip price (as detailed below). The total household expenditure on bus travel, according to the Survey data in 2018, stood at 1.4 billion shekels, and the total household expenditure on train travel stood

at 266 million shekels. These estimates are smaller than the total income of bus companies (3.1 billion shekels) and the railway company (752 million shekels) (Central Bureau of Statistics, 2020a; Israel Railways, 2019).

In order to calculate the amount of subsidy for the regular operation of public transportation in Israel, and the average cost to consumers per trip, we used estimates by The Israeli Association for Transportation Research (2021), which relied on the Ministry of Transportation's budget proposal as well as the financial statements of Israel Railways for 2019, and found that the average subsidy per bus trip stood at 5.81 shekels (in addition to the average cost to the consumer per bus trip of 2.84 shekels), while the average subsidy per train trip stood at 65 shekels (in addition to the average cost to the consumer per train trip of 11.7 shekels). By dividing the total household expenditure on buses and trains by the average price per trip, we obtain the number of trips. Multiplying the number of trips by the subsidy amount gives us the total public transportation subsidy that the household receives:

$$\text{Bus Subsidy} = \frac{\text{Expenditure on Bus Trips}}{2.84} \times 5.81$$

$$\text{Train Subsidy} = \frac{\text{Expenditure on Train Trips}}{11.7} \times 65$$

In total, we estimated 4.437 billion shekels in public transportation subsidies to households, while the total state expenditure on subsidizing public transportation trips according to fiscal-digital data stood at 7.01 billion. To adjust the estimates from the Survey, we inflated household expenditures by the ratio between them.[18]

The following figures show the distribution of the value of public transportation by household structure and resident children, as well as by income decile and population group.

**Figure 62** Average Value of Public Transportation by Household Structure and Resident Children

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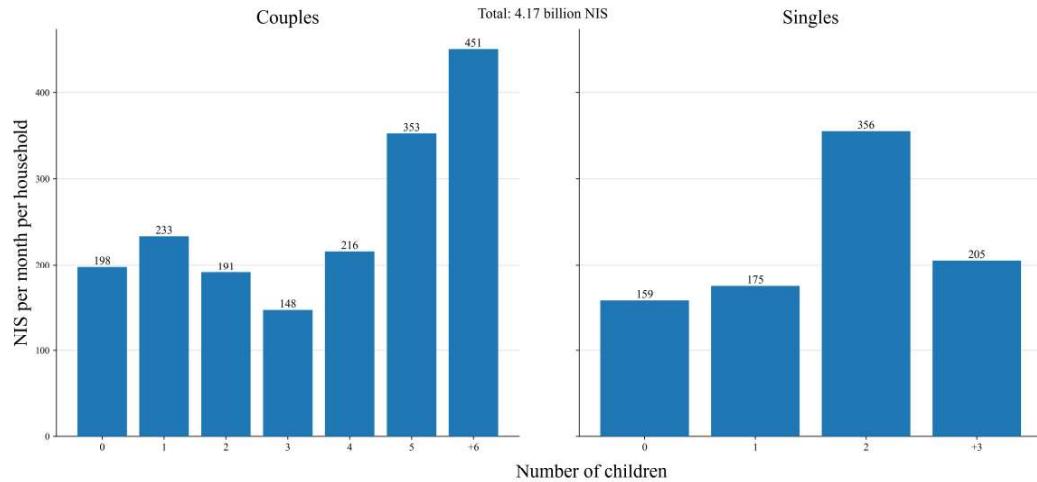
[18] Unfortunately, unlike fuel taxation, we have no reliable indication of potential use of public transportation (such as vehicle ownership), which would allow identification of households that likely consumed public transportation but did not report it.

Figure 63 Average Value of Public Transportation by Income Decile and Population group
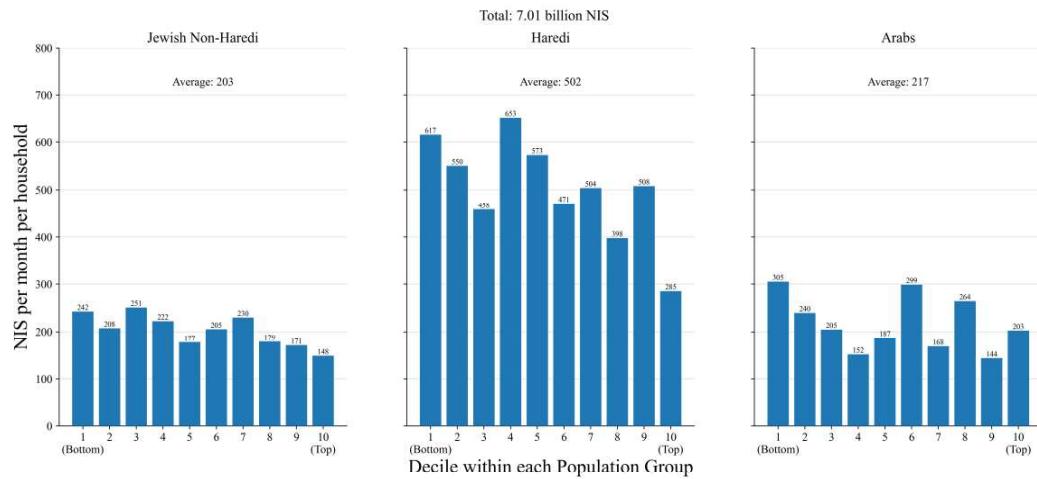
Attributing Public Goods and Infrastructure Investment

Expenditure on Defense, Internal Security and Other Public Goods

A public good is one which one person's consumption of does not diminish others' ability to consume. In addition, it is not possible to prevent people from consuming it. A classic example of a public good is a lighthouse: all ships benefit from its existence, and it is impossible to prevent any ship from consuming the light that emanates from it. Similarly, when one ship consumes the light it is not reduced, and other ships can consume it as well without interference.

In this sense, the expenditures of the general government on defense are intended to finance public goods that are almost completely pure. When an army defends a country against invasion and other existential threats, it protects all the citizens of that country. When one citizen consumes these defense services, they do not reduce the consumption of others, and no one can prevent them from such consumption.

Similarly, internal security services are also public goods. Those who consume the services of the courts and police are not the criminals whom these authorities arrest and convict, but rather all Israeli citizens who benefit from the reduction in crime as a result of enforcement, trial and punishment.

The literature on attribution of pure public goods to households is relatively scarce, and there is no clear conclusion regarding the correct way to attribute them, or whether it is correct to do so at all (Ebert & Tillmann, 2006; Musgrave, 1970).

A possible argument for why it is incorrect to attribute these services to households is that their consumption cannot be divided at all, rendering the alternative to non-attribution the attribution of virtually all national defense, internal security and similar other expenditures to each household. That is, if defense expenditures are 50 billion shekels, each household or resident receives defense services worth 50 billion shekels.

Alternatively, there are also arguments for attributing the total expenditure on public goods by equal distribution of their total cost to each household (or to each person), or alternatively, by proportional distribution to households according to household incomes. The main argument in favor of attribution according to income ratio is that households with higher income have more to lose as a result of war and crime, therefore they benefit more from this protection and so consume more of it.

In light of these arguments, we decided to avoid attribution of expenditures on defense and internal security to households in this paper's central analysis, but we performed three sensitivity tests (described later in chapter 4: Sensitivity Tests): attribution according to the number of persons in the household; attribution according to household expenditures; and attribution according to household incomes. It is important to note that the expenditure for these services is large and constitutes a significant part of state expenditures. The expenditure on national defense stood at approximately 74 billion shekels in 2018, and the expenditure in the same year on internal security stood at approximately 22 billion shekels. With regard to defense, as we detailed in the main paper, there is not only expenditure for households but also a tax in the form of mandatory conscription.

Infrastructure

Investment in infrastructure, such as electricity, gas, water, sewage, communications, air and sea ports, roads and railways as well as the establishment of hospitals, classrooms and other public structures represent a substantial amount of government expenditure (45.885 billion shekels in 2018); however, in most cases it is difficult to identify which households consume the services provided by this infrastructure. For example, in the case of electricity, the price that a household pays to the electric company is supposed to incorporate the cost of establishing the infrastructure, so that if households pay for electricity consumption and these expenditures are reported in the Survey, one can look at the supply of electricity (including the establishment of the infrastructure required for it) as a sale of a service to the public, and not as a transfer. Gas, communications, water and sewage infrastructures pose a similar problem. Correspondingly, the research literature also argues that infrastructures are not pure public goods, although they are also not regular consumer goods (Proag, 2021). In fact, national infrastructures contain components of private goods on the one hand and public goods on the other, which makes it difficult to attribute them to households or individuals.

Moreover, infrastructures are built for the long term, and the current consumption of infrastructure by households does not necessarily reflect the future consumption of these infrastructures. For example, a household with children does not necessarily benefit from the construction of a new school. It is possible that when the school begins to operate and provide education services, the children will already be adults, and other households will benefit from the services of the new school. Due to these reasons, which include methodological and normative challenges, we decided not to attribute investment in infrastructure to households in this paper's central analysis, but performed three sensitivity tests, described later (in Chapter 4: Sensitivity Tests): attribution according to the number of persons in the household; attribution according to household expenditure; and attribution according to household income.

The State of Israel has a variety of additional expenditures, most of which also constitute some kind of public good; these expenditures total approximately 36 billion shekels - expenditures on services such as a monetary authority (Bank of Israel), foreign ministry services, government services (the president, Knesset and prime minister) and more. In addition to these are expenditures that are not public goods, but are also extremely difficult to attribute to households. These expenditures, for example, include subsidies to local industries and agriculture, expenditures on environmental protection and more. All of these we

attributed in the same way as public goods – according to persons, according to consumption, or according to income.

In addition to the articles cited above, the literature review we conducted included additional articles regarding consumption of public goods by households (Bergstrom & Goodman, 1973; Groves & Ledyard, 1977; Hewitt, 1987; Mitchell & Carson, 1989).

3. General Government Income and Expenditure Not Attributed to Households

In this chapter of the appendix, we describe the general government's income and expenditure that fall outside the scope of this paper, or regarding which we took the professional position it would be incorrect to attribute to households.

Income

Land Leasing

Land leasing and sale is an additional source of income for the State of Israel, with the 2018 revenues of the Israel Land Authority standing at 10.58 billion shekels (Israel Land Authority, 2019). This land leasing is current income, while land sales are capital income. In both cases, this is not taxation imposed on households, but rather collection of payment for a service. When a household leases land from the state, it pays for the service it consumes, and therefore there is no reason to attribute these expenditures. In other words, land leasing effectively constitutes consumption of a private good for which consumers pay out of pocket, and the lease has no aspects of either taxation or service/ transfer.

Tax Benefits

A tax benefit is not a service or transfer that the general government provides to households, but rather a waiver of income by the general government (Chief Economist Department, 2018). Since this is not a service or transfer and since the Household Expenditure Survey reports the net payment of taxes (after tax benefits), we do not attribute these benefits to households separately from the attribution of tax payments. On a similar note, we do not attribute tax benefits for pensions and *keren hishtalmut* savings plans (Sharet & Abramzon, 2015).

Additional Income

Additional income of the general government includes loans to cover the current deficit in its budget, seigniorage from money creation, grants from foreign governments, income from capital owned by the government and other additional income.

Of all these, seigniorage effectively constitutes taxation. One factor affecting seigniorage is the gap between the cost of issuing money and its face value. This gap represents the state's profit from minting coins and printing paper bills. The intrinsic value of a bill is almost negligible (only its issuance cost), while the face value of the bill is much higher than its intrinsic value. However, issuing new coins and bills increases the money supply, and an increase in money supply that is faster than the increase in demand for money creates inflation that erodes the value (the purchasing power) of existing coins and bills held by the public. This phenomenon occurs especially during periods of high inflation. A second factor affecting seigniorage is the interest gap on the monetary base. On the one hand, the Bank of Israel effectively has a liability (the monetary base) on which it does not pay interest to any party, and on the other hand, holds assets on which it does receive interest, such as loans that

the Bank of Israel gives to commercial banks. However, both inflation and interest were at very low levels in 2018 (Bank of Israel, 2019). Inflation during 2018 stood at only 0.8%, continuing the low and even negative inflation of previous years. The interest environment was also very low (the average Bank of Israel interest rate stood at only 0.1% on average in 2018). Therefore, it appears that unlike periods of very high inflation (such as in the 1970s and 1980s), this component is negligible in recent years, and therefore we did not attribute it.

Grants from foreign governments are not collected from households in Israel, but rather given by foreign governments to the state, and should therefore not be attributed to households. Similarly, the State of Israel owns various financial and real assets. Income from these assets does not come directly from households, and therefore we did not attribute it.

Expenditures

Interest on Debt and Additional Debt Costs

The State of Israel raises loans in order to cover the deficit in its current budget (mainly through the issuance of government bonds). These loans accumulate into the public debt of the state, debt that bears interest, which the government pays.

The interest payment for the public debt in 2018 stood at 32.36 billion shekels. Although there is an opportunity cost to paying interest on the debt, such as increasing the scope of services that the general government provides, the research literature does not distinguish economically between debt repayment and interest payments on the debt, but rather treats them as one package, the cost of which is usually borne by future generations (Boudreaux, 2019).

The balance of public debt that existed in 2018 was created in the overwhelming majority in the past (especially during periods of wars, economic crises, etc.) and it is not clear whether it is correct to attribute the interest payments paid for it in the present. In addition, even if one decides that it would be correct to attribute this cost, it is not clear how to do so – whether to attribute it to the expenditure side or to the income side. To elaborate, whether attributing it to the expenditure side or to the income side, it is not clear how debt payment in the present is distributed among households. To put it simply, if we think that interest payment on debt should be associated with the expenditure side, it is not clear how it should be attributed – whether it is expressed in reduction of education services or in reduction of defense services? In light of the fact that these distributions are very different, attribution of the debt according to one of them is expected to suffer from significant biases. Similarly, if we assume that interest on public debt is attributed on the side of the general government's income from taxes, and the government needs to collect more income tax or more VAT in order to finance the interest payments, it is not clear how this income is distributed, and in light of the variance in the distribution of different taxes, the attribution may suffer from significant biases.

Budgetary Pensions

Public budgetary pensions are pension payments that the state pays to some of its retired employees. Some of this expenditure is classified, partly due to defense force retirees. In addition, it is not possible to identify from the Survey data which households receive a budgetary pension. For example, the Survey data do not include information on the employment sectors in which individuals worked before their retirement, and accordingly, indirect attempts to attribute budgetary pensions are also not possible within the framework of the current data.

In addition to these methodological problems, it is possible, to a large extent, to also consider budgetary pensions as debts created in the past and it is unclear whether it is correct to attribute them now, when they are being repaid, and how to do so. For example, in the past, the government committed to employees in state service (such as teachers and clerks) that they would receive a budgetary pension, after they retire in many decades. In practice, those employees provided services to Israeli citizens in the past, partly thanks to that commitment to a budgetary pension. Since that commitment was created in the past, and in the meantime the government transferred all its new employees to a contributory pension, it is not clear whether and how it is correct to attribute the payment of this debt in the present.

Therefore, we did not attribute these expenditures.

4. Sensitivity Tests

This section of the technical appendix details the various sensitivity tests we conducted.

Attribution of Expenditure on Public Goods and Infrastructure Investment

In this sensitivity test, we examined net transfers, while attributing public goods and other state expenditures that we did not previously attribute (an additional attribution of approximately 168 billion shekels) in three different ways: according to the number of persons in the household, according to household income, and according to household consumption.

As shown in the following figure, after adding the additional attribution only the high income deciles (8-10) are characterized by a negative net transfer (the total taxes that a household from these deciles paid is higher than the value of services and transfers the household received). As a reminder, before the attribution, deciles 1-4 received a positive net transfer, while deciles 5-10 received a negative net transfer (Figure 2 in the main paper).

The figure also shows that the nature of the attribution changes the distribution of state transfers among the deciles. When the attribution is done according to the number of persons in the household, the low income deciles receive a larger share of these transfers on average, and the high deciles pay more to the state on a net basis. When the attribution is done according to household income, this picture is moderated significantly. In addition to attribution according to the number of persons and to income, we also performed a test of attribution according to consumption, and in this case we obtained a result that reflects an intermediate situation between the two previous attribution methods.

It is important to note that the total state expenditures after adding the attribution are higher than the total state income, due to state income that is not attributed to households (such as land sales and dividends from government companies) as well as given the budget deficit that the government uses in order to allow an expenditure volume larger than the income volume. The total gap stands at approximately 30 billion shekels.

Figure 64 Net Transfers (Services Minus Taxes) Including Public Goods and Investment in Infrastructure, by Attribution Method and Income Deciles
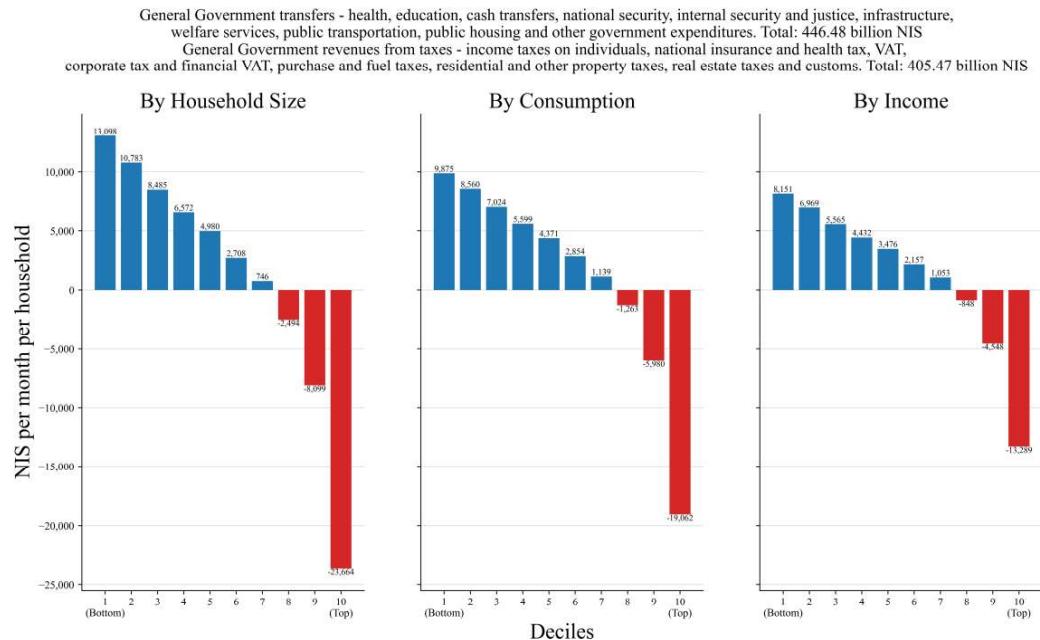
Figure 65 shows attribution of public goods and infrastructure investment by income deciles within the sectors, with attribution calculated by households' consumption. As can be seen, for Haredi and Arab households, the net transfer is positive for all income deciles but the top one, while the four upper deciles of non-Haredi Jewsih households are characterized by a negative net transfer. Note that since this test features more expenditure than income, the total net transfers is positive.

Figure 65 Net Transfers (Services Minus Taxes) by Sector and Income Deciles, Including Public Goods and Investment in Infrastructure, Attributed by Consumption
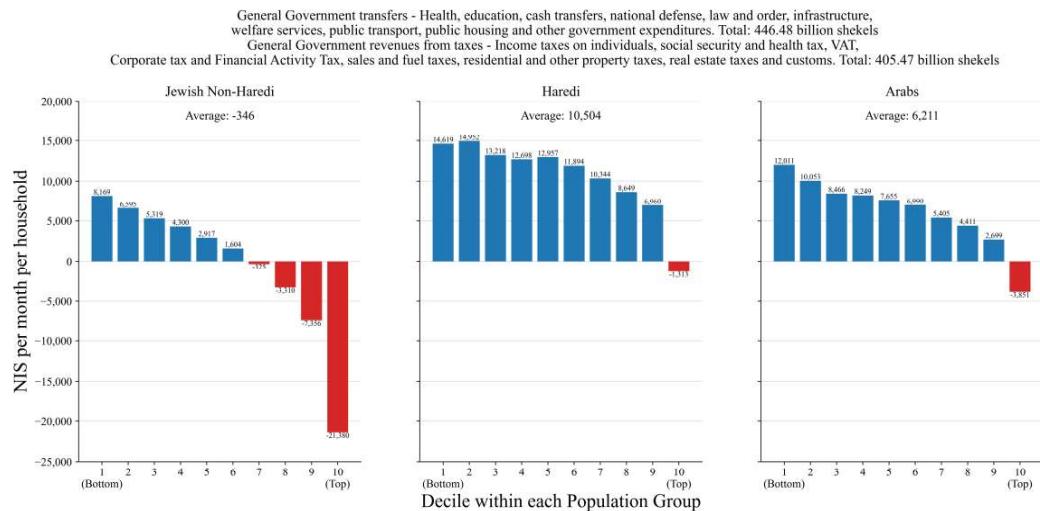
Figure 66 shows attribution of public goods and infrastructure investment by income deciles within the sectors, with attribution calculated by number of household income. As is shown, the picture painted is similar to the previous figure, aside from average net transfer to Haredi households in the highest decile being slightly positive.

Figure 66 Net Transfers (Services Minus Taxes) by Sector and Income Deciles, Including Public Goods and Investment in Infrastructure, Attributed by Income
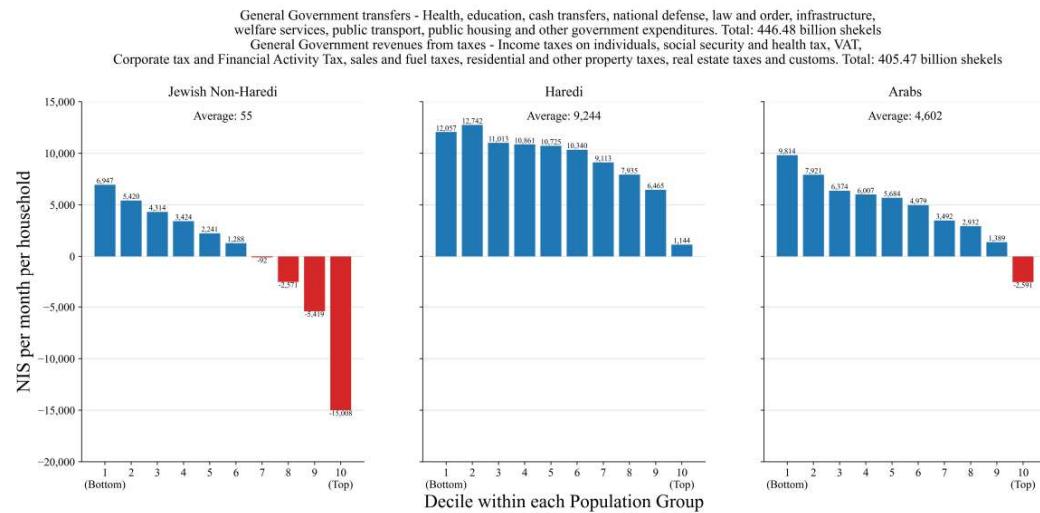

Figure 67 shows attribution of public goods and infrastructure investment by income deciles within the sectors, with attribution calculated by number of persons in the household. As can be seen, in this case the distribution of net transfers is positive for nine deciles of Arab and Haredi households, and six deciles of the non-Haredi Jewish households.

Figure 67 Net Transfers (Services Minus Taxes) by Sector and Income Deciles, Including Public Goods and Investment in Infrastructure, Attributed by Number of Persons
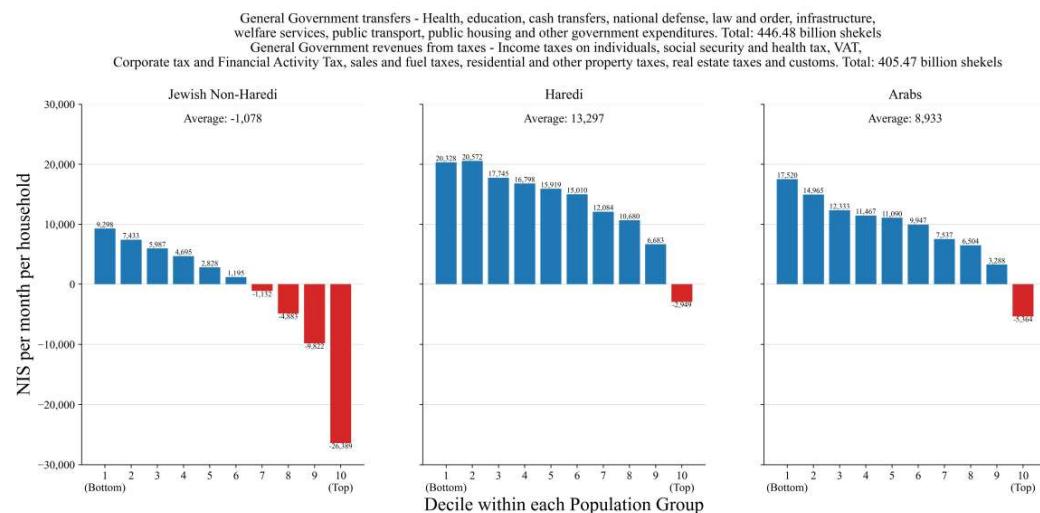
Equalizing Expenditures to Income

As mentioned, there is a significant budget disparity between the expenditures of the general government that we attributed to households and the general government's income. In Figure 68, we performed an additional sensitivity test, in which we equalized the total expenditures to the total income. We performed the test by multiplying, for each household, state expenditures by the ratio between attributed income and attributed expenditures so that they would be equal, and created a new variable: net weighted by expenditure inflation. As can be seen, while the top five deciles in the non-Haredi Jewish sector are characterized by a negative net transfer, only the top decile and the top two deciles in the Haredi and Arab sectors, respectively, are characterized by a negative net transfer.

Figure 68 Average Value of Net Transfers (Inflated Expenditure) by Sector and Income Deciles
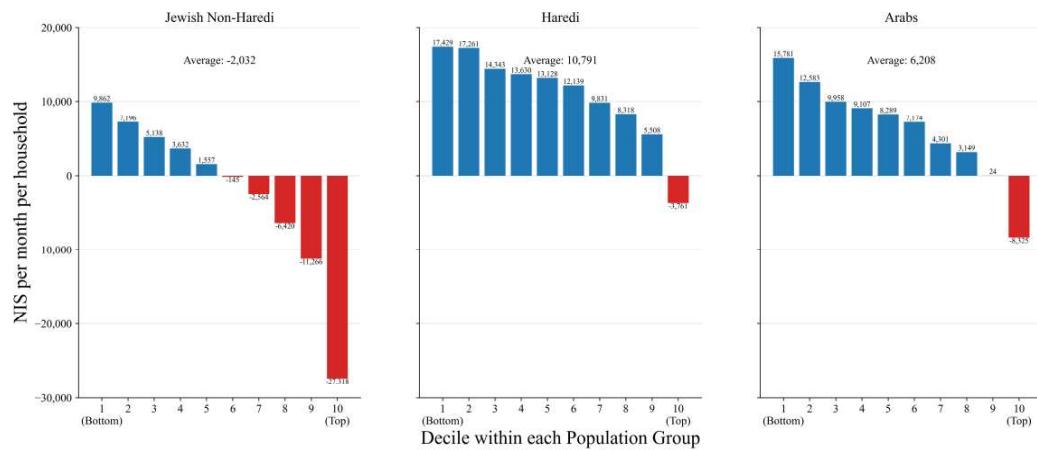
Different Assumptions about Tax Burden Distribution

In this section we conducted additional sensitivity tests, in which we changed the assumptions regarding the distribution of the tax burden from that used in the central analysis, where we used tax burden distributions based on the research literature. We conducted the tests for three main taxes: income tax and capital gains on individuals, purchase taxes (VAT and additional purchase taxes), and corporate tax (which together constitute approximately 65% of state income from taxes).

Comparing the results obtained in the sensitivity tests to the results obtained in the paper's central analysis allows us to obtain an "error range" for each assumption we used. As will be seen below, the "error range" for each of the taxes and for the three taxes together is relatively small, strengthening the reliability of the central results we presented in the work.

Value Added Tax and Additional Purchase Taxes

Original assumption (based on the research literature): The burden of VAT and purchase taxes is placed entirely on the consumer.

Assumption in the sensitivity test: The tax burden is divided equally among the consumer, the employer and the employees, similar to corporate tax. That is, we attributed the tax to households according to their relative share in consumption (one-third of the attribution), their relative share in income from work (another third), and their relative share in capital income (the final third).

Figure 69 Sensitivity Test – Different Assumptions for VAT and Purchase Taxes, Tax Distribution by Income Deciles

Ratio of top three deciles to bottom three: 3.6
Total: 134.64 billion NIS
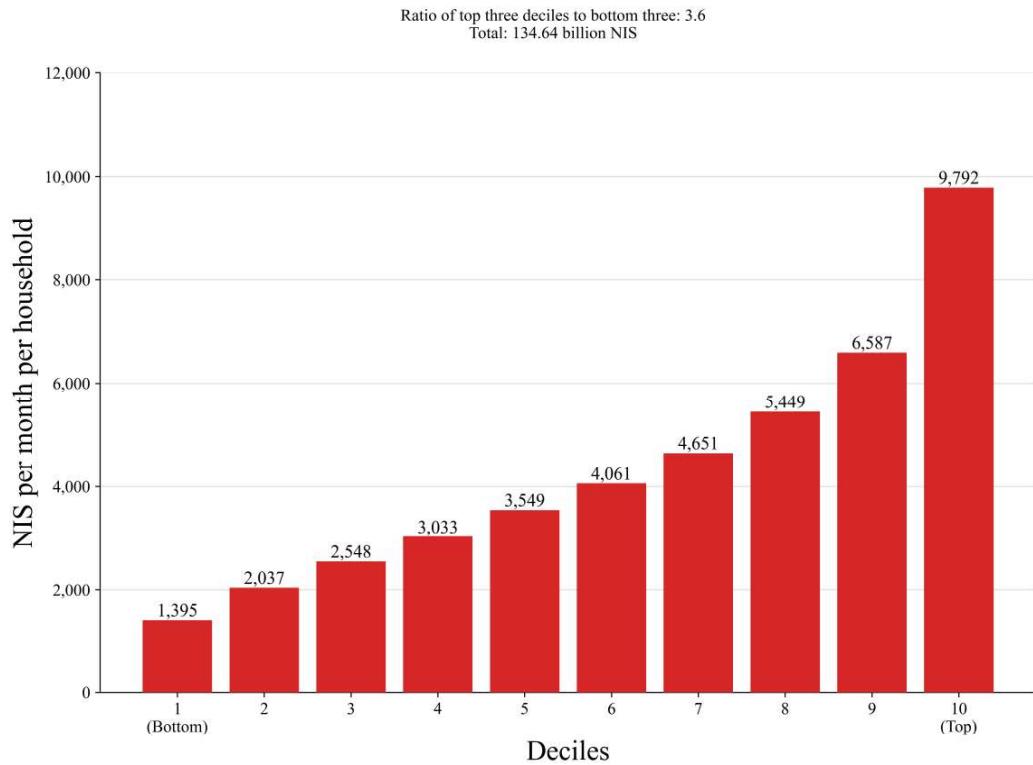
As is shown, even under the new assumptions, the higher income deciles pay more VAT and purchase taxes than the lower deciles, similar to the distribution under the original assumption in the paper. However, there is a difference in the amount that each decile pays – under the new assumption, deciles 7-10 pay more, while deciles 1-6 pay less. For comparison, the original figure is attached, which assumes that the burden of VAT and purchase taxes is placed entirely on the consumer.

Figure 70 Average VAT and Purchase Taxes by Income Deciles

Ratio of top three deciles to bottom three: 2.3
Total: 134.64 billion NIS
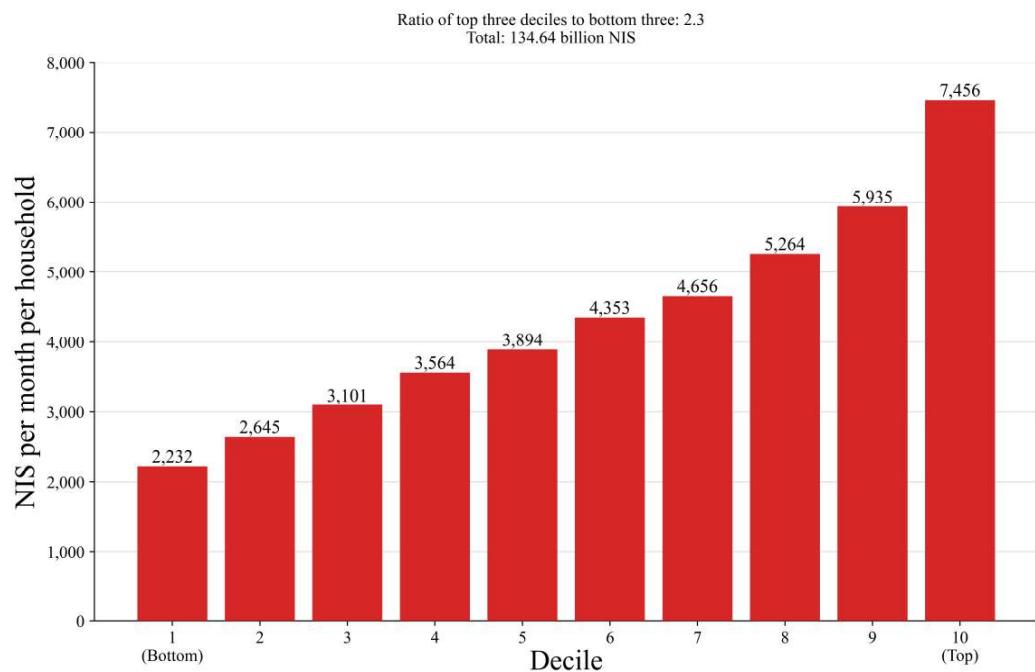
When examining the net transfers to households under the new assumption of VAT and purchase tax burden, it appears that the picture does not change substantially – income deciles 1-4 receive transfers and services worth more than the taxes they pay, while the other deciles receive services and transfers worth less than the taxes they pay.

Figure 71 Sensitivity Test – Different Assumptions for VAT and Purchase Taxes, Net Transfers (Services Minus Taxes) by Income Deciles

General Government transfers - health, education, cash transfers,
welfare services, public transportation and public housing. Total: 267.74 billion NIS
General Government revenues from taxes - income taxes on individuals, national insurance and health tax, VAT,
corporate tax and financial VAT, purchase and fuel taxes, residential and other property taxes, real estate taxes and customs. Total: 405.47 billion NIS
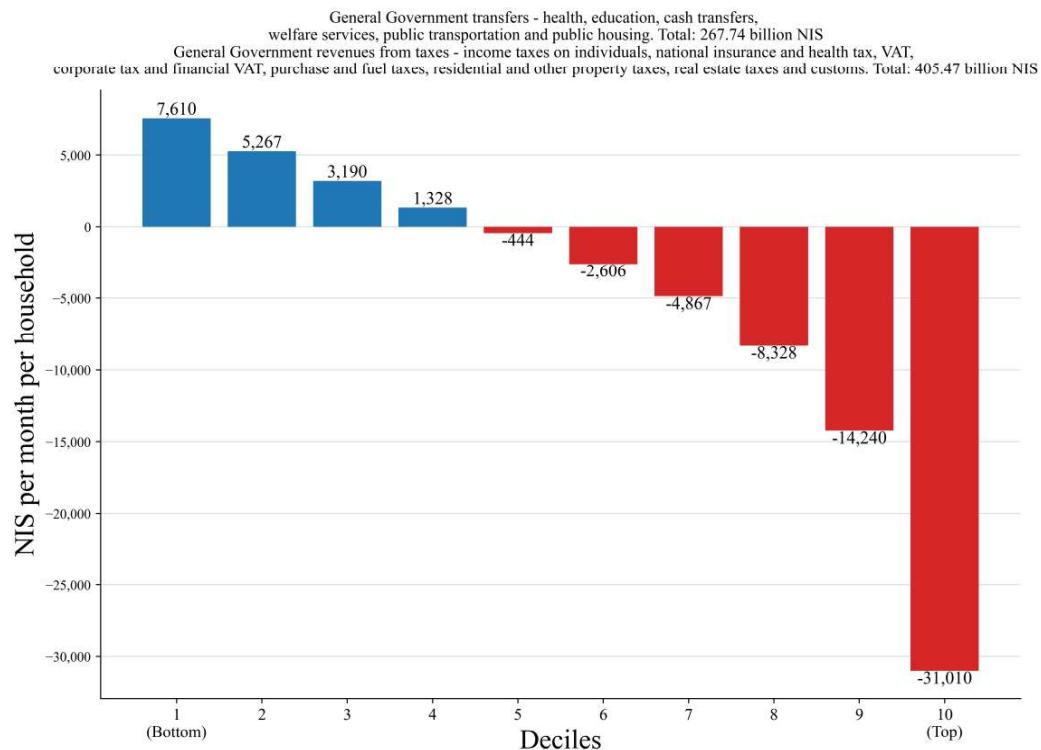
Income Tax and Capital Gains Tax

Original assumption (based on the research literature): The tax burden is placed entirely on employees.

Assumption in the sensitivity test: The tax burden is divided equally between the employees and employers.

Figure 72 Sensitivity Test – Different Assumptions for Income Tax and Capital Gains Tax, Tax Distribution by Income Deciles

Ratio of top three deciles to bottom three: 30.9
Total: 95.51 billion NIS
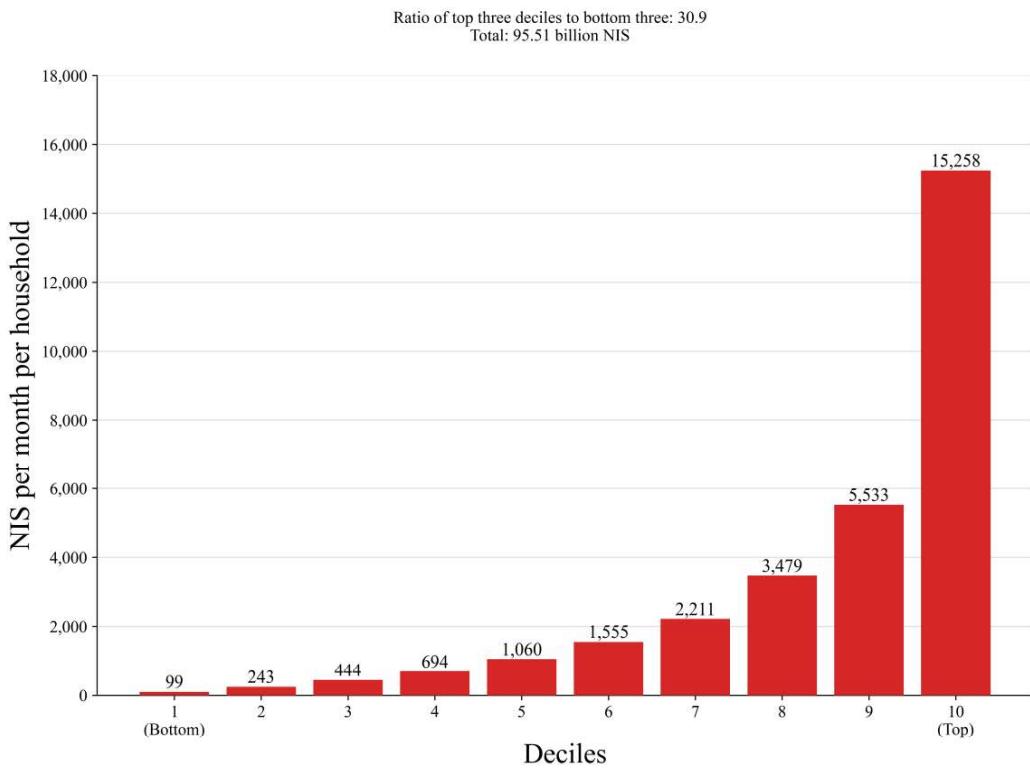
Figure 72 shows that even under a different distribution of the tax burden, income tax and capital gains tax are distributed progressively, but less progressively compared to the central analysis (as shown in Figure 73).

Figure 73 Average Payment of Income Tax and Capital Gains Tax, by Income Deciles

Ratio of top three deciles to bottom three: 56.2
Total: 95.51 billion NIS
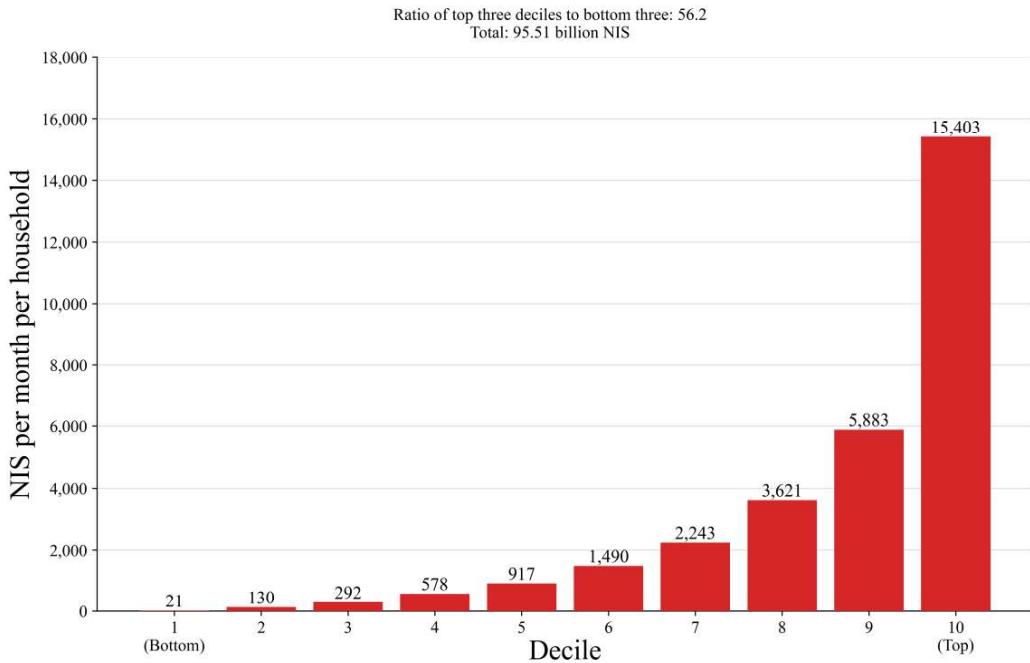
When examining the net transfers to households, it can be seen that the change in assumptions of income tax and capital gains burden does not change the overall picture – income deciles 1- 4 receive services and transfers worth more than the taxes they pay, while the picture is reversed in the other deciles.

Figure 74 Sensitivity Test – Different Assumptions for Income Tax and Capital Gains Tax, Net Transfers (Services Minus Taxes) by Income Deciles

General Government transfers - health, education, cash transfers,
welfare services, public transportation and public housing. Total: 267.74 billion NIS
General Government revenues from taxes - income taxes on individuals, national insurance and health tax, VAT,
corporate tax and financial VAT, purchase and fuel taxes, residential and other property taxes, real estate taxes and customs. Total: 405.47 billion NIS

Corporate Tax

Original assumption (based on the research literature): The tax burden is distributed equally among consumers, employees and capital owners (one-third for each party).

Assumption in the sensitivity test: The tax burden is placed entirely on capital owners\employers. That is, we assume that the economic cost of corporate tax is placed entirely on the employer, without the prices of the products they supply rising or the salaries they pay to their employees decreasing.

Figure 75 Sensitivity Test – Different Assumptions for Corporate Tax, Distribution by Income Deciles

Ratio of top three deciles to bottom three: 3.7
Total: 42.93 billion NIS
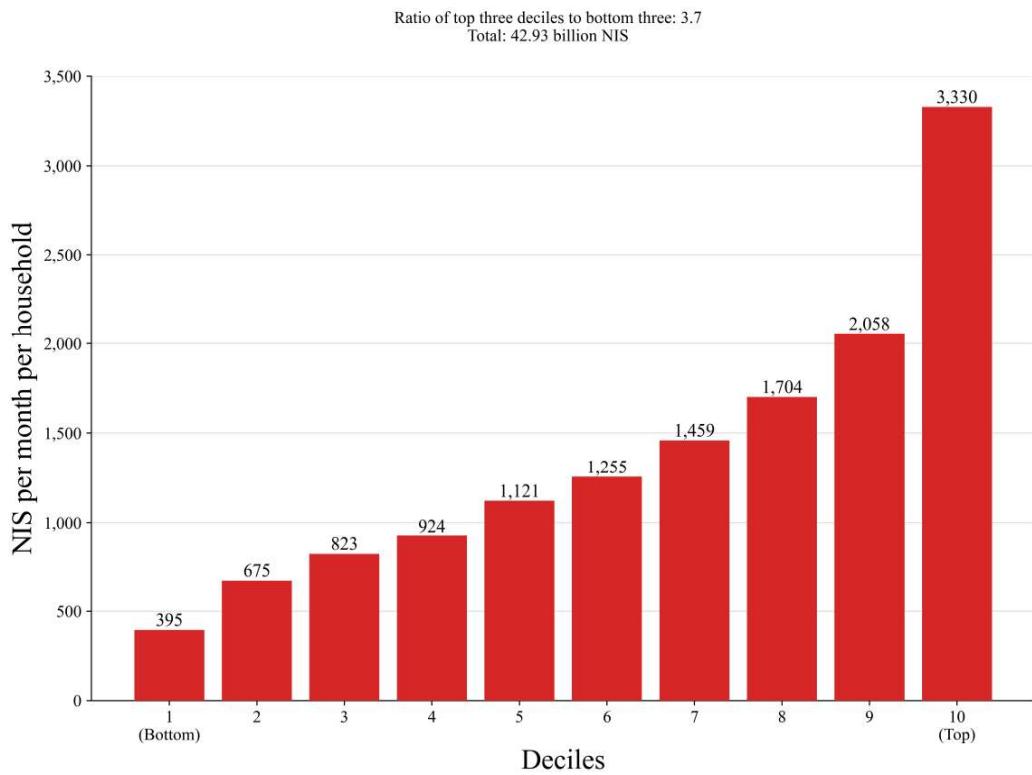
Figure 76 Average Payment of Corporate Tax by Income Deciles

Ratio of top three deciles to bottom three: 3.6
Total: 42.93 billion NIS
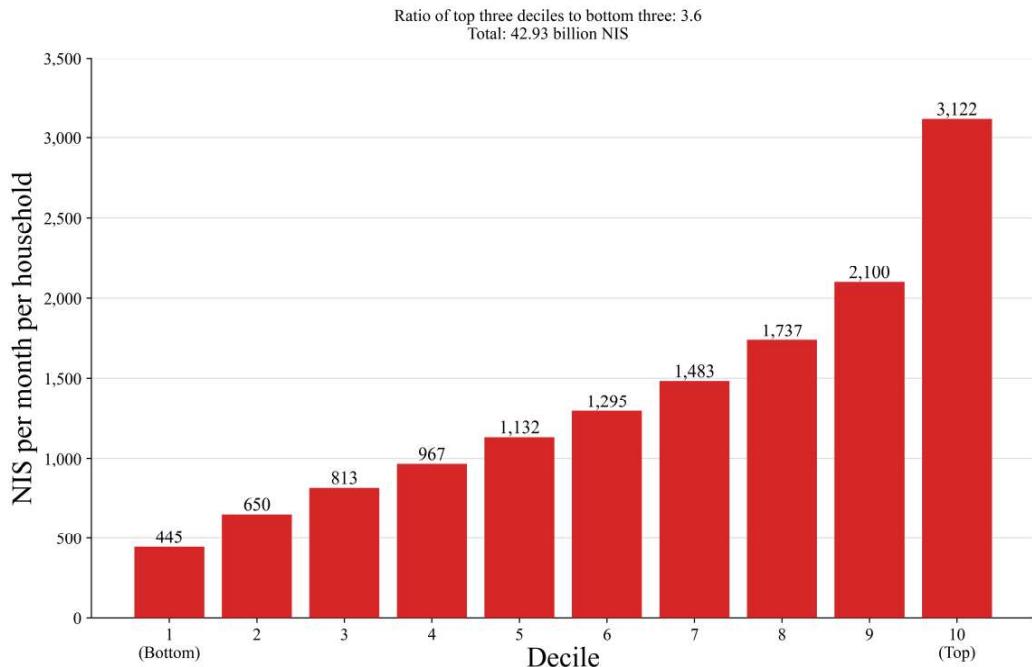
Changing the assumptions about the corporate tax burden does not materially impact the distribution of net transfers to households in the different income deciles. It is apparent that Figure 75 (sensitivity test) and Figure 76 (original assumption findings) are very similar.

Figure 77 shows that households in deciles 5-10 pay taxes at a higher value than the transfers and services they receive, while households in deciles 1-4 receive transfers and services of a higher value than the taxes they pay.

Figure 77 Sensitivity Test – Different Assumptions for Corporate Tax, Net Transfers (Services Minus Taxes) by Income Deciles

General Government transfers - health, education, cash transfers, welfare services, public transportation and public housing. Total: 267.74 billion NIS
General Government revenues from taxes - income taxes on individuals, national insurance and health tax, VAT, corporate tax and financial VAT, purchase and fuel taxes, residential and other property taxes, real estate taxes and customs. Total: 405.47 billion NIS

All Assumption Changes Together

The following figure includes the total effect of the assumption changes for the three taxes examined: income tax and capital gains, purchase taxes (VAT and purchase taxes) and corporate tax. It can be seen that even under a combined change of the three assumptions, the results remain quite similar to the results presented in this paper's central analysis. Households in the low income deciles (1-4) receive services and transfers worth more than the tax payment those households pay. Households in the middle and high deciles (5-10) pay taxes in an amount higher than the value of the transfers and services they receive from the state.

Figure 78 Sensitivity Test – All Different Assumptions Together
Net Transfers (Services Minus Taxes) by Income Deciles

General Government transfers - health, education, cash transfers,
welfare services, public transportation and public housing. Total: 267.74 billion NIS
General Government revenues from taxes - income taxes on individuals, national insurance and health tax, VAT,
corporate tax and financial VAT, purchase and fuel taxes, residential and other property taxes, real estate taxes and customs. Total: 405.47 billion NIS

These results are obtained because of the existence of a very strong correlation between income from work, consumption and capital income. Since these are the main variables according to which we attribute taxation, even a large change in the tax burden composite does not significantly change the distribution of net transfers among income deciles. That is, a household that has high income from work is usually also characterized by high consumption and high capital income, and vice versa. A change in the tax composite, so that one of these components is taxed more than others (and the others less) compared to the base scenario, will not significantly change the total taxation on each household.

The following table presents the correlation coefficients (Pearson's correlation coefficient) between each pair of variables: average income from work, consumption, and capital income of total income percentiles per standardized person (square root of the number of persons). It can be seen that the correlations are very strong.

Table 5 - Correlation Matrix Between Income from Work, Consumption and Capital Income

	Income from Work	Consumption	Capital Income
Income from Work	1	0.95	0.98
Consumption	0.95	1	0.89
Capital Income	0.98	0.89	1

Sensitivity of Results to Different Definitions of Income Groups

There are several ways to calculate household income, where the different calculations are expected to lead to changes in the composition of each income stratum (quintile\decile, etc.), and therefore also to changes in the analysis results of the distribution of income and expenditures of the general government among households.[19] However, it appears that in this case there is much similarity in the compositions of the quintiles according to the different definitions. Figure 79 presents the movement between income quintiles in the different definitions and also the net transfers to each quintile, where on the left side one can see the income quintiles according to the definition we used for the central analysis in the paper (total net income divided by the number of standardized persons according to the OECD scale) and on the right side income quintiles according to the income definition used in the CBS publications (net monetary income divided by the number of standardized persons (Israeli equivalence scale)). As can be seen, the quintiles are similar in their composition, and the vast majority of the changes are between adjacent quintiles.

Figure 79 Movement Between Income Quintiles in The Different Definitions of Income and Net Transfers for Each Quintile
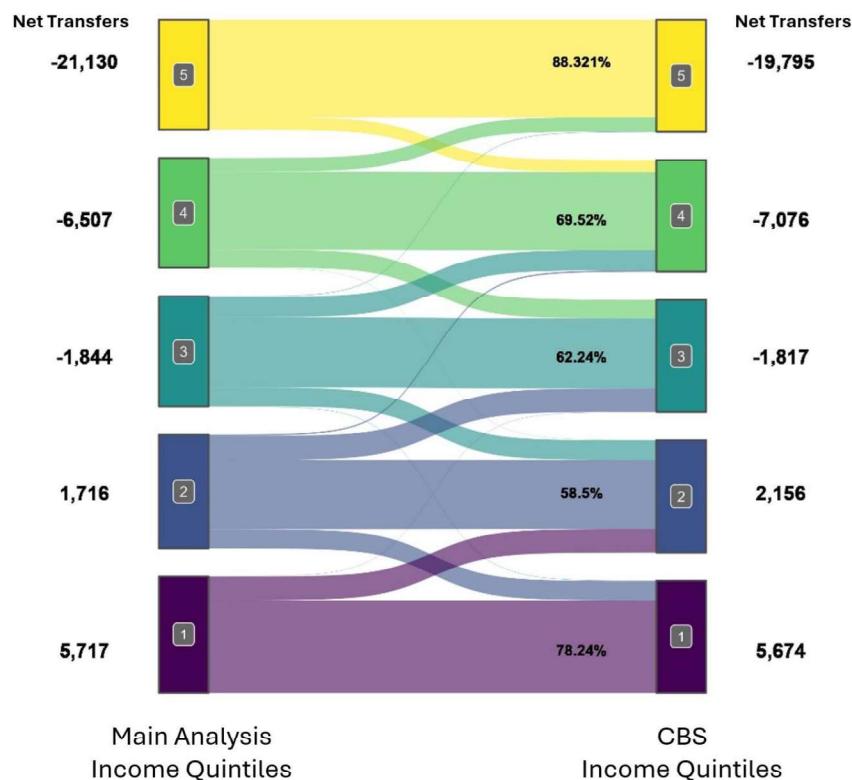
Figure 80 presents the distribution of net transfers (without attribution of public goods and investment in infrastructure) according to the CBS income deciles. As can be seen, the results are very similar to the results presented in the main analysis, where we used a slightly different division to determine income deciles.

Figure 80 Net Transfers (Services Minus Taxes) by Income Deciles (CBS)

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[19] The use of income quintiles was chosen in this case for the purpose of a clearer graphical illustration of the results. Identical trends were also found for division into deciles.

General Government revenues from taxes - Income taxes on individuals, social security and health tax, VAT, corporate tax,
Financial Activity Tax and non-profit VAT, sales and fuel taxes, residential and other property taxes, real estate taxes and customs. Total: 405.47 billion NIS
General Government transfers - Health, education, cash transfers, welfare services,
public transport, religion, culture, sports and leisure, and public housing. Total: 267.74 billion NIS

Consumption Taxes as Payment for Negative Externalities

In addition to taxes being a means to finance services that the state provides to its citizens, there are specific taxes with additional goals, including special taxation for performing undesirable activities that include negative externalities harming social welfare, beyond their impact on the welfare of the person performing the activity. Economically, the price paid by the person performing the action is lower than its social cost, and therefore in equilibrium, without external intervention (special taxation, for example), there may be a non-optimal amount of that activity. For example, driving a car has a negative externality in the form of creating traffic congestion, or noise and emission of polluting gases. Without external intervention, drivers do not internalize the costs they impose on the environment and are therefore expected to drive more than the optimal amount from the perspective of the general public, given the price of the vehicle and fuel. In order to incorporate the price that society pays as part of the product price that the consumer sees, the Israeli government imposes an additional tax on fuel (fuel tax). This is true of tobacco tax and tax on alcohol as well.

While in the central analysis we treated these taxes as taxes intended to finance the activity of the general government, they can also be seen as payment for the damage caused by those activities. Figure 81 shows the distribution of the tax burden by income deciles, when separating between the tax burden without negative externality taxes (the lighter part of the columns) and the payment of taxes imposed on negative externalities (the darker part of the columns).

Figure 81 Sensitivity Test – Total Taxes without Negative Externalities

General Government revenues from taxes excluding negative externality taxes - income taxes on individuals, national insurance and health tax, VAT, corporate tax and financial VAT, vehicle taxes, residential and other property taxes, fees, real estate taxes and customs.
Total: 381.21 billion NIS
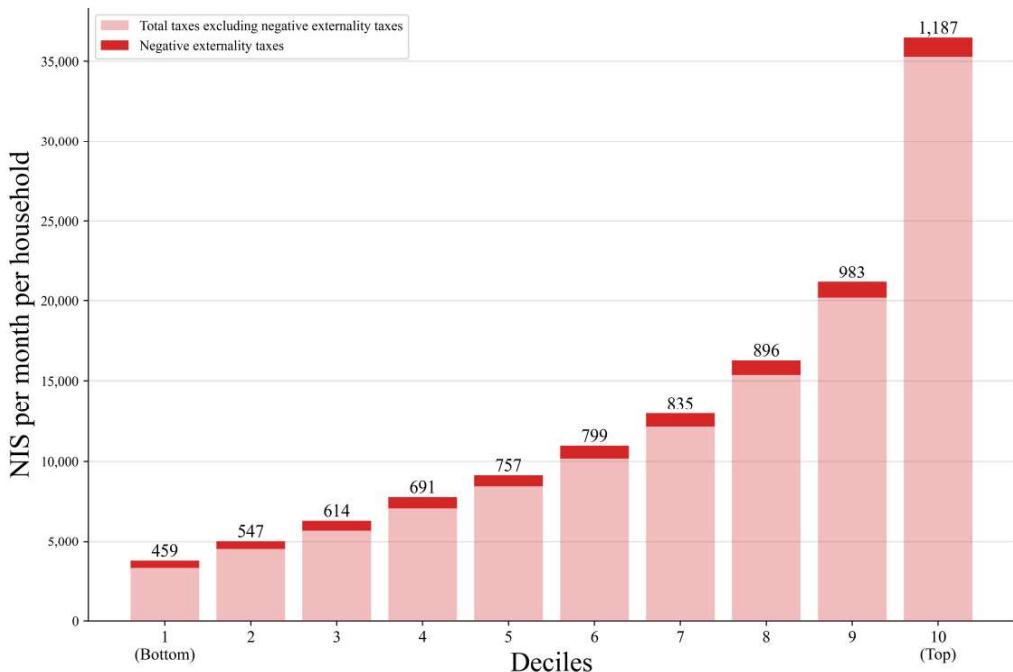
It can be seen that treating these taxes as payment for damage reduces the tax burden borne by households in all deciles. While the absolute decline increases with the deciles, the relative decline decreases as the deciles rise – while these taxes constitute approximately 13% of the total tax payments of households in the bottom decile, they constitute only approximately 3.5% of the total tax payments of the top decile.

5. The Progressivity of the Tax System and the Distribution of Net Transfers as a Percentage of Economic Income

In some of the research literature, and sometimes also in analyses by various international institutions, considerable attention is paid to the issue of measuring the progressivity of the tax system, usually by presenting the tax incidence as a percentage of households' gross income. In our view, this approach is highly problematic for several reasons, and should therefore be avoided.

First, it is incorrect to examine the progressivity of a particular tax (or of all taxes) and decide accordingly whether the policy is progressive or not and to what extent. The tax system is only one side of government intervention - the other side is the transfer system. The combination between them is what makes the system progressive. For example, if the government imposes a high VAT rate (as the only tax in the system) and distributes all the income from that tax equally among citizens (Universal Basic Income), then the first step would not be progressive (neither in absolute terms nor in comparison to many other taxes imposed by the government) while the second step would be less progressive compared to many of the government's social expenditures, but their combination would significantly reduce inequality between households (Yaakobi 2010; Katz and Sarel 2018). Moreover, if the income distribution is means-tested (rather than equal among all citizens) then, naturally, the net transfer system would be highly progressive. Alternatively, one can think of a highly progressive tax system (steep income tax brackets and large social security contributions) and the use of all the revenue to finance pension payments to retirees in a state pension according to their past contributions. Such tax is ostensibly highly progressive, but such a policy does

not really significantly reduce inequality. In addition, according to Moav (2016), the state's reliance on VAT as a taxation tool stems from the fact that the income tax base is narrow due to exemptions and benefits, so that income tax cannot be collected in Israel from a large portion of the population. Therefore, a separate examination of a particular tax misses the interactions between different taxes and different transfers and the their combined effect on the degree of progressivity of the fiscal system as a whole.

Second, expenditure and income surveys are cross-sectional and reflect households' income and expenditures at a specific point in time, without tracking the same households over time. According to established economic theories, primarily the permanent income hypothesis (Friedman, 1957), income varies more sharply over the life cycle compared to expenditure (Chief Economist Department, 2020). In simple terms, while expenditure (consumption) is relatively stable throughout life, income varies sharply between different periods. For example, households that are temporarily unemployed, and to a large extent also relatively young households, as well as older households that mostly rely on their savings, will generally have current income that is lower than their expenditure. In contrast, households where the breadwinners have significant employment tenure and are maximizing their earning capacity will typically be characterized by income higher than expenditures (and increased savings as a result), especially when most or all of the breadwinners' children have already left home. Consequently, current expenditure can sometimes reflect the standard of living more reliably than current income, especially when dealing with cross-sectional data as those in the Survey. Accordingly, VAT is not really a regressive tax, contrary to the result obtained from measuring VAT as a percentage of current income.

Third, presenting the tax incidence as a percentage of households' gross income as a measure of the progressivity of the tax system implicitly assumes that gross income is exogenous, meaning it is not dependent on government policy. However, this assumption is highly unreasonable, and fundamentally mistaken. Gross income is highly likely to be affected by government policy, and is affected, among other things, by the total taxes, the composition of taxes, and the relationship between an individual's or household's gross income and the tax rates imposed on this income. For example, when the government chooses to increase tax rates on high earners and to raise transfer payments to weaker segments of the population, every person of working age may reconsider their work volume, taking into account the total taxes they will have to pay; or perhaps even choose not to work at all and instead rely fully on government support; and the behavioral response may be different if the tax increase is implemented through different types of taxes.

Fourth, the gross income of different households, as well as that of entire population groups in the country, may reflect different cultural preferences for the type of education acquired and its adaptability to the modern labor market; the effort to participate in employment; the desired amount of leisure; and the desired family size as they see fit. For a typical household in the Haredi sector, for example, preferences in these aspects are very different compared to typical households in the othermain population groups. This phenomenon is relatively unique to Israel compared to other Western countries. Therefore, the interesting question from a public perspective and also from the perspective of its policy implications is "what is the volume of net transfers between different population groups and between different family types," and not the question "what is the extent of transfers between those with high gross incomes and those with low gross incomes."

Despite these reservations, our data and estimates allow us to estimate the transfers that households receive and the taxes they pay as a percentage of their economic income and to examine these distributions by income decile. As noted, such calculations exist in the research literature and in international comparisons, whether for theoretical reasons of how public expenditure financing should be distributed (Lindahl 1958) or in order to compare between

countries with different currencies and different income levels across the distribution (Bigot et al. 2014). For this calculation, we used our estimates of total taxes and total transfers and services by deciles (Figures 6 and 17 in the main article, respectively). In addition, since the theoretical literature refers particularly to public goods, we calculated, for each household, the cost of attributing public goods using our main method (according to consumption, Figure 64 in the appendix).

For the purpose of the calculation, household income is "gross economic income" as reported directly in the surveys. "Gross economic income" is the sum of "labor income " and "capital income" (Figure 1 in the main article). That is, it does not include "income from allowances" and is not net of deductions for mandatory payments recorded in the Survey. The results are presented in Figure 82 below.

Figure 82 Transfers and Taxes as a Proportion of Economic Income by Deciles
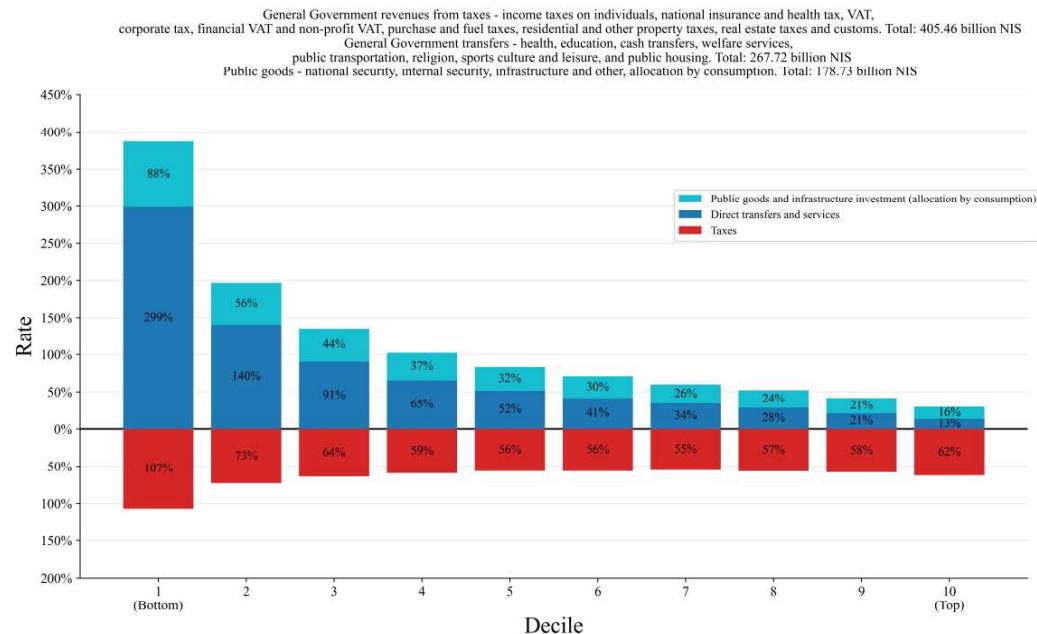

It can be seen that the value of transfers and public services that households receive decreases sharply and monotonically with gross economic income – from 387% of income (for total public expenditure) in the bottom decile to 29% in the top decile. In contrast, the taxes that households pay, as a percentage of their gross economic income, are more evenly distributed across income deciles, with a peak of 107% in the bottom decile and a minimum of 55% in the seventh decile.

Subtracting taxes from transfers in each decile represents the net transfers that households receive as a percentage of their gross economic income, similar to Figure 2 in the main article. Thus, while the lower deciles (and especially the bottom decile) receive positive net transfers, the higher deciles pay more taxes than the value of the transfers they receive – not only in absolute amounts but also as a percentage of their gross economic income.

The figure shows that for households with relatively low gross economic income (whose work volume is low or zero and so is their income from capital), the value of the cash transfers and social services they receive is much larger than their gross economic income (ratios greater than 100% in the figure). Likewise, households in the bottom decile are characterized by tax payments that are larger than their gross economic income. First, they may pay these taxes on consumption, enabled by the transfers they receive or the savings they have accumulated. Second, every tax and every transfer and service that we attributed to households is adjusted to the national accounts, while household income (by any definition) is not adjusted. This adjustment increases the ratio between the numerator (the transfers or taxes) and the denominator (the economic income).[20]

As a sensitivity test, it is possible to estimate the share of transfers that households receive and the taxes they pay as a percentage of their gross economic income minus capital income from "income from owner-occupied housing and rent" and "income from securities". The results of this estimation are presented in Figure 83.

Figure 83 Transfers and Taxes as a Proportion of Deducted Income by Deciles
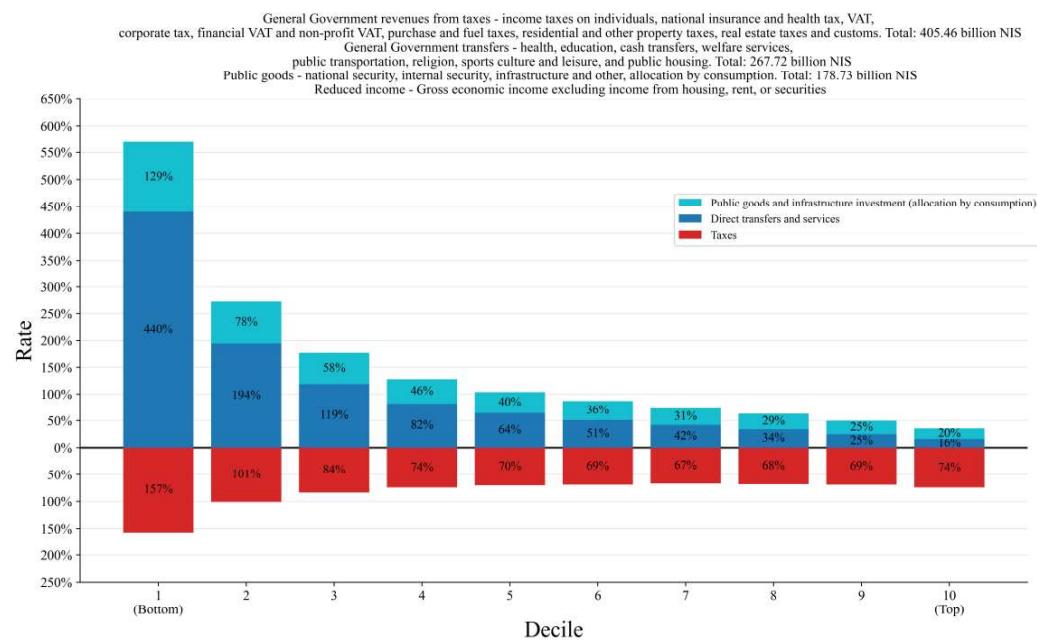
It can be seen that the pattern across the deciles, both for transfers and for taxes, is very similar to the previous analysis.

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[20] For example, the total income taxes on individuals found directly in the Survey (and derived from the taxable income reported to the CBS and Israeli tax laws) amounted in 2018 to approximately 73.33 billion shekels, while our estimate is adjusted at the household level, so that the total taxes correspond to the national accounts, at 95.51 billion shekels. This adjustment increases the total income and capital gains tax that each household pays by 30%, while the denominator (the income) remains unchanged. There are various methods to also adjust household income to the national accounts (Auten & Splinter, 2023; Piketty et al., 2018) but these are studies the purpose of which is to estimate the distribution of total national income and not net transfers as we are doing here.

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