# JORDAN FISCAL REFORM II PROJECT

## Tax Incidence Report: Jordan

### October 4, 2013

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# EXECUTIVE SUMMARY

Tax incidence analysis provides policy makers and practitioners with information regarding who bears the burden of Jordan's tax system, that is, who actually pays Jordan's taxes. Because taxes may lead individuals and corporations to behave differently than they do in the absence of taxes, the economic incidence may differ from the statutory incidence (that in the law) of taxation. A simple example as in the case of fuel helps to differentiate between the economic and statutory incidence. If the legal language states that the distributor of gasoline must turn over 1 JD per liter of petrol to the tax authorities, the statutory incidence of the tax is on the distributor. However, the increased cost of petrol due to the tax may lead the distributor to push the tax forward in higher consumer prices. Consumers in return may reduce their consumption of gasoline if they have alternatives—driving prices down. In the end, the net price for producers may be less, reducing profits. The burden of the tax may be shared in this case by consumers in the form of increased prices and by those that own shares in businesses by lower returns to investment.

An important complement of incidence analysis is the distributional analysis of the burden of taxation among the population. ―Who pays" taxes in and where they are in the distribution of income in Jordan is a relevant question for policy makers who seek to balance revenue yield with some semblance of equity in the tax system. Additionally, a distributional analysis of tax burden provides information regarding where incentives related to tax avoidance (and tax evasion) exist in the system. For example, taxing capital of the wealthy at relatively high rates could incentivize individuals to shift capital out of the country (or out of view of tax administration). Tax incidence and distributional analysis therefore provides important information regarding the equity and efficiency aspects of the current revenue system.

In this study, we analyze the incidence of Jordan's main taxes: personal income (employees and self-employed), corporate income, real property and property transfer taxes, customs, general consumption tax, excises, and taxes on capital (interest, dividends, rent). Using a long literature on tax incidence, we make a series of assumptions regarding the final incidence of taxes after they have been shifted in the economy. We then allocate the actual level of tax collections in 2011 to households based on these assumptions using Jordan's 2010 Household Expenditure and Income Survey (HEIS). The HEIS contains detailed information on income and expenditures of the household, which allows us to allocate (for example) the amount of each tax collected on the share of each household's consumption or income (depending on the tax). We make such an attribution for each tax source and aggregate over the household to arrive at a measure of total taxes paid by household. Finally, sorting households by the size of their total budget from low to high, we report the amount of tax paid by the average household at each level of income (proxied by household budget size) and we also report tax paid divided by income—a measure of effective rate of taxation.

Figures ES-1 and ES-2 provide the result of this analysis. The major findings are as follows:

- The total amount of tax paid per household ranges from a low of 588 JD in the first decile (lowest level of household budget) to a high of 6,255 JD in the top decile.

- The system of indirect taxes (customs, excise and general sales tax) is relatively proportional over all deciles—that is households pay roughly the same proportion of their income in these taxes (approximately 13.4 percent). There is mild progressivity to the burden of these taxes, with the share growing marginally from the first to the sixth decile, and then slightly regressive from the seventh through the tenth decile.

- The rough proportionality of indirect taxes comes about from the broad base of these taxes. The burden of taxable goods consumed heavily by low income households as a share of their budget (tobacco for example) is offset in the total burden by goods consumed heavily by high income households relative to the size of their budget (vehicles and fuel for vehicles, for example)

- The system of direct taxes (personal and corporate income, property taxes and taxes on capital) are distributed in a progressive manner—households with larger budgets pay a larger percent of their household budget in direct taxes.

  - The current threshold of the personal income tax system is a principal driver in the progressivity of the direct tax system; most households are exempt from the personal income tax.

  - The burden of the corporate income tax is assumed to fall on capital and labor, which tempers the progressivity of the corporate income tax and results in some of the burden falling on households in the lower deciles.

- The overall distribution of tax burden in Jordan is not dissimilar to that found in many other countries, with the direct taxes providing progressivity to the system and the consumption system relatively proportional, with a small amount of regressivity from the middle to higher deciles. The main difference in Jordan, relative to other countries is the size of the indirect burden relative to the direct tax burden. While in developing countries indirect taxes typically outweigh direct taxes, in Jordan, there is a somewhat larger concentration of indirect taxes.

- Policy implications:
  - The relatively proportional burden of the indirect taxes is due to a broad-mix of tax items. Retaining a broad tax base reduces the incentive for consumers to shift between taxable and non-taxable goods—retaining efficiency in the tax system.

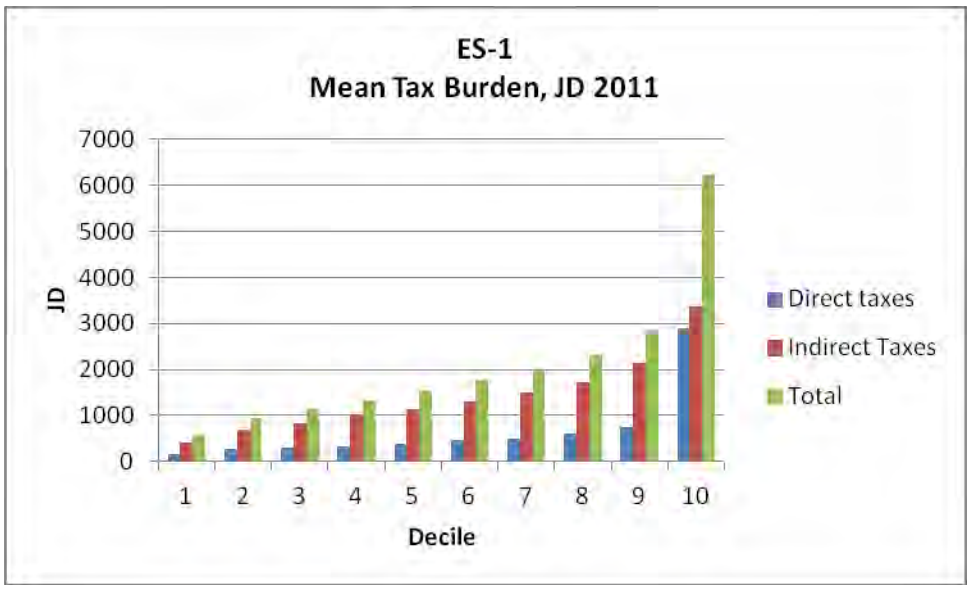
  - The personal income tax is almost exclusively concentrated in the highest decile where there is more ability for taxpayers to engage in avoidance activities. If the Government were to seek additional revenues from the personal income tax, there is some room in the distribution of taxes to lower the threshold and move some of the burden into the deciles below the 9th and 10th.

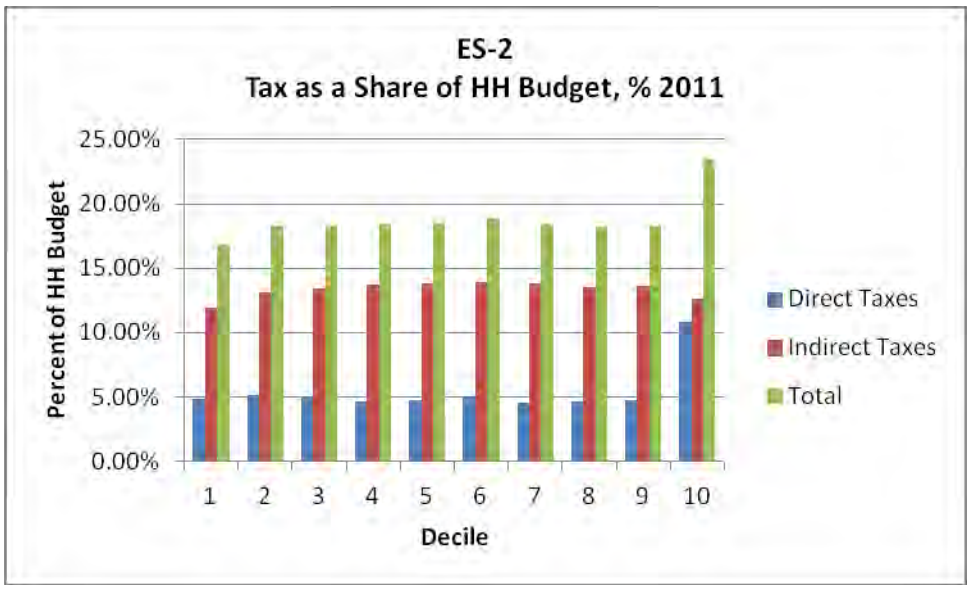
  - The overall burden of tax in Jordan is somewhat low relative to peer middle income countries. There has also been a precipitous decline in tax revenue to GDP since the mid-2000s. If the Government sought to increase revenue through tax policy changes, small changes in the indirect tax rate could be revenue productive given their wide reach across the income distribution.

  - Tax administration is a critical component of any change in tax policy. If Government were to make changes to the tax system, they should be as simple to administer and comply with as possible.

  - Tax expenditures (revenue foregone due to exemptions, deductions, credits, etc.) not only reduce revenue, they provide additional avenues for tax avoidance and evasion. A companion report on tax expenditures provides policy recommendations which may affect the overall distribution of net tax burden.

- The expenditure side of distribution should also be considered in an overall evaluation of the equity of the fiscal system in Jordan. 1 Price controls, subsidies, and other public expenditures could enhance or detract from the overall equity of the fiscal system.




[1] Thus, taxation of cars and motor fuels, while being the main source of progressivity of indirect taxes at the upper tail of income distribution, is likely to be partially offset by government expenditures on roads, which disproportionally benefit car owners.

# INTRODUCTION AND OVERVIEW

The focus of this study is on the incidence of taxes in Jordan. All taxes must ultimately be paid by someone, and one of the most fundamental questions asked by economists is: ―Who bears the final burden of a tax?" Taxes cause individuals and firms to change their behaviors, and the resulting changes in product and factor prices will affect the ―incidence" and the distributional effects, of the tax. 2 The answer to the question ―Who bears the burden of the tax" requires us to estimate whether or not taxes are regressive; that is, do taxes as a share of income decrease or increase as income increases?

Understanding the incidence of taxes in Jordan is important from several perspectives. Over the past decade, Jordan has seen overall economic growth weaken due to the worldwide financial crisis and associated reduction in economic activity and increased pressure due to a renewed influx of refugees from countries including Syria and Egypt. The tax to GDP ratio has fallen from a high of 20.4 percent in 2006 to a current level of approximately 15 percent—on par with countries including Egypt and Lebanon (2011) and substantially lower than several middle income countries including Morocco, Turkey, Mexico. The OECD average tax to GDP ratio is 33.8 percent.3 Increases in current account deficits in the face of the falling tax to GDP ratio have led to calls for Jordan to increase its tax to GDP ratio while maintaining a stable social environment and providing for economic growth.

An analysis of the incidence and distributional implications of the tax system in Jordan can provide useful information with respect to the equity of the system as Jordan weighs its tax reform options. Why is equity a concern? While Jordan is an upper- middle income country, there is a significant portion of the resident population that falls below the poverty line. The Ministry of Planning, Department of Statistics reports that 14.4 percent of the population fell below the poverty line in 2010 (4400 JD per year).4 This represents a substantial portion of the population for whom taxes may represent an especially difficult burden.

The *poverty level* is one measure of income disparity in a country. Another equity-related concept is the *distribution of income* among population groups. A commonly accepted measure of distribution is the Gini coefficient, which measures the difference between complete equity in income distribution (each portion of the population holds the same level of income) and the actual distribution. A Gini of 0 measures perfect equality and a Gini of 1 measures complete inequality (all income concentrated in one decile). The World Bank has published estimates of the Gini coefficient for a large number of countries for various years. A sample of those countries is reported in Table 1. As seen there, the Gini coefficient in Jordan increased between 2008 and 2010 suggesting a less equal distribution of income. Coupled with the increase in poverty rates, it is important for the Government to consider the impacts of tax reform options on the distribution of tax burdens as they may acerbate tensions over income distribution in Jordan.

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[2] Economic incidence actually estimates the change in welfare due to changes in prices, returns to capital, and returns to labor. In practical terms, it is typically operationalized by measuring changes in net income which can then be examined over the income distribution.

[3] OECD: http://www.oecd.org/ctp/tax-policy/revenuestatisticstaxratioschangesbetween2007and2011.htm

[4] UNDP, *Jordan Poverty Reduction Strategy – Final Report*, 2013.

http://www.undp.org/content/dam/jordan/docs/Poverty/Jordanpovertyreductionstrategy.pdf

Table 1: Gini Coefficients

| Country | Year | | | |
|---|---|---|---|---|
| | 2003/04 | 2008 | 2009 | 2010 |
| Jordan | 38.9 | 33.8 | - | 35.4 |
| Argentina | 54.7 | 46.3 | 46.1 | 44.5 |
| Georgia | 40.4 | 41.3 | 41.7 | 42.1 |
| Indonesia | - | 34.1 | 35.6 | 38.1 |
| Macdeonia | 39.0 | 44.2 | 43.2 | 43.6 |
| Serbia | 32.8 | 28.2 | 27.8 | 29.6 |
| Turkey | 43.4 | 39.0 | 38.7 | 40.0 |

Source*:* World Bank, World Development Indicators 2003, 2007, 2012

It should be noted that the ability of the tax system to redistribute income is difficult. Reducing the tax burden on one portion of the population (say low income) and increasing it on the upper end of the income distribution could induce higher income households to avoid taxes or otherwise change behavior that could reduce the overall level of productive economic activity. Expenditure programs such as health and education may help to alleviate poverty and impact the distribution of income. Direct subsidies such as those for housing or food, also can impact the distribution of income. After expenditure policy, tax policy is a second fiscal instrument that may be used to change the underlying distribution of income within a country, although it is difficult for tax reforms to have a big impact on income redistribution (Bahl, 1990). Our focus in this report is on the incidence of taxation, and we will not deal with the distribution of public expenditure benefits although we need to point out that expenditures are an important consideration in evaluating the equity of the public sector.

In this report, we address the following questions and issues:

- How does the current tax system treat low versus high income individuals?
- Are there imbalances in the distribution of taxes that create a perception of unfairness?
- What does the effect tax rate say about distortionary effects of the tax system on economic behavior?
- Are some taxes more progressive and some more regressive?
- How does the distribution of tax burden in Jordan compare to that in other countries?

The goal of this report is to provide policy makers in Jordan with information about the distribution and effective rate of taxation on households in Jordan. The analysis lends itself to some recommendations for Government consideration as they evaluate tax reform options under the assumption that Government is focused on increasing the level of tax revenue to GDP. We estimate the incidence of all major taxes, and perform sensitivity analysis related to the incidence assumptions. This study will therefore provide a baseline for evaluating the equity of reforms.

## Methodology

Statutory incidence of taxation is the legal incidence—who by law is liable to pay tax. The economic incidence of taxes takes into consideration the ability of the tax to be shifted through the economy and can be very different from statutory incidence. For example, the corporate income tax can be shifted to labor in the form of lower wages, consumers in the form or higher prices, or stockholders in the form of lower returns to capital. In general, if a tax is imposed on a mobile factor or on a consumer good for which there are many substitutes, the tax will more easily be shifted to other components of the economy. A more detailed discussion of economic incidence is provided Appendix A.

There are a number of steps in the methodology used to analyze the incidence and distribution of taxes. There are five main steps in the analysis:

- Determine the taxes to be analyzed
- Identify appropriate data to measure household income and consumption, determine a measure of ability to pay
- Appealing to the literature on tax incidence, make appropriate assumptions regarding the incidence of each tax
- Once the incidence has been determined, allocate the tax to individuals based on their share of consumption or income (depending on the incidence assumption) or their share of factor income
- Sort the population from lowest income to highest income to report how much tax is paid relative to income (by income groups) and also report the tax paid relative to income by each segment of the population, i.e., -- the average effective tax rate or the ratio of tax paid to income. If the average effective tax rate increases with income, the system is called —progressive" and if it falls as income rises, the tax is regressive.

At each step in the methodology, important decisions have to be made and many of those hinge on assumptions based on available data and existing literature. These assumptions become critically important in the incidence analysis. We perform some sensitivity tests on these assumptions to judge how large an impact they have.

The taxes that are analyzed in this report are: employee and self-employed income tax, corporate income tax, tax on capital (interest, dividends, rents), property tax, property transfer tax, excise taxes, customs, and general sales tax. We use 2011 as the base year for the analysis, and allocate a total of 3.3 billion JD in revenue, allocated as follows:

- Employee and self-employed tax: 148 million JD
- Corporate income tax (CIT): 523 million JD
- Property transfer tax: 171 million JD
- Property tax: 54 million JD
- Excise: 779 million JD[5]
- Customs: 236 million JD
- General sales tax (GST): 1,600 million JD

[5] This includes JD 236 million of SST levied by Jordan Customs on imported cars in addition to the net tax liability of JD 520 million reported by ISTD, which does not include any SST on cars.

- TOTAL 3,511 million JD

The personal income tax is levied on salaried individuals (who largely pay tax through a withholding system) and individuals with self-employment and other income. The tax rates are 7 and 14 percent and there is a substantial basic deduction of 12,000 JD for individuals and 24,000 for families. This threshold is high relative to average monthly income and to the poverty line. As a result, a very small portion of the population is liable to pay the tax.

The corporate income tax is levied on profits of incorporated firms at a basic rate of 14 percent for general legal entities, 24 percent for the communications, insurance, and certain financial companies, and 30 percent for banks.

The real property tax base is the annual rental value of all residential, commercial, and industrial properties and vacant land (Bahl, 2010). The tax rate is 15 percent but it is a combination of a 10 percent municipal property tax, a 3 percent sewer fee, and a 2 percent education fee. Vacant land is taxed at a nominal rate of 2 percent. The property transfer tax is levied at a rate of 5 percent on the value of real property transferred.

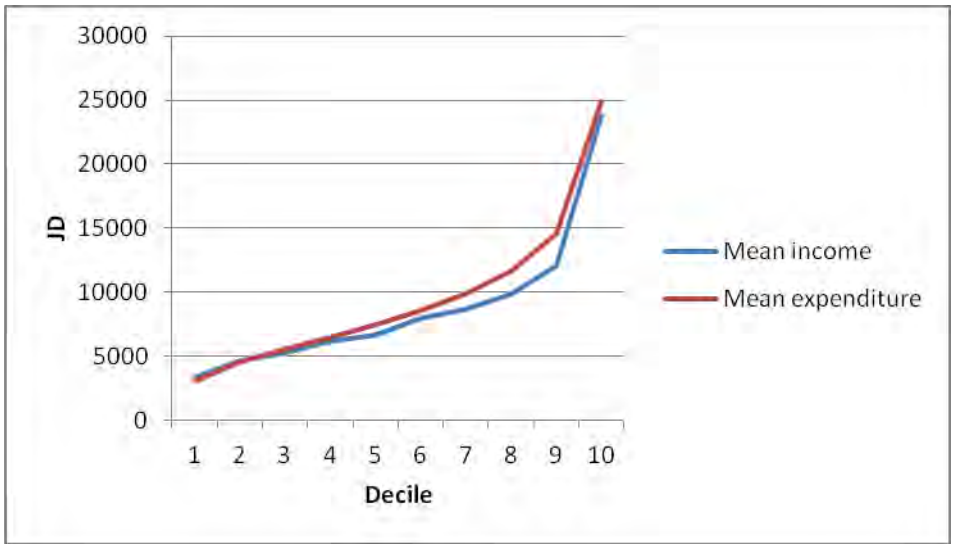
Indirect taxes are the main source of tax revenues in Jordan. They include the General Sales Tax (GST), Special Sales Taxes (SST), and Import Duties. Together they accounted for about three quarters of the national tax revenues in 2011. Jordan uses the ―credit-invoice" approach in its General Sales Tax (essentially a form of VAT) and Special Sales Taxes (essentially excises). GST is a broad-based sales tax with a standard rate of 16 percent, and reduced rates of 0, 4, 7 and 8 percent applied to selected items. Special Sales Tax is levied on certain selected goods and services according to ad valorem and specific rates.

The burden of the tax will be analyzed relative to the ability of the households to pay taxes. Ability to pay comes from a comprehensive definition of income and the assumption is the larger the income, the higher the ability to pay. To analyze the tax burden across households, we need to work with household level data—or what might be called micro data. Jordan's Household Expenditure and Income Survey (HEIS, 2010) provides detailed household level information on types of income (wages, capital, rental income, etc.) and detailed information on expenditures (tobacco, fuel, clothing, food, etc.). Survey data provided substantial detail, but can suffer from reporting biases—income is often underreported and expenditures may also be misreported. Based on discussions with the Department of Statistics and practices used in many other countries, this analysis relies on total household expenditures as a measure of ability to pay.

In fact, the actual distribution of income and expenditures by household reported in the HEIS is quite similar. Figure 1 shows the distribution of households by population decile (the lowest 10 percent of population in terms of household expenditures to the top 10 percent of the population). As seen there, income and expenditures are distributed very similarly among household deciles. Because our tax collections are for 2011, we inflate the expenditure base to 2011 levels using an expenditure inflation adjustment of 6.6 percent (based on macro data provided by FRPII staff). We made one additional adjustment to the 2011 data for the fuel subsidy that was instituted that year. The subsidy was made available to households with income less than 10,000 JD and was allocated as 70 JD per family member up to a total of six family members (420 JD limit). This subsidy adds to the households' ability to pay and to consume, so it is appropriate to scale up expenditures in this manner. Other government subsidies are included in total expenditures (as a proxy for income) by default since they were already available in 2010.

The next section of the report provides detail on the incidence and allocation methods for each major tax. These assumptions and methods are summarized in Table 2.

Figure 1: Distribution of Income and Expenditure by Expenditure Decile (2010)




## Incidence and Allocation Assumptions

*Incidence of taxes on labor: personal income (including salaried and self-employed workers)*. The incidence of taxes on wage income is a function of the labor supply elasticity—how much labor changes as wages change. The intuition is straightforward--if labor is mobile, then, as taxes on labor increase, individuals will seek to escape the tax by moving to sectors without the tax or otherwise reducing their work effort.

Based on relatively standard assumptions regarding this mobility and the incidence of taxes on labor, we assume that the income taxes fall 100 percent on labor. We allocate the income tax revenues across households based on the share of wage over the current 12,000/24,000 threshold held in each decile.

*Incidence of the corporate income tax.* The debate over the incidence of taxes is probably most contested in the case of corporate income taxes. The theoretical analysis done on the corporate income tax for developed countries in the 1960s and 1970s suggested that the tax could be born by owners of capital (general financiers large and small), labor in the form of lower wages (which could be reduced to lower the firms' cost of business once a corporate income tax is imposed or increased), or consumers in the form of higher prices (which could be increased to absorb the increased cost to the firms of the corporate income tax) (Harberger 1962, McLure 1975, Hines 1999). Just like the incidence analysis of all other taxes, the true impact of the corporate income tax is affected by the type of market, competitiveness of output prices, mobility of capital and labor, wage constraints, price elasticity of demand for the output, and other factors. Over time, while incidence studies have used different assumptions regarding the incidence of the corporate tax, a general consensus seemed to be the incidence of the tax is shared by capital and consumers in the form of higher prices or by labor in the form of lower wages.

Based on the literature, in our baseline distribution of tax burdens, we assume that 50 percent of the corporate income tax falls on capital and 50 percent on labor (wages). Of the 50 percent that falls on capital, we assume that 49 percent of that is on households in Jordan.6 The HEIS provides detail on holdings of capital income (interest, dividends, property revenue) and wages, which allows us to allocate a portion of the corporate income tax revenue to capital and to labor

[6] Based on data from the Jordan stock exchange, 51 percent of shares are owned by foreigners. We assume that this represents the distribution of corporate capital between domestic and foreign.

income. We provide sensitivity analysis where we assume that 50 percent of tax is borne by capital and 50 percent is borne by consumers via general consumption.

*Incidence of taxes on property transfer and property tax*. Like the corporate income tax, there is some controversy regarding the incidence of these taxes. In the —traditional view" of the property tax, capital owners bear no burden of the property tax on capital; the tax is borne by renters, consumers, and/or labor because investors in property could use their capital elsewhere and therefore will not suffer a loss in profit. The tax on land is borne by land owners since land cannot —escape" the tax. The —new view" treats the capital portion of the property tax as two pieces: a basic, or average, tax rate applied to all capital, plus a local differential that varies by jurisdiction. The average tax is levied on a fixed supply of capital, and thus capital owners can't escape the tax. The differentials around the average encourage capital to move among jurisdictions until the net of tax rates of return on capital are equal. The net rate of return to capital falls as a result but how much it falls depends on the effect on land and labor. Property taxes are more progressive under the new view than under the traditional view.

Finally, the benefits view of property tax incidence argues that the property tax is a benefits tax equal to the benefits received for the public services funded by the property tax. Under this view, individuals search for jurisdictions that meet their demands for public goods, with the property tax being the price or payment for local public goods. As long as there are sufficient choices of jurisdictions and jurisdictions impose fiscal zoning to prevent individuals from paying less than the average cost, individuals will seek to match their demand for public goods with the appropriate jurisdiction. In this case, the tax is a user charge—and there is an inherent fairness to the tax based on the benefit principle (Hamilton 1975).

In this study, we apply alternative assumptions regarding the incidence of taxes on property. We assume first that 50 percent of the tax is borne by renters and 50 percent by owners of property and then we assume that 100 percent is borne by renters in the case of residential property. In the case of commercial property we use a set of alternative incidence assumptions including shifting of the tax to consumers.

*Incidence of sales taxes*. Following the conventional approach, in this study the incidence of the sales taxes is assumed to be on the final consumer. Using data from HEIS allows us to relate the tax burden of the sales taxes to the size of a household budget. ISTD reports sales tax receipts by business activity code (ISIC) of the suppler. First, we aggregate the receipts into 81 industries in Jordan's input-output table, provided by the Department of Statistics under the Ministry of Planning.

Annex Table shows statutory incidence of indirect taxes for each of the 81 industries. These are actual amounts paid by businesses to their suppliers and collected from their buyers due to statutory tax obligations. The largest amounts of indirect taxes are remitted to the government by the trade sector (JD 591 mln.), motor vehicles (JD 336 mln.), tobacco (JD 267 mln.), telecommunications (JD 182 mln.) and petroleum products (JD 163 mln.). However, with the exception of the part of output that is exported abroad at given world prices, the market prices of the final domestic consumption of goods and services are expected to include indirect taxes paid by businesses throughout the production chain.

Therefore, next we map outputs from these 81 industries into 33 main groups of commodities in the HEIS (16 groups of food commodities and 17 groups of non-food commodities). The impact of taxes on the market prices of products of respective industries is accounted in household budgets according to the relative share of household expenditures on those products. For examples, on average 47% of household expenditures on Food Group 8 (Dried & canned legumes) are on dried legumes produced by industry 3 (Crops & Other Agriculture) while the remaining 53 % are on canned legumes produced by industry 17 (Other Food Products ). Therefore, the —effective tax" estimated for industry 3 at 4.78% is accounted for with 0.47 weight while the 10.72% effective rate

on industry 17 is accounted for with weight 0.53 to arrive at the —tax element" of 0.47*4.78%+0.53*10.72%=7.93% in the household expenditures on food group 8. While the share of the —tax element" in household expenditures on a particular commodity group is estimated to be the same for all income levels, when applying this share to actual household expenditures, which vary across income deciles, we arrive at different amounts of the tax burden for different groups of households. This exercise is done for all 33 commodity groups.

*Incidence of import duties*. Incidence analysis of import duties on final products relies on the same assumptions as the sales taxes. However, for import duties on intermediate inputs, the incidence assumptions will differ between industries producing non-tradable outputs as opposed to products that have to compete with imports. For industries, producing non-tradable outputs

Table 2: Summary of Taxes Analyzed, Level of Revenue, Incidence Assumption, and Allocation Methods

| Tax source | Collection Attributed (2011) | Incidence assumption | Allocation method |
|---|---|---|---|
| Individual income tax | TOTAL: 74,000,000<br><br>Domestic:100%<br><br>Foreign: 0% | 100% Borne by labor in self-employed sector above threshold | Simulated 2009 law with HEIS data and then adjusted to total collection amount |
| Employee income tax (PAYE) | TOTAL: 74,000,000<br><br>Domestic: 98%<br><br>Foreign: 2% | 100% Borne by wage-earners (labor) above threshold | Simulated 2009 law for wage earners with HEIS data and then adjusted to total collection amount |
| Corporate income tax (partnerships and corporations) | TOTAL: 568,456,962<br><br>Domestic: 49%<br><br>Foreign: 51% | 50% Borne by labor (wage earners); 50% borne by capital<br><br>ALTERNATIVE:<br><br>50% borne by consumer; 50% borne by capital<br><br>NOTE: In all cases the portion borne by wages is assumed to remain domestic; portion borne by | Wages as reported in the HEIS, capital income from HEIS (sum of rental income q910, q912, q914, and income from interest, bonds, stocks q922) |

| | | | |
|---|---|---|---|
| | | capital is assumed 51% foreign | |
| Tax on interest, mutual funds | TOTAL:<br>3,273,111<br><br>Domestic: 100% | Allocated based on ownership of capital | Capital income from HEIS (sum of rental income q910, q912, q914 and income from interest, bonds, and stocks q922) |
| GST | TOTAL:<br>1,599,484,901<br><br>Domestic: 100%<br><br>Foreign: 0% | 100% Borne by consumers Taxes on means of production are entirely allocated to final consumption assuming a steady state (capital replacement equal to capital depreciation) | Input and output taxes declared by vendors mapped to HIES data on final consumption |

Table 2: Summary of Taxes Analyzed, Level of Revenue, Incidence Assumption, and Allocation Methods (continued)

| Tax source | Collection Attributed (2011) | Incidence assumption | Allocation method |
|---|---|---|---|
| Excise taxes | TOTAL:<br>778,576,478<br>Domestic: 100%<br>Foreign: 0% | 100% Borne by consumers. Taxes on means of production are entirely allocated to final consumption assuming a steady state (capital replacement equal to capital depreciation) | Input and output taxes declared by vendors mapped to HEIS data on final consumption |
| Customs duties | TOTAL: 235,988,679<br>Domestic: 100%<br>Foreign: 0% | Duties on final goods borne by consumers, who also pay for increased value added in domestic production of these goods;<br>Duties on intermediate inputs to production of non-tradable goods borne by final consumers;<br>Duties on intermediate inputs to production of tradable goods borne by production factors. | Duties paid by importers mapped to HEIS data on final consumption; I-O table used to estimate factor income as the different between values of output and intermediary inputs |
| Property transfer tax | TOTAL: 170,921,925<br>Residential: 70% (all of this domestic)<br>Industrial/commercial: 30% | Residential: 50% to property owners (assumed to be domestic) and 50% to renters; alternative 100% to renters<br>Industrial/commercial: 100% to property owners; alternative 50% to property owners and 50% to all capital (51% is assumed exported); alternative 50% to property owners and 50% to consumption[7] | Property income from HEIS: q910, q912, q914 and rent imputed as noted in text<br>Consumption from HEIS total expenditures<br>Capital income from HEIS (sum of rental income q910, q912, q914 and income from interest, bonds, and stocks q922) |

[7] Assumes that foreign companies/individuals face same basic market structure

Table 2: Summary of Taxes Analyzed, Level of Revenue, Incidence Assumption, and Allocation Methods (continued)

| Tax source | Collection Attributed (2011) | Incidence assumption | Allocation method |
|---|---|---|---|
| Real property tax (excluding education and sewer) | TOTAL: 54,486,695 | Individual: 50% to property owners and 50% to renters; alternative 100% to renters | Property income from HEIS: q910, q912, q914 and rent imputed as noted in text |
| | Individuals/domestic: 70% | | |
| | Industrial/commercial: 30% | Companies-domestic: 100% to property owners; alternative 50% to property owners and 50% to all capital (51% is assumed exported); alternative 50% to property owners and 50% to consumption[8] | Consumption from HEIS total expenditures |
| | | | Capital income from HEIS (sum of rental income q910, q912, q914 and income from interest, bonds, and stocks q922) |

(e.g. personal services), we assume that import duties on inputs are fully passed forward to the final consumers. However, for tradable products, the market price is determined by world prices and thus domestic produces will have to absorb import duty on their inputs.

The incidence assumptions and allocation methods used for all of the taxes are summarized in Table 2. In some cases, we list multiple incidence assumptions and will test those in our sensitivity analysis. The first assumption listed should be considered the —base case."

## Findings

The level of direct tax paid by households varies from 171 JD per year in the first decile to 2,892 JD per year in the 10th decile (Figure 2). The distribution of the tax burden for direct taxes (personal, employee, corporate, property taxes and taxes on capital) is progressive (see Figure 3). The burden (tax divided by household budget) ranges from 4.9 percent (first decile) to 10.9 percent in the 10th decile. The progressivity is largely affected by the distribution of the personal and employee income tax. The large threshold eliminates most of the households from the income tax system. The assumption that the corporate income tax is shared by wages and capital means that some of the burden of corporate tax is found in all deciles—since there are households in each decile that report wage income.

[8] Assumes that foreign companies/individuals face same basic market structure

Under the aforementioned incidence assumption, the burden of the sales taxes is practically flat (Figure 4). It is only mildly progressive at the bottom, increasing from 9.71% for the first decile to 11.41% for the sixth decile, and then slightly regressive over deciles 7-10, dropping to 10.77 % for the top decile. Thus all households essentially pay the same share of their budgets in sales taxes, with the middle class sacrificing a slightly higher share of their incomes than the poor or the rich.

The burden of the import duties has a similar distributional pattern. The tax burden is increasing from 2.25% for the first decile to 2.55% for the third decile, and then mildly declining over deciles 5-9, and dropping to 1.89% for the top decile.

All in all, the combined burden of all indirect taxes is mildly progressive at the bottom, increasing from 11.96% for the first decile to 13.93% for the sixth decile, and then mildly regressive over deciles 7-9 before dropping to 12.65% for the top decile (Figure 5). This incidence is determined by interplay of the progressive burden of taxes on transport-related commodities, and to a lesser extent adult clothes and education, and the regressive burden of taxes on most other groups of commodities, especially tobacco. Even though the burden for better-off household might be declining relative to their ability to pay, nevertheless it is increasing in absolute amounts. Thus the top decile pays eight times more in indirect taxes than the bottom decile, roughly in line with differences in the size of household budgets

Finally, it has to be pointed out that the deviations from the proportional distribution of the tax burden for selected commodities are to a large extent due to the Special Sales Tax (see Figure 6). As one can see from the figure below, the burden of the SST on cars and motor fuels is sharply progressive.

The entire burden story is summed up in Figure 7, which presents the tax burden of direct, indirect, and total taxes as a share of household expenditures. The burden of the entire tax system is progressive and as noted earlier, this is driven by the very progressive distribution of the income tax and relatively flat distribution of consumption taxes.

Figure 2: Mean Direct Tax, JD 2011

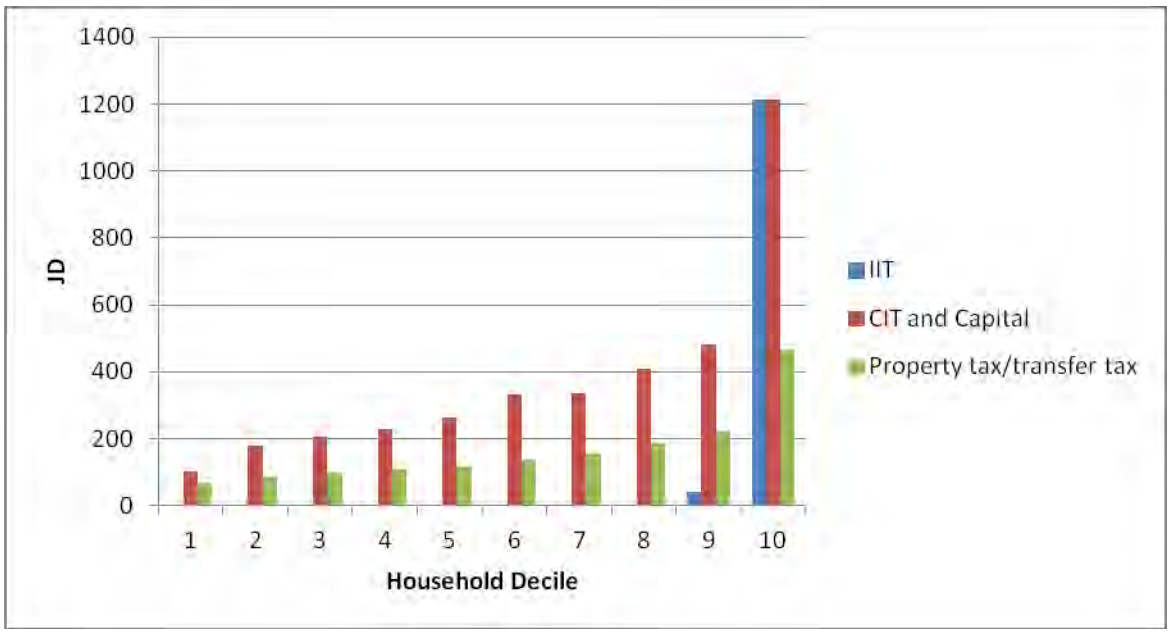


Figure 3: Direct Taxes as a Share of Household Expenditure, 2011

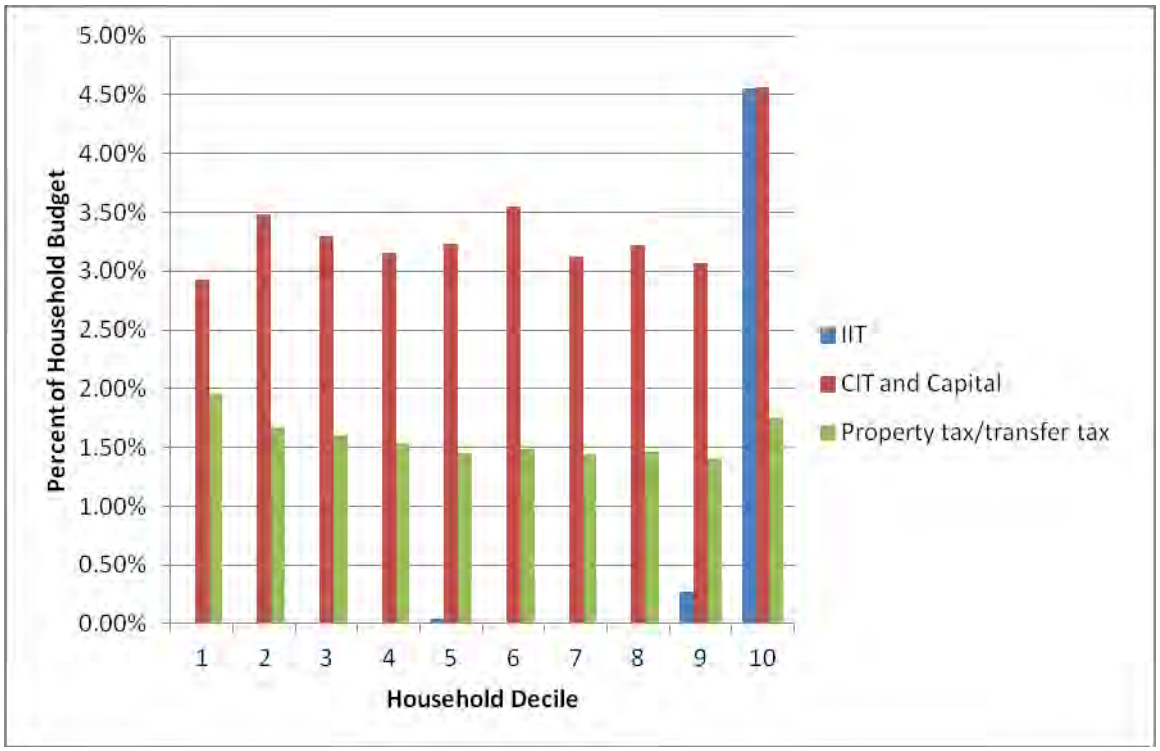



Figure 4: Sales tax and import duty as a share of household expenditures, 2011

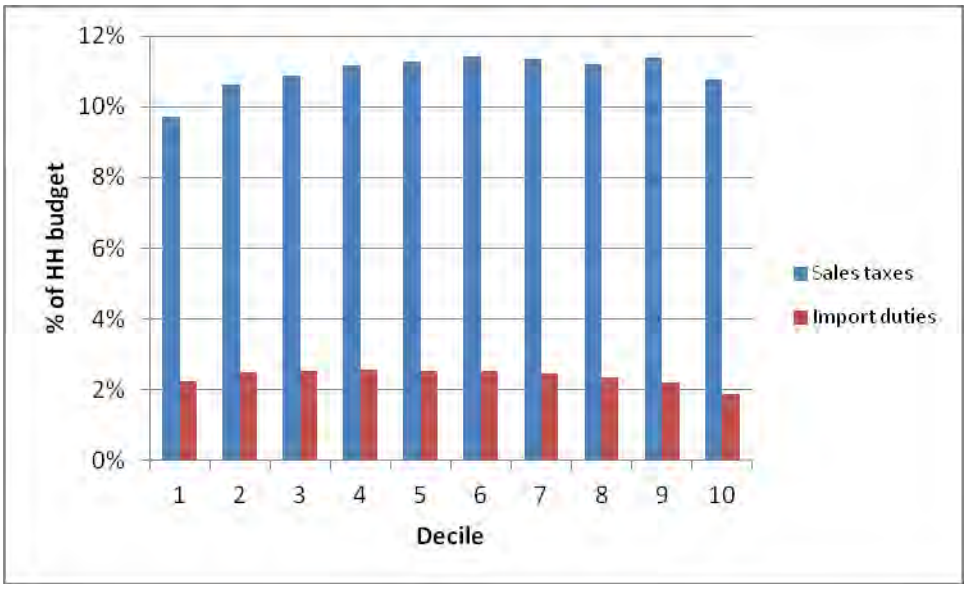


Figure 5: Indirect tax by item as a Percent of Household Expenditure, 2011

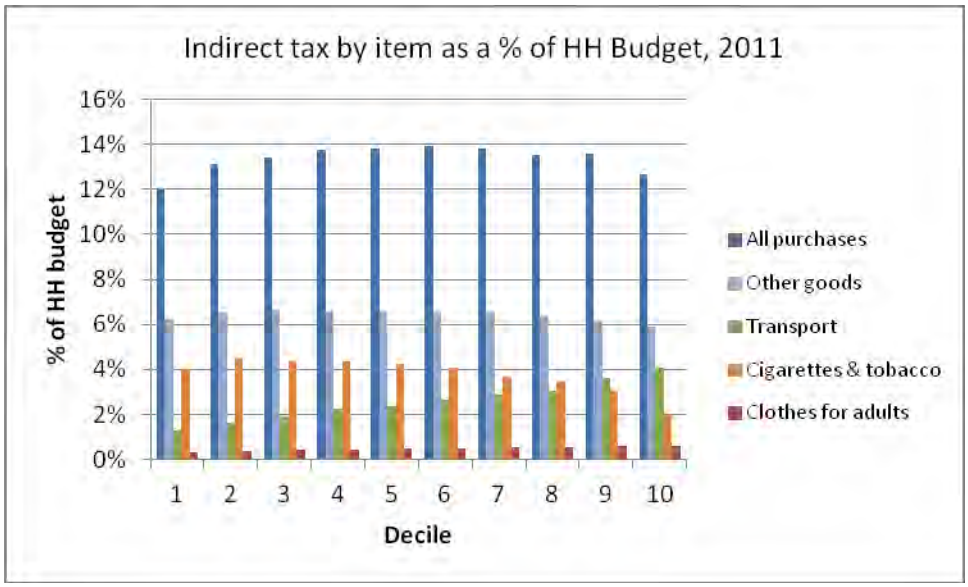



Figure 6: Special Sales Tax Burden

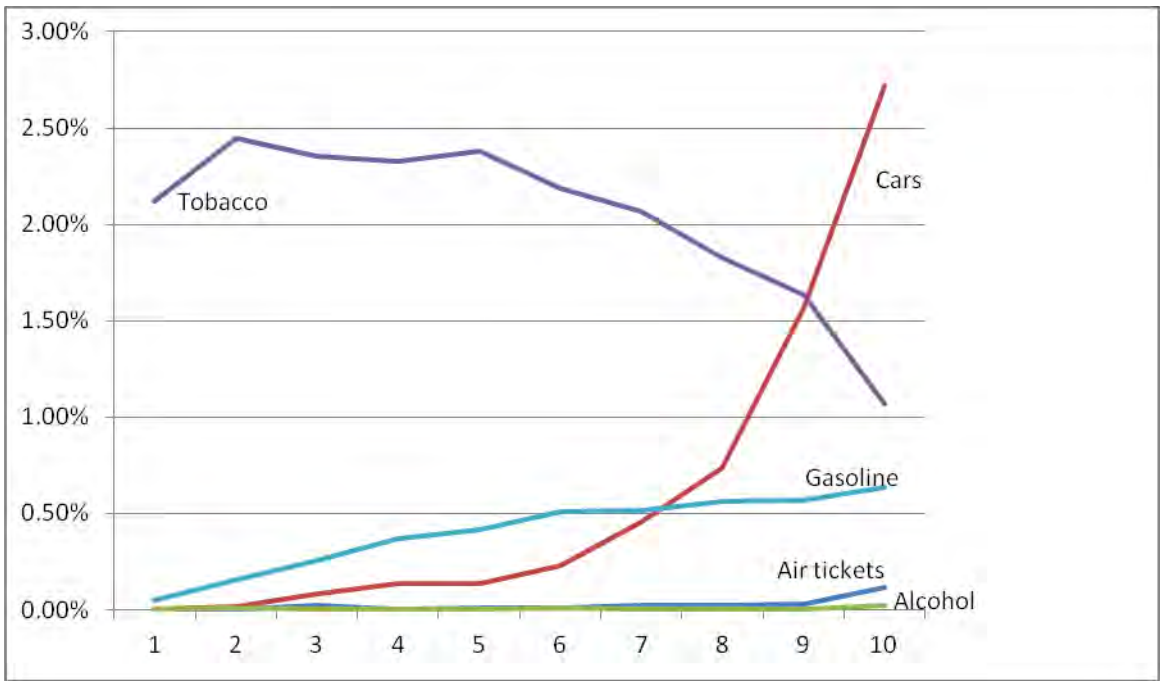
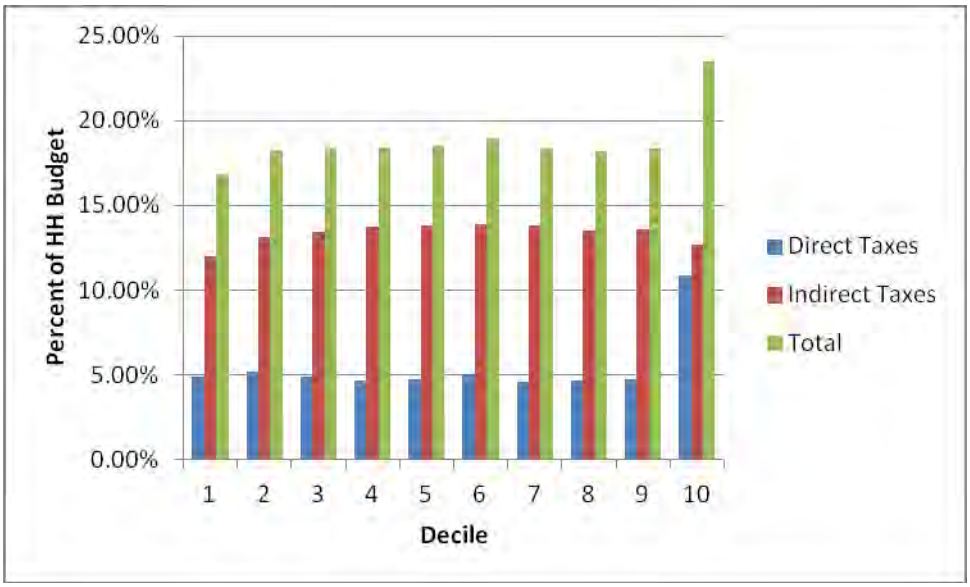


Figure 7: Direct plus indirect taxes as a share of household expenditure, 2011




Direct taxes include: personal income (including employees and self-employed), corporate income tax, taxes on capital, property and property transfer tax, GST, excises and custom duties.

The distributional implications are generally as expected with consumption taxes falling proportionally among the budget deciles and direct taxes progressively across the same deciles. Compared to other countries, the general distribution of Jordan's taxes is similar to that found in Pakistan, Jamaica, and Chile. However, the level of indirect taxes as a share of the household budget in Jordan is larger than that found in those countries. In Pakistan, the equivalent level effective tax rate for excise is approximately 9 percent (2007), while in Jamaica it was 16 percent (2004). In countries including Chile, South Africa, and Slovenia, among others, the system of direct taxes (notably the individual income tax) introduced progressivity in the overall burden of taxes. In these countries, the direct taxes play a larger role than in Jordan, so the resulting overall distribution of tax burden is progressive over a larger portion of the population. This is in contrast to the case of Jordan where the progressivity of direct taxes is almost exclusively found in the top two deciles.

The relatively proportional nature of consumption taxes in Jordan may reduce the potential for tax avoidance. In cases where the tax base is broad, it is not easy for individuals to find non-tax substitute goods. Therefore, from an efficiency stand-point, the distribution of the consumption tax is a positive attribute of the fiscal system. Regarding the direct taxes, the focus on upper income earners paying income tax may be problematic for just the opposite reason that the consumption tax distribution is positive. High income individuals often have several –levers" to pull to avoid taxes—they may be able to move money off-shore or into different forms of income that would be less taxable including investments abroad. So on efficiency grounds, the income tax case is weak.

From the perspective of equity, some might argue that a proportional consumption tax is unfair. How much equity is fair is a decision for Jordanians. Relative to many other countries with an income tax, the threshold of income tax in Jordan is quite high, which results in this steep progressivity of the tax burden. However, the expenditure side of the budget could be used to offset the consumption tax burden as in the case of the tax on fuels. Equity considerations should include an analysis of the expenditure side of the budget.

## Sensitivity Analysis

As noted in this report, some incidence assumptions are more tenuous than others in the case of direct taxes. This is particularly true for the corporate income tax and the property and property transfer taxes. The first sensitivity analysis run was to substitute the 50 percent CIT on wages for 50 CIT on consumption (shifting the burden to final consumers). Because the distribution of consumption is quite similar to that of wages, there is virtually no change in the overall distribution of taxes using this assumption.

Similar sensitivity analyses were performed for the property taxes. In these cases, the burden first assumed to fall on owners of property. In the sensitivity analysis, the burden was shared between property owners and renters which will shift the burden of the tax down into the lower deciles. The net result is a property tax system that is markedly regressive—with a burden of 6.77 percent of household expenditures in the first decile compared to 4.8 percent in the base case. The level of property tax is not sufficient to offset the progressivity of the income tax and as a result the system of direct taxes remains progressive under these alternative assumptions but less so than in the baseline case.

There are other interesting demographics associated with the concept of tax burden including relative taxes borne by men versus women or in urban versus rural areas. The HEIS is comprised of 86.5 percent male head of households and 13.5 percent female (weighted, as reported in the survey). Regarding tax incidence, it would be interesting to know whether female headed households earn money or consume differently from male headed households. For example, if female headed households consume relatively less of their budget in tobacco, they would attract a lower amount of burden of taxes on tobacco (relative to their budget).

The comparisons among households by these demographics can be accomplished in several ways. First, we look at the relative number of female and male headed households in each decile, where the deciles are defined across the entire population. If household budgets were equally weighted across the distribution for both genders, we should see approximately 10 percent of female households in the first decile and the same for males. However, we see something quite different in the data. As shown in Table 3, female households are much more heavily concentrated in the lowest two deciles, while there are fewer female households (as a percent of all female households) in the top deciles. For males, we see a more even distribution across deciles except that the lowest decile is less concentrated in male households. Taxes that affect the low end of the income distribution could be expected to have a magnified impact on female households as a result.

Table 3: Percent of Gender-specific Households by Decile

| Decile | % of female households | % of male Households |
|---|---|---|
| 1 | 23.9 | 7.8 |
| 2 | 11.5 | 9.8 |
| 3 | 9.7 | 10.1 |
| 4 | 9.2 | 10.1 |
| 5 | 7.4 | 10.4 |
| 6 | 6.8 | 10.5 |
| 7 | 7.8 | 10.3 |
| 8 | 6.9 | 10.5 |
| 9 | 9.2 | 10.1 |
| 10 | 7.6 | 10.4 |
| Total | 100 | 100 |

Reported wages in female households are substantially lower than in male households. In the top decile, the average wage for women is half that for men (on average). This suggests that the burden of the personal income tax is largely irrelevant for female headed households. As noted earlier, taxes on tobacco are an important source of revenue, and over the income distribution create some regressivity to the system. Interestingly, among female households, tobacco consumption as a share of household budgets is on par or greater than that found in male households. This relative expenditure pattern suggests that the tobacco tax is more regressive when analyzed from a gender perspective than it is when the overall distribution is analyzed. Female households spend a smaller share of their budgets on transportation and communication in general, but there is also less progressivity to their consumption of these items—the top deciles do not spend more relative to their budget than the lower deciles. The fuel tax will therefore not be progressive as it is in the general population.

In general, women headed households spend the largest share of their budget on housing and household expenditures. The lowest decile for female headed household spends 27 percent of their budget on housing and household expenditures—the largest share being rent (or imputed rent), while for male households it is 22 percent. Direct taxes such as property tax will therefore add a relatively heavy burden on low-income female headed households relative to males.

Overall, the implication of gender on tax burden is a mixed bag. Some direct taxes such as the income tax will impose less burden while property taxes will impose a higher burden on low income female households than male households at the same relative level of income/expenditures. Regarding consumption taxes, because the concentration of consumption varies across gender, we expect to see a slightly more regressive burden for tobacco taxes that is not outweighed by taxes on fuels for female households.

# CONCLUSIONS AND RECOMMENDATIONS

This study has provided an analysis of the incidence of Jordan's main taxes: personal income (employees and self-employed), corporate income, real property and property transfer taxes, customs, general consumption tax, excises, and taxes on capital (interest, dividends, rent). Using data from a variety of sources, total tax collections in 2011 were attributed to households in the HEIS based on household expenditures and reported income items under a set of assumptions regarding who bears the burden of the taxes.

The major findings of the analysis are as follows:

- The total amount of tax paid per household ranges from a low of 588 JD in the first decile (lowest level of household budget) to a high of 6,255 JD in the top decile.

- The system of indirect taxes (customs, excise and general sales tax) is relatively proportional over all deciles—that is households pay roughly the same proportion of their income in these taxes (approximately 13.4 percent). There is mild progressivity to the burden of these taxes, with the share growing marginally from the first to the sixth decile, and then slightly regressive from the seventh through the tenth decile.

    - The rough proportionality of indirect taxes comes about from the broad base of these taxes. The burden of taxable goods consumed heavily by low income households as a share of their budget (tobacco for example) is offset in the total burden by goods consumed heavily by high income households relative to the size of their budget (vehicles and fuel for vehicles, for example)

- The system of direct taxes (personal and corporate income, property taxes and taxes on capital) are distributed in a progressive manner—households with larger budgets pay a larger percent of their household budget in direct taxes.

    - The current threshold of the personal income tax system is a principal driver in the progressivity of the direct tax system; most households are exempt from the personal income tax.

    - The burden of the corporate income tax is assumed to fall on capital and labor, which tempers the progressivity of the corporate income tax and results in some of the burden falling on households in the lower deciles.

- The overall distribution of tax burden in Jordan is not dissimilar to that found in many other countries, with the direct taxes providing progressivity to the system and the consumption system relatively proportional, with a small amount of regressivity from the middle to higher deciles. The main difference in Jordan, relative to other countries is the size of the indirect burden relative to the direct tax burden. While in developing countries indirect taxes typically outweigh direct taxes, in Jordan, there is a somewhat larger concentration of indirect taxes.

- Policy implications:

    - The relatively proportional burden of the indirect taxes is due to a broad-mix of tax items. Retaining a broad tax base reduces the incentive for consumers to shift between taxable and non-taxable goods—retaining efficiency in the tax system.

    - The personal income tax is almost exclusively concentrated in the highest decile where there is more ability for taxpayers to engage in avoidance activities. If the Government were to seek additional revenues from the personal income tax, there is some room in the distribution of taxes to lower the threshold and move some of the burden into the deciles below the 9th and 10th.

    - The overall burden of tax in Jordan is somewhat low relative to peer middle income countries. There has also been a precipitous decline in tax revenue to GDP since the mid-2000s. If the Government sought to increase revenue through tax policy changes, small changes in the indirect tax rate could be revenue productive given their wide reach across the income distribution.

    - Tax administration is a critical component of any change in tax policy. If Government were to make changes to the tax system, they should be as simple to administer and comply with as possible.

    - Tax expenditures (revenue foregone due to exemptions, deductions, credits, etc.) not only reduce revenue, they provide additional avenues for tax avoidance and evasion. A companion report on tax expenditures provides policy recommendations which may affect the overall distribution of net tax burden.

    - The expenditure side of distribution should also be considered in an overall evaluation of the equity of the fiscal system in Jordan. 9 Price controls, subsidies, and other public expenditures could enhance or detract from the overall equity of the fiscal system.

In summary, Jordan's main taxes are distributed in a progressive manner due to the direct taxes in the system. The consumption taxes are relatively proportional, which increases the economic efficiency of the tax. There is "room" to reduce the income tax threshold and reduce tax expenditures (Heredia, Tax Expenditure Report) in an effort to increase Jordan's tax to GDP ratio. The consumption tax level is robust, but there is some room to increase that relative to what is found in other countries. Small increases in the rate will have substantial impacts on revenue but very little impact on the relative fairness of the tax system.

[9] Thus, taxation of cars and motor fuels, while being the main source of progressivity of indirect taxes at the upper tail of income distribution, is likely to be partially offset by government expenditures on roads, which disproportionally benefit car owners.

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# APPENDIX A: THE CONCEPT OF TAX INCIDENCE

The incidence of taxes has been a research focus among economists throughout history. A distinction is drawn between the concept of *statutory incidence* and *economic incidence*. Statutory incidence refers to allocating taxes based on the entity that is legally responsible for making a tax payment. Economic incidence determines where the burden of the tax ultimately lies—whether it is with the entity who legally paid the tax, or whether the tax has shifted to consumers, laborers, or capital owners through the workings of the economy. A simple example may help to illustrate the difference. Assume that the price of a liter of gas is 5 JD and the government imposes a tax of 1 JD per liter. The owner of the gasoline station is legally responsible for collecting and remitting 1 JD per liter sold. Casual observation suggests that the seller (gasoline station owner) is paying the tax. However, suppose that after the imposition of the tax, the tax induces a rise in the price of gasoline to 6 JD per liter as the owner faces a higher total cost (including the tax). If buyers have great need of the gasoline and there is no good substitute, the buyers may have to pay the additional 1 JD. In this case, the seller is no worse off than before the tax (the seller receives a net price of 5 JD per liter) and the consumers pay the entire tax in the form of higher prices. On the other hand suppose that once the tax is imposed, the price of gasoline rises but buyers simply reduce their consumption (substituting transportation in the form of walking or sharing rides). This may limit the amount of price increase possible to, say, 5.5 JD per liter. Since the seller has to turn over 1 JD to government per liter sold, the seller keeps a net of 4.50 liter--he is worse off by 50 cents per liter. Consumers are also worse off, because they have to pay 50 cents more per liter than before the imposition of the tax. In this case producer and consumer share the tax burden. Yet another example possibly is that after tax is imposed the price stays at 5 JD per liter. In this case the consumers are not worse off; the entire tax is born by the sellers.

The economic study of tax incidence has yielded several principles which serve to inform practical analysis of taxes. The first principle is that only people (individuals) bear the tax burden. Those individuals may be residents of Jordan, or may be residents of other countries. Corporations are simply *legal entities made up of individuals*. By drawing a sharp distinction between individual and corporation, the principal points out a common fallacy that businesses have an independent ability to bear the tax burden. It is true that many countries tax corporations as entities but this has nothing to do with economic incidence. People, i.e., shareholders, workers, landlords, interest income recipients, and consumers bear the burden of —taxes on corporations" which is simply paper-entity. While it is sometimes popular to claim that corporations should be taxed more heavily than individuals, this ultimately means that some individuals will be taxed more heavily than others.

The corporate income tax is a popular focus of taxpayer ire. However, a corporate tax may be shifted in a variety of ways. The company bears the —statutory incidence" of the corporate income tax because its responsibility is to remit the tax payment to the government. However, the economic incidence will be borne by one or more of several possible candidates: the owners of the company who take in lower profits because of the tax, the consumers of the company's product (s) who face higher prices because of the tax, or the workers of the company who receive lower wages.

A second principle of tax incidence is that the incidence of a tax change depends on the change in net income. This may happen on the consumption side or income side. Therefore, the distribution of taxes depends on the consumption pattern of the individuals and on how income is distributed among Jordanians. If a tax is —shifted forward" in the price of a commodity, then people who consume more of that product will be worse off by virtue of the higher prices they pay. On the other hand if the imposition of the tax reduces demand for that product, and the net returns to the seller fall, the employed factors of production of the product may see a reduction in wages or returns to capital. So, a tax can also change the income distribution by affecting the source of

income. Therefore both the sources and the uses of income must be analyzed in incidence analysis.

There is a third principle underlying tax incidence analysis which is more theoretical in nature. This principle assumes that any tax changes are made in a revenue-neutral way so that the incidence of expenditure changes is not considered. This is referred to as —differential incidence" (Musgrave 1952). This is an important assumption. Government expenditure is financed from tax revenue, non-tax revenues and borrowing from the public or private sectors.10 Therefore, any change in tax revenues must be accompanied by a corresponding change in government expenditures, in government debt, in the money supply, or in another tax. In theory, it is important to consider what happens to the new revenue, or loss in revenue. For example, if there are additional revenues that come from a proportional tax and the additional revenues are spent on pro-poor expenditures, the net impact of the tax/expenditure change could be more equalizing in nature. In this analysis, we simply assume that there is no change in the distributional effects of government expenditures, and no distributional change due to the offsetting reduction in taxes or non-tax revenue.

That tax incidence does not depend on where the tax is imposed is a fourth important principle in incidence analysis. Tax incidence tracks through the impact of a tax on the price of factors of production and on the final product. In a competitive market, the incidence of a tax does not depend on where it is imposed—whether statutorily on the producer or consumer of a product. The tax simply drives a wedge between the gross-of-tax price paid by consumers and the net-of-tax price received by producers, and the origin of the wedge (e.g., from the demand side of the market or from the supply side of the market) is irrelevant (see Appendix A for a numerical derivation of this concept). However, note that a tax that is imposed in a market in which all demands and supplies come from domestic sources will have a different impact on prices if it is imposed in a market in which international agents participate either on the demand side or on the supply side.

Finally, incidence depends upon elasticity or responsiveness of consumers and producers to changes in prices (the price elasticities of demand and supply). When a tax is imposed, individuals will adjust their behavior to reduce their tax liabilities. Those who are better able to adjust their behavior are better able to shift the burden to others and will bear less of the burden of the tax. For example, if consumers have a low response to gasoline prices, then consumers will bear more of the incidence of a tax on gasoline. Similarly, if workers are able to reduce their work effort or to shift their labor to untaxed sectors in response to an individual income tax or a payroll tax, then workers will bear less of the burden of an income or a payroll tax.

Once the global incidence of a tax is determined – on consumers or land, labor or capital income -- the tax should be allocated to individuals based on their share of consumption or income (depending on the incidence assumption) or their share of factor income. Take for example the case of a tax that is shifted forward to consumers of a particular product. If we sort the population from lowest income to highest income and distribute the share of taxes accordingly, we can determine how much burden is born by different income groups in the population. We can also determine how much tax is paid relative to income by each segment of the population, i.e., -- *the average effective tax rate* or the ratio of tax paid to income. If the average effective tax rate increases with income, the system is called —progressive" and if it falls as income rises, the tax is regressive.

Fullerton and Rogers (1991) conduct a lifetime incidence analysis for the U.S. and find that the overall distribution of tax burdens under a lifetime analysis is very similar to that found using annual incidence approaches. Income taxes (corporate and individual) are found to be progressive in nature while the consumption taxes are somewhat regressive. They conclude that

[10] In 2004-05 the share of tax and non-tax revenue in total federal and provincial tax plus non-tax revenue was 73 and 26 percent respectively.

lifetime incidence analysis is very difficult due to data intensity and the sensitivity of assumptions regarding future streams of income. Individuals and households change partnerships as well as income deciles over time—but those changes are based on various assumptions that make the entire incidence analysis very sensitive. However, Caspersen and Metcalf (1994) find that the lifetime incidence of a value added tax in the U.S. would be less regressive (possibly slightly progressive) than an annual incidence analysis would conclude.

What is the right approach to estimating tax incidence, annual or lifetime incidence? The answer depends in large part on the policy question. In a relatively low income country with little economic mobility and low life expectancies, annual incidence is likely to be very similar to lifetime incidence. For discussions of equity in the tax system in many countries, the concern is often the impact of the tax system on people at a moment in time versus over their lifetimes when the tax system can change dramatically. Government's understanding of the impact of the tax system on their constituents today is relevant for understanding the impact the system has on available income, standard of living, and ability and incentives to work, save, and consume. In addition, unless there is significant income and earnings mobility, the economic situation of a majority of the population may remain relatively constant.

For indirect taxes, the tax burden of a particular group of households is commonly defined as a loss of their real incomes or in other words the reduction of the amount of consumption resulting from reduced purchasing power of their incomes.11 In this study, our approach is essentially a hybrid of micro-simulation and tax allocation. Following the tax allocation approach, we start with actual taxes collected by businesses from their buyers and paid to their suppliers (or to Jordan Customs in case of imported supplies). Then we percolate these output taxes net of input tax credits throughout the production chain in order to impute the tax element in the market price of final consumption, which is a difference between the price actually paid by the final consumer and a counterfactual price that would be in place without taxes.12 Once we know the amount of tax in the market price of a consumer good, we apply these to the actual household expenditures on specific commodities. Similar to the micro-simulation approach, we account for the tax burden in all household purchases, including the higher prices of purchases from informal vendors responding to tax increases in the formal sector through market arbitrage.

Regardless of the incidence assumptions, in accounting sense the *buyer* (market) price pb of a commodity can be decomposed into sales taxes, costs of intermediary inputs and value added (costs of factors of production and production-based taxes and subsidies):

pb = output tax + inputs costs – credit for input taxes+ value added, (1)

where all amounts are expressed per physical unit of output.

For this so-called ~~-v~~alue equation" to hold under any tax regime, changes in taxes and subsidies have to be accommodated by changes in *buyer prices of* commodities (inputs and outputs) as well as returns to factors of production (value added). Since this identity has to hold for each sector, it is convenient to write it in a matrix form:

pb = output tax + pb • A – credit for input taxes + v,

[11] In theory, a broad-based value added tax should be equivalent to a tax on income after taxes less saving. Therefore, distributional effects of indirect taxes can be analyzed both by the use of income for consumption (the use method) and by sources of income (the sources method). Since in practice a VAT never applies to all commodities uniformly, the sources method becomes less reliable for analysis of either revenues or incidence. In the presence of exemptions of various commodities and businesses as well as subjecting some commodities to non-standard (e.g. zero) rates, the equivalence between sources and uses of income can break down completely. Furthermore, in addition to the VAT, in this study we also examine excises and customs duties, for which the relation to sources of income becomes moot.

[12] For imported inputs, it is the sales taxes levied by the Customs on the duty-inclusive value of imports that is further percolated throughout the production chain.

where v is a row vector of value-added coefficients.[13]

This in turn can be rearranged as

pb • [I–A] = output tax – credit for input taxes+ v

or

pb = {output tax – credit for input taxes+ v}• [I–A] –1 (2)

Thus, allocation of the indirect taxes requires the analyst to make an assumption about the share of the net tax collections (output tax – credit for input taxes) born by the factors of production (v). With this assumption in hand, it is conceptually straightforward to estimate shifting of the remaining part of the tax burden to the final consumers of different products. Thus, if α percent of a tax change is born by the factors of production, then the remaining share (1– α) will be shifted to consumers via changes in buyer prices:

Δ pb = (1– α) • { Δ output tax – Δ credit for input taxes}• [I–A] –1 (3)

In practice, the computation is somewhat more complicated, because the input-output table (A) is only available for a manageable number of aggregate industries, each producing a range of different physical products. Since physical units of different products cannot be added together, one has to work with the monetary values of outputs produced by different industries in the form of a so-called transaction matrix. In the annex, we describe in detail how aforementioned estimation strategy can be implemented using transaction matrices.

## Shifting of import taxes

Because import duties do not directly affect consumption of items that cannot be imported (non-tradables), the incidence analysis has to distinguish between two groups of goods: tradable and non-tradable. Following the notation proposed by MacKenzie (1991), we can decompose the input-output matrix as

$$A = \begin{Bmatrix} A_{11} & A_{12} \\ A_{21} & A_{22} \end{Bmatrix}$$

where

A11 describes tradable inputs used in the production of tradable outputs;

A21 describes non-tradable inputs used in the production of tradable outputs;

A12 describes tradable inputs used in the production of non-tradable outputs;

A22 describes non-tradable inputs used in the production of non-tradable outputs.

Because the incidence of the sales taxes has already been analyzed in the previous section, let us assume that there are no sales taxes so that pb = psb = p0.

[13] Besides payroll, the value added also includes returns on investment, which among other things includes the use of capital assets manufactured by various domestic industries or imported from abroad. Conceptually, taxation of production and importation of these capital assets affects the rate of returns on these investments throughout their useful life. However, we cannot estimate how taxation of these capital inputs of production affects the output price because we do not know either the consumption of fixed capital assets by each sector in a given year nor the breakdown of used capital assets by industry it was purchased from.

For a domestically producer good that has to compete with imports (a tradable good), the price p10 of its output is determined by a combination of its world-market price p1m and import duties τ1m.

p10 = p1m • (1+ τ1m) and therefore, the difference relative to the baseline can be expressed as

Δ p10= p1m • Δ τ1m (4)

*In the case of no sales taxes,* the accounting identity (2) makes it clear that the value added (i.e., factor income) is determined by the set of prices of outputs and inputs:

v = p0 • [I-A] (5)

Then, relative to relative to the baseline with no duties and no sales taxes, equation (5) can be expressed in differences as following

$$\{\Delta v_1 \quad \Delta v_2\} = \{\Delta p_1^0 \quad \Delta p_2^0\} \bullet \begin{Bmatrix} I_{11} - A_{11} & -A_{12} \\ -A_{21} & I_{22} - A_{22} \end{Bmatrix} \qquad (6)$$

For domestic products that do not compete with imports (non-tradable), factor incomes will remain intact (Δv2 =0) and import duties on all inputs upstream the production chain have to be accommodated in the price of this non-tradable output, similar to equation (3).

Therefore, equation (6) can be rewritten as

$$\{\Delta v_1 \quad 0\} = \{\Delta p_1^0 \quad \Delta p_2^0\} \bullet \begin{Bmatrix} I_{11} - A_{11} & -A_{12} \\ -A_{21} & I_{22} - A_{22} \end{Bmatrix} \qquad (7)$$

Thus, for the non-tradable sector, it follows from equation (7) that

Δ p20 • [I22-A22] – Δ p10 • A12 = 0

Therefore,

Δ p20 = Δ p10 • A12• [I22-A22] –1 (8)

In addition to the change of real income of consumers (through market prices), customs duties also affect the income of the owners of factors of production in the tradable sector.14

For the tradable sector, it follows from equation (7) that

Δv1 =Δp10 • [I11-A11] – Δ p20 • A21

[14] Conceptually, the net burden of import taxes is a sum of three elements: 1) effect on the consumer prices; 2) effect on factor income s; 3) offset to the burden direct taxes due to the impact on factor incomes. Because direct taxes are smaller relative to indirect taxes, in our analysis of tax incidence we disregard the last two elements of the burden of import taxes.

| Annex Table: Statutory incidence of indirect taxes | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Sector # | Sector name | GST | | | SST | | | Import duties | Total indirect taxes |
| | | Output tax | Deductable input tax | Net | Output tax | Deductable input tax | Net | | |
| 1 | Vegetables | 557,929 | 0 | 557,929 | 0 | 0 | 0 | 1,414,179 | 1,972,109 |
| 2 | Fruits | 10,948,340 | 0 | 10,948,340 | 0 | 0 | 0 | 8,645,791 | 19,594,130 |
| 3 | Crops & Other Agriculture | 5,284,446 | 0 | 5,284,446 | 0 | 0 | 0 | 5,902,947 | 11,187,393 |
| 4 | Livestock's & Livestock's Products | 734,551 | 0 | 734,551 | 0 | 0 | 0 | 96,727 | 831,278 |
| 5 | Poultry and Eggs | 26,695 | 0 | 26,695 | 0 | 0 | 0 | 115,847 | 142,542 |
| 6 | Fishing | 121,497 | 0 | 121,497 | 0 | 0 | 0 | 73,819 | 195,316 |
| 7 | Crude Oil & Natural Gas | 2,058,230 | 703,003 | 1,355,226 | 0 | 0 | 0 | 1,462 | 1,356,689 |
| 8 | Mining | 14,335,438 | 6,398,161 | 7,937,277 | 0 | 0 | 0 | 0 | 7,937,277 |
| 9 | Quarrying | 18,612,494 | 3,922,850 | 14,689,643 | 0 | 0 | 0 | 94,223 | 14,783,867 |
| 10 | Meat & Fish Products | 17,386,263 | 5,801,375 | 11,584,889 | 40,852 | 0 | 40,852 | 8,724,187 | 20,349,928 |
| 11 | Olive Oil & Other Oils | 2,736,111 | 580,248 | 2,155,864 | 0 | 0 | 0 | 168,438 | 2,324,302 |
| 12 | Dairy products | 12,815,835 | 5,898,125 | 6,917,710 | 0 | 0 | 0 | 522,032 | 7,439,742 |
| 13 | Grain mill products | 2,014,530 | 0 | 2,014,530 | 0 | 0 | 0 | 313,692 | 2,328,222 |
| 14 | Prepared Animal Feed | 321,413 | 521,857 | -200,444 | 0 | 0 | 0 | 16,594 | -183,850 |
| 15 | Bakery Products | 9,431,119 | 2,478,377 | 6,952,741 | 0 | 0 | 0 | 2,432,408 | 9,385,149 |
| 16 | Sugar & Confectionery | 8,531,430 | 1,306,744 | 7,224,686 | 0 | 0 | 0 | 4,051,936 | 11,276,621 |
| 17 | Other Food Products | 33,132,225 | 6,504,706 | 26,627,518 | 0 | 0 | 0 | 7,037,776 | 33,665,294 |
| 18 | Soft Drink Beverages | 12,781,560 | 3,473,751 | 9,307,809 | 0 | 0 | 0 | 564,383 | 9,872,192 |

| Annex Table: Statutory incidence of indirect taxes (continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 19 | Alcoholic Drinks | 29,374,741 | 8,021,600 | 21,353,141 | 16,104,832 | 82,345 | 16,022,487 | 5,699,239 | 43,074,867 |
| 20 | Tobacco Products | 46,911,970 | 4,706,958 | 42,205,012 | 224,767,609 | 382,460 | 224,385,148 | 426,432 | 267,016,592 |
| 21 | Textile Industry | 18,856,412 | 1,602,295 | 17,254,117 | 0 | 0 | 0 | 2,003,296 | 19,257,413 |
| 22 | Carpets | 1,486,927 | 0 | 1,486,927 | 0 | 0 | 0 | 988,405 | 2,475,332 |
| 23 | Clothing | 29,941,454 | 815,258 | 29,126,196 | 0 | 0 | 0 | 17,775,313 | 46,901,509 |
| 24 | Leather products | 2,037,181 | 35,533 | 2,001,649 | 0 | 0 | 0 | 3,284,466 | 5,286,114 |
| 25 | Footwear | 7,223,954 | 80,594 | 7,143,361 | 0 | 0 | 0 | 8,822,631 | 15,965,991 |
| 26 | Wood Products Except Furniture | 7,001,650 | 924,379 | 6,077,271 | 0 | 0 | 0 | 997,781 | 7,075,052 |
| 27 | Furniture | 18,749,599 | 4,177,686 | 14,571,913 | 0 | 0 | 0 | 10,996,863 | 25,568,776 |
| 28 | Paper & Paper Products | 39,664,083 | 7,306,509 | 32,357,573 | 0 | 0 | 0 | 1,883,191 | 34,240,765 |
| 29 | Printing & Publishing | 19,199,458 | 6,185,992 | 13,013,465 | 0 | 0 | 0 | 678,776 | 13,692,241 |
| 30 | Refinery & Refined products | 77,109,703 | 7,452,983 | 69,656,720 | 168,032,635 | 75,287,540 | 92,745,095 | 231,262 | 162,633,077 |
| 31 | Fertilizers & Insecticide | 7,012,809 | 1,176,634 | 5,836,175 | 0 | 0 | 0 | 750,683 | 6,586,858 |
| 32 | Paint Industry | 11,931,322 | 2,866,019 | 9,065,304 | 0 | 0 | 0 | 390,185 | 9,455,488 |
| 33 | Pharmaceuticals products | 12,578,324 | 649,534 | 11,928,790 | 0 | 0 | 0 | 0 | 11,928,790 |
| 34 | Soap and Detergents | 25,984,716 | 2,128,387 | 23,856,330 | 0 | 0 | 0 | 3,723,660 | 27,579,990 |
| 35 | Other Chemical Products | 23,350,224 | 1,782,712 | 21,567,512 | 0 | 0 | 0 | 998,768 | 22,566,280 |
| 36 | Rubber products | 8,914,711 | 124,125 | 8,790,586 | 0 | 0 | 0 | 6,696,269 | 15,486,855 |
| 37 | Plastics products | 56,731,373 | 6,083,638 | 50,647,735 | 0 | 0 | 0 | 1,525,307 | 52,173,042 |
| 38 | Cement Industry | 14,864,747 | 1,673,082 | 13,191,665 | 48,223 | 630 | 47,593 | 6,077 | 13,245,335 |

| Annex Table: Statutory incidence of indirect taxes (continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 39 | Bricks, articles of cement concrete | 10,119,077 | 5,218,052 | 4,901,025 | 0 | 0 | 0 | 440,831 | 5,341,856 |
| 40 | Cutting Shaping Finishing Stone | 5,652,025 | 856,363 | 4,795,663 | 0 | 0 | 0 | 2,004,280 | 6,799,942 |
| 41 | Manufacture of Glass and Clay | 22,919,633 | 776,597 | 22,143,035 | 0 | 0 | 0 | 15,362,274 | 37,505,309 |
| 42 | Other Non- Metallic Minerals | 2,004,689 | 601,881 | 1,402,808 | 0 | 0 | 0 | 241,342 | 1,644,150 |
| 43 | Iron and Steel Industry | 44,571,296 | 17,245,929 | 27,325,368 | 0 | 0 | 0 | 2,905,597 | 30,230,964 |
| 44 | Non Ferrous Metal Industry | 5,731,426 | 256,769 | 5,474,658 | 0 | 0 | 0 | 807,761 | 6,282,419 |
| 45 | Basic Metals Products | 2,109,720 | 537,740 | 1,571,980 | 0 | 0 | 0 | 0 | 1,571,980 |
| 46 | Structural Metals Products | 1,251,203 | 45,499 | 1,205,704 | 0 | 0 | 0 | 465,476 | 1,671,180 |
| 47 | Fabricated Metal Products | 28,623,659 | 4,941,382 | 23,682,277 | 0 | 0 | 0 | 8,930,906 | 32,613,183 |
| 48 | Machinery and Equipments | 50,906,249 | 3,605,656 | 47,300,593 | 0 | 0 | 0 | 18,525,899 | 65,826,493 |
| 49 | Domestic Appliances | 13,742,799 | 28,325 | 13,714,474 | 0 | 0 | 0 | 13,559,260 | 27,273,734 |
| 50 | Electrical Machinery | 36,315,538 | 493,478 | 35,822,061 | 0 | 0 | 0 | 11,618,363 | 47,440,424 |
| 51 | Engineering Instruments | 18,905,099 | 2,767,472 | 16,137,627 | 0 | 0 | 0 | 2,508,184 | 18,645,811 |
| 52 | Motor Vehicles Bodies, Trailers | 72,389,599 | 8,202 | 72,381,397 | 236,856,937 | 0 | 236,856,937 | 27,106,934 | 336,345,268 |
| 53 | Other Transport Equipments | 1,440,569 | 85,837 | 1,354,731 | 0 | 0 | 0 | 666,639 | 2,021,370 |
| 54 | Jewelery | 40,191 | 255 | 39,936 | 0 | 0 | 0 | 346,107 | 386,043 |
| 55 | Other Manufacturing Industries | 18,732,678 | 17,737 | 18,714,941 | 0 | 0 | 0 | 19,434,269 | 38,149,210 |

| Annex Table: Statutory incidence of indirect taxes (continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 56 | Electricity | 970,109 | 72,119 | 897,991 | 0 | 0 | 0 | 0 | 897,991 |
| 57 | Water Supply | 455,254 | 143,850 | 311,404 | 0 | 0 | 0 | 0 | 311,404 |
| 58 | Construction | 14,669,749 | 5,249,599 | 9,420,151 | 0 | 0 | 0 | 0 | 9,420,151 |
| 59 | Trade | 898,136,431 | 383,616,674 | 514,519,757 | 76,664,770 | 0 | 76,664,770 | 0 | 591,184,527 |
| 60 | Hotels & Restaurants | 55,296,160 | 16,957,921 | 38,338,239 | 0 | 0 | 0 | 0 | 38,338,239 |
| 61 | Road Transport | 3,960,562 | 1,833,844 | 2,126,718 | 0 | 0 | 0 | 0 | 2,126,718 |
| 62 | Rail Transport | 183,416 | 109,860 | 73,556 | 0 | 0 | 0 | 0 | 73,556 |
| 63 | Pipelines transport | 907,818 | 163,991 | 743,827 | 0 | 0 | 0 | 0 | 743,827 |
| 64 | Sea Transport & Ports | 3,751,238 | 423,326 | 3,327,912 | 0 | 0 | 0 | 0 | 3,327,912 |
| 65 | Air Transport | 5,109,688 | 1,207,102 | 3,902,586 | 63,523,593 | 0 | 63,523,593 | 0 | 67,426,179 |
| 66 | Services Incidental to Transport | 1,162,776 | 150,525 | 1,012,251 | 0 | 0 | 0 | 0 | 1,012,251 |
| 67 | Storage & Warehousing | 272,612 | 10,875 | 261,737 | 0 | 0 | 0 | 0 | 261,737 |
| 68 | Travel, Tour Operators Services | 891,438 | 263,407 | 628,031 | 0 | 0 | 0 | 0 | 628,031 |
| 69 | Postal Services | 1,082,171 | 257,082 | 825,089 | 0 | 0 | 0 | 0 | 825,089 |
| 70 | Telecommunication Services | 167,697,658 | 53,264,388 | 114,433,269 | 67,164,629 | 0 | 67,164,629 | 0 | 181,597,899 |
| 71 | Information and Computer Technology | 37,312,061 | 14,711,749 | 22,600,312 | 0 | 0 | 0 | 0 | 22,600,312 |
| 72 | Banking Sector | 8,894,059 | 7,280,343 | 1,613,716 | 0 | 0 | 0 | 0 | 1,613,716 |
| 73 | Insurance | 38,501,688 | 7,046,473 | 31,455,214 | 0 | 0 | 0 | 0 | 31,455,214 |
| 74 | Other Financial Sector | 22,203,547 | 7,451,790 | 14,751,757 | 0 | 0 | 0 | 0 | 14,751,757 |
| 75 | Business Services | 95,225,477 | 49,146,213 | 46,079,264 | 1,125,374 | 0 | 1,125,374 | 2,689 | 47,207,327 |

| Annex Table: Statutory incidence of indirect taxes (continued) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 76 | Real estate | 7,594,626 | 2,536,688 | 5,057,938 | 0 | 0 | 0 | 0 | 5,057,938 |
| 77 | Ownership of Dwellings | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 78 | Education | 1,806,522 | 827,045 | 979,477 | 0 | 0 | 0 | 0 | 979,477 |
| 79 | Health Services | 3,069,867 | 1,334,875 | 1,734,992 | 0 | 0 | 0 | 0 | 1,734,992 |
| 80 | Public Administration and Defense | 23,508,921 | 14,181,840 | 9,327,081 | 0 | 0 | 0 | 0 | 9,327,081 |
| 81 | Others Services | 35,709,992 | 11,958,810 | 23,751,183 | 0 | 0 | 0 | 3,006,825 | 26,758,008 |
| | | | | | | | | | |
| | Total | 2,374,584,754 | 713,070,675 | 1,661,514,079 | 854,329,454 | 75,752,976 | 778,576,478 | 235,988,679 | 2,676,079,237 |

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