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FISCAL POLICY, INCOME REDISTRIBUTION, AND POVERTY REDUCTION: EVIDENCE FROM TUNISIA

BY NIZAR JOUINI*

Doha Institute for High Graduates

NORA LUSTIG

CEQ Institute, Tulane University; Center for Global Development; Inter-American Dialogue

AHMED MOUMMI

United Nations Economic and Social Commission for Western Asia

AND

ABEBE SHIMELES

Development Research Division, African Development Bank

This paper estimates the impact of Tunisia's tax and transfer system on inequality and poverty and assesses the benefits from public spending on education and health. Results show that Tunisia's redistributive fiscal policy reduces inequality and extreme poverty significantly. However, based on the national poverty line, the headcount ratio increases, implying that a large number of the poor people pay more in taxes than they receive in cash transfers and subsidies. This is due to a relatively high burden of personal income taxes and social security contributions for low-income households.

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1. INTRODUCTION

Tunisia has experienced a sustained rate of GDP growth of 4–5 percent since 1990, and the incidence of poverty decreased from 32.4 percent in 2000 to 15.5 percent in 2010.¹ The decline in poverty was driven by economic growth and by increased government transfers and subsidies. Judging by the record of economic growth and poverty reduction alone, Tunisia should be enjoying political and social stability. However, discontent was brewing under the surface, and in 2011, Tunisia experienced a revolution that triggered a democratization process and fiscal reform.

Was there anything in the pre-2011 fiscal compact that could shed light on the reason for the widespread social discontent? As shown in this paper, fiscal policy

*Correspondence to: Nizar Jouini, Doha Institute for Graduate Studies, Al Tarfa Street, Zone 70 PO BOX 200592 Doha, Qatar (njouini@dohainstitute.edu.qa).

¹Measured with the official poverty line of US\$4.19/day in PPP 2005. Source: National Bureau of Statistics, <http://www.ins.tn/>

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in Tunisia reduced inequality and extreme poverty, but a substantial portion of the moderately poor and vulnerable population paid more in taxes (direct and indirect) than they received in cash transfers and consumption subsidies. Although one needs to be very cautious in attributing causality, the high burden of personal income and payroll taxes at relatively low levels of income may have contributed to the discontent.

This paper estimates the impact on poverty and inequality of Tunisia's safety net system and the taxes used to fund them². It also analyzes who benefits from public spending on education, health, and student housing. Using the National Survey of Consumption and Household Living Standards for 2010, the most recent survey data available, we apply standard fiscal incidence analysis, as described in Lustig and Higgins (2013) and in Lustig (forthcoming, Chapters 1, 5, and 7).³ Because this methodological framework has been applied to other middle-income countries under the Commitment to Equity (CEQ) project⁴, the results for Tunisia can be compared with those of other countries.⁵

This paper, analyzes fiscal incidence based on what people actually paid and received, without assessing the behavioral responses that taxes and public spending may trigger from individuals or households. This method, often referred to as the “accounting” approach, starts from a pre-fiscal income concept—henceforth, called market income—and allocates the proper amount of taxes and transfers to each household or individual.⁶ The incidence analysis used here is point-in-time, rather than lifecycle and does not incorporate behavioral or general equilibrium effects. That is, we do not claim that the pre-fiscal income obtained in this exercise equals the true counterfactual income in the absence of taxes and transfers. It is a first-order approximation. But even though the fiscal incidence analysis ignores second-round and general equilibrium effects, it is not a simple assessment of the statutory incidence. In particular, the incidence of taxes is analyzed by their (assumed) economic incidence rather than their statutory incidence. For instance, the analysis assumes that personal income taxes and contributions (by employee and by employer) are borne by labor in the formal sector.

As indicated by Younger (chap 16, forthcoming CEQ Handbook 2017), the first-order approximation captures the largest share of the compensating variation. Since the ratio of the second-order term to the first-order increases with the size of the price change and the demand elasticity, the first-order approximation is reasonably accurate only for smaller price changes and commodities with inelastic demands. Many of the demand and supply functions in a typical

²The results are based on the CEQ Master Workbook of Results: Tunisia of September 9, 2015, which is available upon request.

³This paper primarily uses Lustig and Higgins (2013). This version is available upon request.

⁴For details about the project, visit www.commitmenttoequity.org.

⁵See, for example, Jaramillo (2014), Bucheli *et al.* (2014), Higgins and Pereira (2014), Lustig and Pessino (2014), Lustig *et al.* (2014), Paz-Arauco *et al.* (2014), Scott (2014), Cabrera *et al.* (2015), Lustig (2015), Higgins and Lustig (2016), Higgins *et al.* (2016), Lustig (2016b), Lustig (2017), as well as the CEQ Working Paper series, available in www.commitmenttoequity.org.

⁶The tax incidence literature includes a long list of studies with empirical estimates of incidence going back more than half a century (Musgrave *et al.*, 1951; Musgrave, 1959; Musgrave *et al.*, 1974; Pechman and Okner, 1974). Similarly, on the expenditure side, there is a long tradition using the traditional approach (Meerman, 1979; Selowsky, 1979).

incidence analysis tend to be inelastic at least in the short run such as food demand (Green *et al.*, 2006) and labor supply (Gravelle, 2003). However, if price changes are non-marginal and/or demand and supply functions are not inelastic, second order effects will be more significant. The results section offers some evidence that assuming away the second-order effects, is not far-fetched, in the case of Tunisia.

Despite the limitations of being a basic incidence analysis, this study is among the most comprehensive and comparable tax–benefit incidence analyses available for middle-income and low-income countries to date. Previous studies looked at the equity implications of specific fiscal interventions in Tunisia. One study, for example, found that cash transfers and subsidies reduced poverty from 16.5 percent to 15.5 percent, when poverty was measured by the national poverty line, and did not reach 48.8 percent of the poor population (AfDB, INS and CRES, 2013). The same study also found that subsidies were not well targeted: overall, the poor received only 9.2 percent of total subsidies and 12 percent of food subsidies. Another study on energy subsidies found that the poorest 20 percent received 13 percent of total subsidies while the richest 20 percent received 29 percent (World Bank, 2013). To the best of our knowledge, no studies have analyzed the incidence of fiscal policy on both the spending and revenue sides. The aim of this paper is to close that gap.

The redistributive effects in Tunisia are compared with those of 29 other low- and middle-income countries with results currently available in the CEQ Data Center on Fiscal Redistribution (<http://www.commitmenttoequity.org/datacenter>). Compared to other middle-income countries, the total redistributive effect of taxes, cash transfers, subsidies, and in-kind transfers (from market to final income) in Tunisia is somewhat lower than in Argentina, Brazil, Costa Rica, Georgia, Iran, Mexico, South Africa, and Uruguay higher than in Chile, Colombia, Russia, and Venezuela, and much higher than in Indonesia, Jordan, and Peru. The combined redistributive effect of direct taxes and direct cash transfers only is higher in Tunisia than in 24 of the other 29 countries in the CEQ Data Center. The redistributive effect of in-kind transfers is higher in 15 of the other 29 countries in the CEQ Data Center, so Tunisia does not stand out one way or the other. Where Tunisia really differs from the rest is in the combined effect of consumption taxes and subsidies. Not only is the decline in inequality induced by subsidies higher in Tunisia than in every other country in the CEQ Data Center but for as many as one third of the 30 countries, consumption taxes and subsidies increase inequality (compared with disposable income inequality) while in Tunisia consumption taxes and subsidies are equalizing.

The impact of fiscal policy on poverty depends of course on the poverty line. For the lower international poverty lines of \$1.25 per day (extreme poverty) and \$2.50 per day (in 2005 purchasing power parity, or PPP), the combined effect of taxes, transfers, and subsidies reduces poverty. That is not the case for Tunisia's national poverty line of 5.02 Tunisian Dinars (TD) per day (equivalent to \$3.4 in 2005 PPP) or the middle-income international poverty line of \$4 per day (in 2005 PPP). For the national poverty line, the combined effect of all taxes, direct cash transfers, and indirect subsidies increases from 15.2 percent to 17.8 percent. The increase is due primarily to the high burden of direct taxes and social contributions

TABLE 1
GENERAL GOVERNMENT REVENUES IN TUNISIA, 2010 (% OF GDP)

	National accounts (% of GDP)	(% of GDP)
Total general government revenue	24.3	10.29
<i>Tax Revenue</i>	20.9	10.29
<i>Direct taxes</i>	8.3	4.29
Personal income tax	4.29	4.29
Corporate income tax	4.01	...
<i>Indirect taxes</i>	12.6	6.1
Value-added tax	6.1	6.1
Customs taxes	1.0	...
Consumption duties	2.6	...
Other indirect taxes	2.9	...
<i>Non-tax revenue^a</i>	3.1	...

Source: Authors' calculations based on data from the website of the Ministry of Finance:
http://www.finances.gov.tn/index.php?option=com_content&view=article&id=121&Itemid=302&lang=fr.

a. Non-tax revenue includes oil and gas revenue and revenue from privatization and participation.

at relatively low-income levels. As mentioned, the fact that the moderately poor and the population most vulnerable to falling into poverty were net payers into the system may explain some of the widespread social discontent that fueled the 2011 revolution.

The next section, briefly describes the Tunisian tax system, social programs, and subsidies. Section 3 presents the methodology, data, key assumptions, and clarifications. Section 4 discusses the main results. Section 5 summarizes the findings and suggests some implications for Tunisia.

2. TAXES, SOCIAL SPENDING, AND SUBSIDIES

This section, describes the main characteristics of the tax system, and the systems of direct transfers, education and health benefit, and indirect subsidies.

2.1. Taxes

Tunisian direct taxes include the Personal Income Tax (PIT) and the Corporate Tax, and the indirect taxes, includes the value-added tax (VAT), consumption duties, and other indirect taxes (Table 1). The ratio of total tax revenue to GDP was about 21 percent in 2010, which is comparable to that in other middle-income countries (Lustig, 2016c). Indirect taxes account for almost two-thirds of total tax revenue; the VAT alone accounts for about one-third of total. Even so, direct taxes represent a high burden on labor (Tables 2 and 3).

2.1.1. Personal Income Tax

The personal income tax which is levied on sources of income such as labor, pensions, interest, and dividends, ranges from 15 percent to 35 percent (Table 2). The tax is paid primarily through source withholding taxes on wages, and progressively

TABLE 2
PERSONAL INCOME TAX RATES IN TUNISIA [2010]

Taxable income brackets		
Tunisian dinar (TD), annual	US dollar	Tax rate (%)
0–1,500	0–1,044	0
1,500–5,000	1,044–3,480	15
5,000–10,000	3,480–6,960	20
10,000–20,000	6,960–13,920	25
20,000–50,000	13,920–34,800	30
More than 50,000	More than 34,800	35

Source: Website of the Ministry of Finance http://www.finances.gov.tn/index.php?option=com_content&view=article&id=75&Itemid=258&lang=fr.

higher rates apply to incomes greater than TD 1,000 (\$696) for public employees or greater than TD5,000 (\$3,480) for corporations and private sector employees. Several exemptions apply. Workers earning the minimum wage (or less) and foreign consular employees do not pay income taxes. Interest on deposits in foreign currency, savings accounts for housing (purchases or improvements), and other special savings accounts are exempt from income taxes as well. Deductions apply for premiums on life insurance and for marital status and dependents.

2.1.2. Social Security Contributions

The Tunisian social security system is a contributory only system and is administered by the government (Table 3). The compulsory social security

TABLE 3
SOCIAL SECURITY CONTRIBUTIONS IN TUNISIA BY REGIME, 2010 (PERCENT)

Regime	Employer contribution (%)	Employee contribution(%)	Total (%)
Nonagriculture regime			
Pension	7.76	4.73	12.50
Sickness and maternity	4.61	2.90	7.60
Family allowances	2.21	0.88	3.10
Accidents and occupational diseases	0.40–4.0	–	0.40–4.0
Welfare workers–Special State Fund	1.51	0.38	1.90
Total	16.97–20.57	9.18	26.15–29.75
Agriculture regime			
	(%)	E	(%)
Pension	3.50	1.75	5.25
Sickness and maternity	4.18	2.80	6.98
Accidents and occupational diseases	0.04	0.01	0.05
Total	7.72	4.56	12.28
Independent regime			
	(%)		
Pension	7.00	–	–
Sickness and maternity	7.26	–	–
Accidents and occupational diseases	0.45	–	–
Total	14.71	–	–

Source: Centre des Recherches et des études Sociales (CRES 2012).

provides benefits relating to pensions, family benefits, and coverage of risk, such as illness, accidents at work, and occupational diseases. All benefits are provided by the National Social Security Fund (Caisse Nationale de Sécurité Sociale, CNSS) for private sector employees and by the National Pension and Social Security Fund (Caisse Nationale de Retraite et de Prévoyance Sociale, CNRPS) for national and local government employees and employees of public institutions. Social security contributions rates differ for agricultural and non-agricultural activities. Self-employed workers are required to join the CNSS. They may voluntarily insure against risks of accidents at work and illnesses.⁷ Under both the CNSS and the CNRPS, the main benefit is the retirement pension, which is based on wages and contributions over the 10 years before the age of retirement.

2.1.3. Corporate Taxes

The corporate income tax is imposed on companies established in Tunisia. The tax rate is 30 percent on profits, except for small businesses and agriculture (10 percent) and firms in financial, telecommunications, insurance, oil production, refining, transport, and distribution sectors (35 percent). Most firms in the country (97 percent) are microenterprises, with 0–5 employees. Most of these enterprises are part of the informal sector and do not pay taxes. Thus, company tax evasion is a considerable problem.

2.1.4. Indirect Taxes

The VAT is the primary indirect tax, with rates of 6, 12 and 18 percent,⁸ and accounts for almost half of total indirect tax revenues (see Table 1). Other indirect taxes are customs taxes (7.3 percent) and consumption taxes, including excise taxes (20.3 percent). The VAT is collected using the credit invoice method. Exports are zero-rated. A number of goods are exempt from the VAT, the most important being primary foods, nurseries, education and vocational training at all levels, agricultural equipment, air transport, and interest on bank accounts. Consumption taxes are also applied to alcoholic beverages, tobacco, personal vehicles, and fuel. Taxes are assessed either as ad valorem rates or specific taxes.

Other indirect taxes include customs taxes and registration fees, which are applied to the sale of property (2–5 percent of the value); professional training tax (1 percent of gross payroll for manufacturing industries); and tax on insurance contracts (5 percent for contracts in maritime and air transport and 10 percent for others).

⁷The contribution rate is not the same across all regimes, and they do not pay for all the same social protection: for example, non-agricultural employees do not receive family allowances. Agricultural workers, independent operators, and self-employed agricultural workers benefit from different rates.

⁸The VAT rates are 6 percent for fertilizer, handicrafts, medical activities, canned food, and compound feed for cattle; 12 percent for computers, computer services, hospitality, food, equipment not produced locally, and fopost fiscal ur horsepower cars; and 18 percent for products and services not subject to another rate.

TABLE 4
GENERAL GOVERNMENT EXPENDITURE IN TUNISIA, 2010 (PERCENT OF GDP)

Composition of government expenditure	National accounts	
	2010	Incidence analysis
Total general government expenditure	29	
Primary government spending	23	
<i>Social spending</i>	18.7	17.7
Total cash transfers	1.30	0.30
PNAFN	0.15	0.15
Scholarships	0.15	0.15
Other cash transfers	0.5	--
Subsidies	2.4	2.4
In-kind transfers	6.2	6.2
Education	4.6	4.6
Health	1.6	1.6
Housing and urban	0.03	0.03
Contributory pensions	8.7	8.7

Source: Ministry of Finance, 2011; total spending on PNAFN are from the Research Center for Social Studies; data on spending for scholarships are from the Ministry of Higher Education.

2.2. Social Spending

Social spending, excluding contributory pensions, accounts for 10 percent of GDP and includes direct cash transfers and in-kind spending on education and health. Contributory pensions amount to 8.7 percent of GDP. Adding contributory pensions brings total social spending to 18.7 percent of GDP. Direct transfers include the cash transfer program National Assistance Program for Families in Need (Programme National des Familles Nécessiteuses, PNAFN) and scholarship assistance for students. These two programs amounted to 0.3 percent of GDP in 2010. Other cash transfers represent a combined 0.5 percent of GDP and include grants to local communities, youth activities, and NGOs and special treasury funds. In-kind transfers are benefits received from universal free public education and health systems. The main programs are described below and their budgets are presented in Table 4. Compared to other countries with similar income per capita, Tunisia spends slightly less on direct transfers, more on education (as a share of GDP), and well below others on health (as a share of GDP).

2.2.1. Direct Transfers

Created in 1986, the PNAFN is the main cash transfer program for low-income households. This program was designed to cover the entire country in order to mitigate the adverse effects of the International Monetary Fund (IMF)-led structural adjustment program, particularly in areas with a high number of poor families. In 2010, the program covered 520,337 beneficiaries (135,000 households, 5 percent of total population) at a total cost of about TD100 million, more than double the 1986 coverage of 250,000 beneficiaries (74,000 households).⁹ Each beneficiary household received an average of TD70 (\$48.8) in 2010. At 0.15 percent of GDP, the program is small (see Table 4). Household eligibility is based on surveys conducted by the Ministry of Social Affairs. Eligibility criteria include

⁹Total spending for PNAFN came from CRES (Research Center for Social Studies).

income below the national poverty threshold, inability to work, absence of the head of household, lack of family support, or the presence of disabled or chronically ill family members. Although the program was never formally evaluated before the 2011 revolution, it has since been acknowledged by the government that the program suffered from weaknesses in the identification of eligible families, with identification influenced by subjective criteria (Ayadi *et al.*, 2014).

Direct social assistance also includes a scholarship program for students in tertiary education. According to a report from the Ministry of Higher Education, 98,533 college students benefited in 2010, and grants totaled the equivalent of TD56 million (\$38.9 million) a year, or 0.15 percent of GDP (see Table 4).¹⁰ For a student to be eligible to receive the scholarship, the head of his/her household's total income cannot exceed the official minimum wage.

Other cash transfers total about 0.5 percent of GDP and include grants to local communities, NGOs, nurseries, and local cultural activities.

2.2.2. Education

Tunisia has both a public and a private education system. Mandatory basic education is composed of two cycles: 6 years of primary school and 3 years of lower secondary school or preparatory cycle. Secondary school is 4 years. Public primary and secondary education is practically free (beneficiaries pay the equivalent of \$3 per year). Public tertiary education is also nearly free, as students pay about \$25 a year for undergraduate education and \$50 for graduate education. Public primary and secondary education spending amounted to 4.6 percent of GDP in 2010 (see Table 4), of which tertiary education accounted for 1.7 percent.

Since 2002, gross enrollment in primary school has been almost universal, averaging 100 percent for both sexes. The net enrollment rate¹¹ for children ages 6–16 years increased 3.3 percentage points between 2002 and 2010, reaching 92.6 percent. Girls benefited more than boys from access to basic and secondary education. Among youth ages 12–18, net enrollment was 84.5 percent for girls and 75.8 percent for boys. The enrollment rate in higher education for individuals ages 20–24 rose from 25 percent in 2000 to 37 percent in 2010.

2.2.3. Health

Health care in Tunisia is provided through a contributory national health insurance program for the nonpoor and a free or subsidized system for low-income individuals and households. The free and subsidized system includes two programs. The Free Health Care (AMG1) program is intended for poor families and provides a five-year assistance program. The Subsidized Health Care (AMG2) program distributes health care discount cards to families based on income and family size.¹² Beneficiaries receive a lump sum payment based on the

¹⁰Total spending for scholarships was obtained from the Ministry of Higher Education.

¹¹The net enrollment rate is the total number of students in the theoretical age group for a given level of education enrolled in that level, expressed as a percentage of the total population in that age group.

¹²For two-member households, annual family income cannot exceed an amount equal to the guaranteed minimum wage (SMIC). Annual income cannot exceed 1.5 times the minimum wage for families with three to five members, or exceed twice the minimum wage for families with more than five members.

costs of the service. The health care discount card is also issued for a period of five years and needs to be revalidated every year at a cost of TD10 (\$7).

In 2010, the contributory system had 2,202,447 affiliates, the free system had 197,411, and the subsidized system had 448,810. Total public spending on the health care systems was 1.66 percent of GDP.

2.3. *Indirect Subsidies*

The indirect subsidy system in Tunisia has long been directed at basic consumption products, energy, and transport. These subsidies equaled 2.4 percent of GDP in 2010.¹³ The composition of subsidies was 1.2 percent for food, 1 percent for energy, and 0.3 percent for transport (World Bank, 2013). Data on subsidies for primary products and energy were obtained from the La Direction Générale des Etudes et de la Législation Fiscales of the Ministry of Finance.

The composition of products in the subsidized basket changed considerably between 1990 and 2010. The subsidies on primary products and transport were established in the 1990s. The energy subsidy was not introduced until 2003, to promote the competitiveness of the private sector and support the purchasing power of the middle class at a time when international oil prices were rising.

3. METHODOLOGY, DATA, AND MAIN ASSUMPTIONS

3.1. *Methodology*

This study uses the methodology of the CEQ, as presented in Lustig and Higgins (2013) and Lustig (forthcoming).¹⁴ Essentially, the method allocates taxes and transfers from household income or expenditure surveys to derive four income concepts at the household level: market (or pre-fiscal impacts) income, disposable income, consumable income, and final income. Disposable income equals market income minus personal income taxes and social security contributions plus cash transfers. Consumable income equals disposable income minus indirect taxes plus indirect subsidies. Final income equals consumable income plus the imputed value of government spending on education, health, and housing. Contributory pensions can be considered deferred income or pure government transfers, and the analyses were conducted both ways. This paper presents the results for the case in which contributory pensions are considered deferred income and were included as part of market income. The scenario in which they are treated as a pure transfer is available on request.¹⁵

¹³In 1988, subsidies equaled 8.5 percent of GDP, and almost half of the subsidy costs were for wheat. Since the revolution in 2011, subsidies have risen again to 6.9 percent of GDP in 2013 (World Bank, 2013). Studies by the African Development Bank (AfDB, 2013) and World Bank (2013) have pointed to the need to reform the subsidy system, because subsidies are relatively regressive. However, these subsidies play a key role in maintaining purchasing power for vulnerable groups who spend almost all their revenue on food consumption.

¹⁴As indicated in the Introduction, this paper uses primarily Lustig and Higgins (2013). This version has been removed from the CEQ Institute's website, but is available upon request.

¹⁵For details, see Lustig and Higgins (2013) and Lustig (forthcoming).

After the income concepts were generated, Gini coefficients and poverty indicators were calculated to assess how taxes and transfers affected inequality and poverty. Poverty is estimated using the national poverty line as well as the three international poverty lines of \$1.25, \$2.50, and \$4 per day (in 2005 PPP). A detailed description of the method and indicators is in Lustig (forthcoming, chap 1, 5, and 7).

Empirically, one often needs to start from a concept different than market income, because household surveys report incomes after taxes, for example, or because household surveys do not collect income data.¹⁶ This was the case for Tunisia. Since the household survey is consumption-based, we assumed that consumption equals disposable income¹⁷ and “backwards generated” market income by applying a net-to-gross conversion.¹⁸ To obtain market income, we subtracted direct transfers and added income taxes, payroll taxes (without property taxes), and social contributions (including those paid by the employer) to consumption.

We used the 2010 National Survey of Consumption and Household Living Standards from the National Institute of Statistics, which includes three components: expenditures, living standards, and food. The analysis included individuals who appear in all three so that we could impute, for example, the benefits from cash transfers. The final national sample included 23,764 individuals and 5,456 households and is statistically representative for large cities, medium-size cities, small towns, and rural areas. Although this is about half of the households that are included in the expenditures-only component, the sample is still representative of the Tunisian population.¹⁹

Because the consumption and household living standards survey does not include imputed rent for owner-occupied housing, we used an estimation from another source that imputed rent using a log linear regression model with variables controlling for housing characteristics and locations (INS, ADB, and World Bank, 2012). Monthly housing rent is estimated at TD211 (\$147) per household in cities, TD129 (\$90) in small and medium-size towns, and TD119 (\$83) in rural areas.

Since the survey does not include explicit information on all the taxes and transfers analyzed here, some had to be simulated or imputed. Data on direct taxes include only income tax and were imputed according to the tax rate applicable to each level of income of formal workers (see Table 2). Formal workers are assumed to be workers who contribute to the social security system. Information

¹⁶Many low- and middle-income countries collect information on consumption or expenditures only (Ferreira *et al.*, 2015).

¹⁷Of course, this leaves out savings and, thus this assumption may yield a somewhat lower incidence of personal income taxes, especially for richer households for which income is likely to be higher than consumption. Although having to make this assumption is not ideal, there is no conventional method to reproduce the amount of savings (or dissavings) corresponding to each household based on their consumption and other characteristics. In national accounts, the savings rate for households in 2010 was 11 percent of disposable income. Most of this saving likely originated in high-income households. If that is the case, and assuming that high-income individuals actually paid personal income taxes, our results probably underestimate the extent to which direct taxes reduce inequality.

¹⁸Working backwards is common in fiscal incidence analysis. See, for example, Immervoll and O’Donoghue (2001).

¹⁹As happens with practically every income or expenditure survey, Tunisia’s survey probably features underreporting of expenditures, especially among richer households, and truncation of the very rich, who are likely not captured by the surveys.

on who contributed to social security is reported in the survey, and contributions were imputed according to whether the household head is salaried or non-salaried and works in the agricultural or the nonagricultural sector (see Table 3). We also assume that formal workers do not evade taxes.

3.2. Simulations

The incidence of personal income taxes was simulated using two tax rates following Tunisian tax law: a regular regime for salaried workers and a flat regime for independent workers. The total of direct taxes by taxpaying individuals in the survey is generated by applying appropriate tax rates on their net income revenues (as estimated from the survey) and then scaling this total down so that the proportion of personal income taxes to disposable income by households in the survey matches the ratio obtained from administrative accounts. This adjustment to scale is performed for two reasons. First, due to tax avoidance, tax evasion, and other factors, actual tax collection will be less than the predicted value obtained by applying statutory rules. Second, the size of the economy (as measured by disposable income) tends to be smaller in household surveys than in national accounts. If fiscal interventions were not adjusted in the same proportion, their distributional effect would be exaggerated. We know from theory that the distributional effect depends on the size (and progressivity) of the fiscal intervention of interest.

The total for personal income taxes equaled TD2,740 million before scaling down and TD2,260 million after scaling down. As expected, the total after scaling down is somewhat lower than the total from national accounts (TD2,600 million). We assumed that only individuals who reported being affiliated with the social security system paid personal income and payroll taxes. The rate of tax evasion calculated from the survey (the percentage of workers who do not pay income tax) was 40 percent, which is similar to the size of the informal sector estimated in some studies.²⁰ The share of tax revenue paid by salaried workers equaled 73 percent, close to the 75 percent reported in national accounts.²¹

The imputed contributions to social security are simulated as a percentage of market income and include contributions to pensions, health, and death benefits. The contributions include both employees' and employers' contributions, and the rate depends on whether the worker is in the public sector (CNRPS) or the private sector (CNSS) under the salaried regime, or in the agricultural or nonagricultural sector in the nonsalaried regime.

The incidence of the VAT was simulated by applying the relevant rate (6, 12, or 18 percent) to detailed consumption data on consumption products, energy products, transport, and health.

Only two direct cash transfers were included in this study: the PNAFN and scholarships. The survey does not include enough information on the others to

²⁰See the survey by the Solidarity Center and the Tunisian Worker Union: http://www.solidarity-center.org/wp-content/uploads/2014/11/Tunisia.Informal-Economy-Report.UGTT_.2014.ENGLISH.pdf

²¹This percentage is calculated from national accounts published by the National Institute of Statistics; data are also available on the website of the Ministry of Finance: <http://www.finances.gov.tn>

estimate their incidence. The survey reports the number of recipients but not the amount of the transfers. The third component of the survey, called Quality of Life, reports whether the individual received free health care. Where the answer is in the affirmative, we know that the household must have received PNAFN transfers. The total number of beneficiaries in the survey is very close to the number in the administrative data, which validates the chosen method.

The amount of per capita benefits received from PNAFN was imputed from the values from the administrative accounts for each of the programs. However, because the number of beneficiaries is smaller in the survey than in administrative accounts, we used a probit model to impute likely beneficiaries who did not report receiving the PNAFN so that the total number of beneficiaries in the survey matches the number in national accounts. The survey also reports information on recipients of the scholarship program for students from low-income families. The amount allocated to each beneficiary equals the total annual amount paid, according to administrative records (see previous section), divided by the number of beneficiaries in the survey. The number of beneficiaries in the survey is almost equal to the number reported by the ministry.²²

The incidence of in-kind education and health benefits was estimated by imputing the average cost of the service to the users of education and health services. This approach has the limitation that it treats benefits uniformly regardless of context. For example, differences in the quality of education of schools in rich area and those in poor areas are assumed to be negligible. In reality, since the best-ranked teachers are given the opportunity to choose the schools where they want to teach, poorer and rural areas may end up with poorer quality teachers. This allocation mechanism creates, by definition, inequality in the distribution of benefits of education spending and will tend to exacerbate inequality in education outcomes.

The survey reports whether an individual attends school (and if so, whether public or private) and the level of education. The number of beneficiaries is taken from the survey. The annual cost per capita is the ratio of the annual budget for each education level and the number of beneficiaries. The average cost includes administrative and capital expenditures divided by the number of beneficiaries. The average cost of tertiary education and that of primary and secondary education are calculated together, as the two are not separated in the budget. In the second stage, as for personal income taxes, we scale down spending for the different levels of education, so that the ratio of total spending by level divided by consumption in the survey is the same as the ratio of spending to disposable income in administrative accounts. The average spending was scaled from TD1,610 million to TD1,464 million.

Health benefits per person are calculated as the Ministry of Health's budget on capital and current expenditures in public hospitals and health centers divided by the number of beneficiaries from the survey. Following survey categories, we divide health expenditures into normal care, maternity care, and hospitalization. Hospitalization costs equal five times the average cost of normal or maternity

²²It was assumed that the benefits for PNAFN and scholarships are accurate in absolute terms, so that the figures here were not scaled down to match the proportions in surveys and national accounts. For a justification, see Lustig (2016, chap 5).

care, taken here as a numéraire. Each category of spending is a multiple of the unit average cost of normal care. The coefficient for each individual is a function of the type and frequency of care received. The average unit cost is calculated by dividing the Ministry of Health's budget by the total multiplier coefficient of all patients reported in the survey.²³ This approach does not account for the quality of health care, based on the availability of specialized doctors, equipment, and distance from these services. In reality, quality differences are exacerbated as doctors can choose where they want to work, based on their performance at their exam, with top ranked doctors—not surprisingly—avoiding vulnerable or rural areas.

Subsidies are calculated from information reported on food and nonfood consumption. This includes subsidies on primary consumption products, energy, and transport. The amount of subsidies is adjusted downward, from TD2,650 million to TD1,400 million, to match the ratio to disposable income in the survey to that in the administrative accounts.

4. RESULTS

4.1. *The Impact of Fiscal Policy on Inequality*

Under the benchmark scenario, which treats contributory pensions as deferred income, fiscal policy in Tunisia reduces inequality significantly: the Gini coefficient for market income declines from .44 to .35, a decline of .08 Gini points (Table 5). When in-kind transfers in public education and health are excluded, the Gini declines by .05 points, which means that two-thirds of the reduction in inequality can be accounted for by taxes, cash transfers, and subsidies.

Compared to other middle-income countries, the redistributive effect of taxes, cash transfers, subsidies, and in-kind transfers (from market to final income) in Tunisia is somewhat lower than in Argentina, Brazil, Costa Rica, Georgia, Iran, Mexico, South Africa, and Uruguay but it is higher than in the other 21 countries with results included in the CEQ Data Center on Fiscal Redistribution (<http://www.commitmentoequity.org/datacenter>). The total redistributive effect is higher, however, than in Chile, Colombia, Russia, and Venezuela and much higher than in Indonesia, Jordan, and Peru. The combined effect of direct taxes and direct cash transfers is higher in Tunisia than in 24 of the other 29 countries included in the CEQ Data Center. The combined effect is higher only in Argentina, Georgia, Iran, South Africa, and Uruguay. The redistributive effect of in-kind transfers is higher in 15 countries, so Tunisia does not stand out one way or the other. Where Tunisia

²³We illustrate with an example. Assume that the Ministry of Health's budget is \$100, and 50 individuals reported using health services. The average benefit is \$2 per individual. Then, we assume that 25 individuals received hospitalization care once and normal care twice, while the other 25 received only normal care once. Under these assumptions, the multiplier equals $7 = (5 + 2)$ for the 25 individual in the first group and 1 for the remaining 25. The total multiplier for the 100 individuals equals $(25 * 7) + (25 * 1) = 200$. The average spending is $(100/200) * 7 = \$3.5$ for the first 25 and $(100/200) * 1 = \$0.50$ for the second 25. The weighted average of the two values is \$2, which is exactly right.

TABLE 5
INEQUALITY AND POVERTY INDICATORS FOR EACH INCOME CONCEPT, 2010

	Market income	Disposable income	Consumable income	Final income
Inequality indicators				
Gini coefficient	0.44	0.39	0.38	0.35
Theil index	0.35	0.27	0.26	0.22
Ratio of the top 90% to bottom 10%	7.91	5.98	5.67	4.65
Headcount poverty indicators (%)				
National poverty line	15.20	15.61	17.86	–
International poverty lines				
US\$1.25 per day at 2005 PPP	0.65	0.41	0.38	–
US\$2.50 per day at 2005 PPP	6.18	5.58	5.65	–
US\$4.0 per day at 2005 PPP	17.01	18.90	19.23	–

Source: Authors' estimates based on the National Survey of Consumption and Household Living Standards of 2010. CEQ Master Workbook of Results: Tunisia, September 9, 2015 (available upon request).

Note1: National poverty line is set at TD5.026 a day, equal to \$3.40 in 2005 purchasing power parity (PPP).

Note2: the differences between poverty rates are all significant at 1%.

really differs from the rest is in the combined effect of consumption taxes and subsidies. The decline in inequality induced by consumption taxes and subsidies is not only higher in Tunisia than in every other country included in the CEQ Data Center, but for as many as a third of the 30 countries consumption taxes and subsidies increase inequality (when compared with inequality for disposable income). Remarkably, the moderately poor and the population most vulnerable to falling into poverty benefit from net subsidies through primary products, while the upper middle class has been negatively affected which make it easy to reduce inequality.

The redistributive effect generates a low rate of horizontal inequality as evidenced in re-ranking. This means that the ranking of individuals before and after accounting for fiscal programs does not change (Bourguignon, 2011; Duclos *et al.*, 2003). For example, for the redistributive effect of market income to consumable income, the extent of horizontal inequity measured by the Atkinson–Plotnick index is 0.0069, or 12 percent of the change in vertical inequality. Compared to other middle-income countries, this is a bit higher than in South Africa (7.5 percent; Inchauste *et al.*, 2015), but lower than in Brazil (30 percent; Higgins and Pereira, 2014) and Indonesia (45 percent; Jellema *et al.*, 2017).

4.2. *The Impact of Fiscal Policy on Poverty*

To assess the impact of fiscal policy on poverty, we compared the headcount ratio at market income and at consumable income (market income adjusted for taxes, cash transfers, and subsidies; see Table 5). Following conventions, we do not add the monetized value of in-kind transfers in education and health because poverty lines are not generated with these components in mind. The impact of fiscal policy on poverty depends on the poverty line. For the lower international poverty lines of \$1.25 and \$2.50 per day (in 2005 PPP), the combined effect of taxes, transfers, and subsidies reduced poverty. However, this is not true using

Tunisia's national poverty line (TD5.02 per day, equivalent to \$3.4 in 2005 PPP) or the middle-income international poverty line of \$4 per day (in 2005 PPP).²⁴

The rate of poverty under the national poverty line rose from 15.2 percent to 17.9 percent, after taking into account the impact of all taxes and direct cash transfers, indirect subsidies and in-kind transfers (Figure 1). This increase is due, in particular, to the high burden of direct taxes and social contributions at relatively low-income levels²⁵ (Table 6). For people in the bottom 40 percent of the population, direct taxes and social contributions amount to roughly 4 percent of market income, which is not compensated for by direct transfers, except for the poorest 10 percent of the population. In fact, in what is an unusual result for such analyses, individuals from the second decile up become net payers to the fiscal system once direct taxes and transfers are accounted for. Despite the large amount of subsidies, the poverty headcount ratio is still a bit higher for consumable income than for market income under the national poverty line because of indirect taxes.²⁶

In sum, the poorest 10 percent of the population is the only population decile that does relatively well as a result of fiscal policy. They receive transfers equivalent to 89 percent of their market income, including in-kind transfers, imputed mainly to in-kind education subsidies (50 percent) and indirect subsidies (12.3 percent) and, to a lesser extent, in-kind health subsidies (20 percent) and cash transfers (6.1 percent). Moreover, the burden of direct taxes is low for the poorest 10 percent, at 0.6 percent of their market income, although indirect taxes amount to 13 percent of market income. Overall, fiscal measures increase the market income of the poorest 10 percent by 74 percent.

4.3. *Who Benefits from Direct Transfers and Subsidies, and Who Bears the Burden of Taxes?*

This section focuses on the progressivity of transfers and taxes. Usually, pro-poor spending implies that government spending per capita on transfers falls with market income. However, taxes are progressive in absolute terms when the amount of taxes per capita increases with income. Technically, a program is defined as pro-poor when its concentration curve is above the original income Lorenz curve making its concentration coefficient less than Gini.

Several results stand out from an analysis of the concentration shares of each component of fiscal policy analyzed here (Table 7). The share of PNAFN received by the poorest 20 percent is 32.5 and the share of other direct transfers is 24.7 percent, implying that spending on these direct transfers is pro-poor. However, the richest 10 percent also benefit from these transfers: they receive 8.2 and 6.6 percent, respectively. Most important, indirect subsidies, calculated at 2.3 percent of government spending, are not pro-poor at all. The bottom 20 percent of the

²⁴While the results are point estimates based on a sample, at this point the methodology did not allow us to make pairwise comparisons attaching statistical significance to the observed differences.

²⁵Almost 67 percent of low-income category (below \$1.25 PPP) do pay taxes. The remaining 33 percent of this category belongs to the informal sector, representing only 1.25 percent of the total informal sector.

²⁶Indirect taxes here include excise taxes on alcohol, tobacco, tea, perfume, and transport, among others.

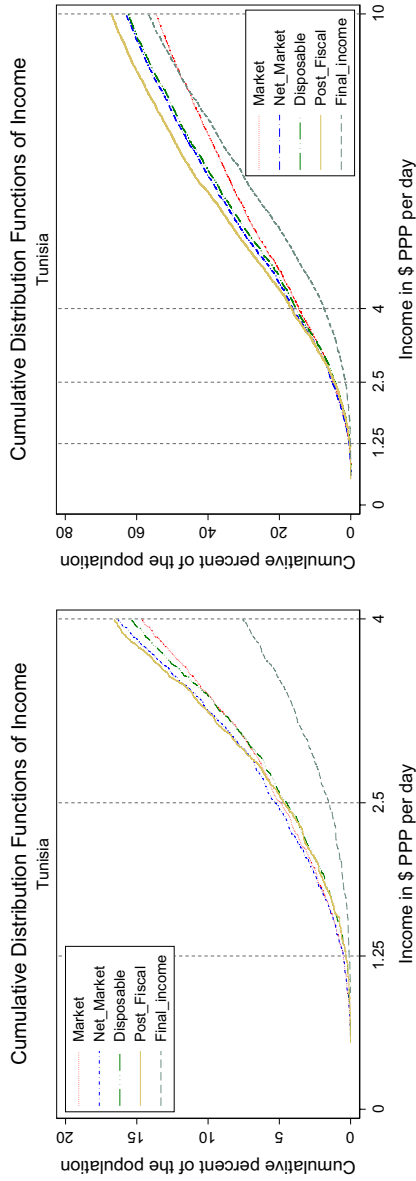


Figure 1. Cumulative distribution functions of income by income concept
 Source: Author's calculation. [Colour figure can be viewed at wileyonlinelibrary.com]

TABLE 6
FISCAL INCIDENCE BY DECILE IN TUNISIA, 2010 (PERCENT)

Decile	Direct taxes	Contributions	Direct taxes and contributions to SS [social security]	Net market income	Flagship CCT[cash transfers]	Other direct transfers (targeted or not)	All direct transfers	Disposable income	Indirect subsidies	Indirect taxes	Net indirect taxes	Consumable income	In-kind education	In-kind health	Housing and urban	Final Income
1	-0.6	-1.1	-1.7	-1.8	3.3	2.9	6.2	4.5	12.3	-13.1	-0.8	3.7	50.3	20.0	0.4	74.7%
2	-1.2	-2.5	-3.7	-4.5	1.4	1.6	3.0	-1.5	9.3	-12.4	-3.1	-4.7	35.7	8.6	0.2	40.6%
3	-1.3	-3.2	-4.6	-4.7	0.8	1.1	1.9	-2.7	8.1	-13.1	-5.0	-7.8	22.4	7.8	0.0	22.7%
4	-2.1	-4.9	-6.9	-9.3	0.6	1.0	1.6	-7.7	7.3	-12.8	-5.6	-13.3	17.6	4.7	0.1	11.4%
5	-3.1	-7.3	-10.3	-11.0	0.5	0.7	1.2	-9.8	6.1	-13.0	-6.9	-16.8	14.3	3.4	0.0	1.7%
6	-3.9	-9.3	-13.2	-14.1	0.4	0.6	0.9	-13.2	5.4	-12.4	-7.0	-20.2	13.5	2.6	0.0	-3.1%
7	-5.0	-11.5	-16.5	-16.8	0.2	0.5	0.8	-16.0	5.0	-11.1	-6.1	-22.2	12.9	3.1	0.0	-5.8%
8	-6.1	-13.5	-19.7	-20.3	0.2	0.2	0.4	-19.9	4.2	-11.2	-7.0	-26.9	8.6	2.0	0.0	-15.5%
9	-7.3	-15.2	-22.5	-23.4	0.1	0.1	0.2	-23.1	3.4	-10.3	-6.9	-30.0	5.7	1.3	0.0	-22.2%
10	-11.4	-20.2	-31.6	-30.2	0.1	0.1	0.2	-30.0	2.3	-8.6	-6.2	-36.2	3.2	1.2	0.0	-33.3%
Total population	-7.0	-13.8	-20.8	-20.8	0.3	0.4	0.7	-20.0	4.3	-10.6	-6.3	-26.3	10.0	2.8	0.0	-13.5

Source: Authors' estimates based on the National Survey of Consumption and Household Living Standards of 2010. CEQ Master Workbook of Results: Tunisia, September 9, 2015 (available on request).

TABLE 7
CONCENTRATION SHARES OF TAXES AND TRANSFERS IN TUNISIA, BY DECILE, 2010 (PERCENT)

Decile	Direct taxes	Contributions	Flagship CCT[Cash Transfers]	Other direct transfers				Education	Health	Housing and urban
				Flagship CCT[Cash Transfers]	(targeted or not)	Indirect subsidies	Indirect taxes			
1	0.20	0.10	19.20	13.20	5.20	2.30	9.20	13.30	28.20	
2	0.50	0.60	13.30	12.20	6.50	3.60	10.90	9.60	19.80	
3	0.80	0.90	10.60	11.10	7.60	5.00	9.30	11.50	6.60	
4	1.50	1.80	9.70	12.30	8.30	6.20	9.00	8.80	11.30	
5	2.70	3.30	9.50	10.80	8.70	7.70	9.00	7.70	6.30	
6	4.20	5.20	8.60	10.40	9.30	8.90	10.30	7.10	13.10	
7	6.60	7.80	7.10	11.90	10.70	9.80	12.00	10.40	13.00	
8	10.50	11.90	6.60	7.20	11.80	12.80	10.40	8.90	0.00	
9	17.60	18.60	7.20	4.40	13.70	16.40	9.50	8.00	0.60	
10	55.40	49.80	8.20	6.60	18.30	27.50	10.90	14.60	1.10	
Total population	100	100	100	100	100	100	100	100	100	

Source: Authors' estimates based on the National Survey of Consumption and Household Living Standards of 2010. CEQ Master Workbook of Results: Tunisia, September 9, 2015 (available upon request).

TABLE 8
CONCENTRATION COEFFICIENTS FOR TUNISIA BY SPECIFIC CATEGORY, 2010

Program	Concentration coefficient
<i>Gini coefficient for market income</i>	0.44
Other scholarships	-0.18
PNAFN	-0.18
Primary and secondary education spending	-0.06
Total education spending	-0.02
Total health spending	0.012
Hospitalization	0.06
Subsidy	0.19
Tertiary education spending	0.23

Source: Authors' estimates based on the National Survey of Consumption and Household Living Standards of 2010. CEQ Master Workbook of Results: Tunisia, September 9, 2015 (available upon request).

population receives 11.7 percent of indirect subsidies, while the richest 10 percent receives 18.3 percent.

Spending on education is fairly evenly distributed across population deciles. This result is expected because enrollment rates for children ages 6–16 are nearly universal in Tunisia, including among people in the poorest deciles. The results show that per capita benefits decrease with income, meaning that spending on primary and secondary education is progressive. Transfers that follow such a pattern are considered pro-poor. When the per capita transfer decreases with income, the concentration coefficient turns negative (Table 8; see Enami *et al.*, 2016). Spending on tertiary education is progressive in relative terms only; that is, the benefit as a proportion of market income decreases with income. When this occurs, the concentration coefficient is lower than the market income Gini, which is the case for Tunisia (see Table 8). Spending on tertiary education is thus equalizing but not pro-poor. Still, only 0.1 percent of students enrolled in tertiary education came from the bottom 10 percent; for primary and secondary enrollment, the proportion is 0.8 percent. Health spending is distributed fairly equally across all deciles. In other words, per capita health benefits are roughly equal across the distribution.

The observed distribution of benefits from direct transfers and subsidies appears to indicate room to improve conditions for the poorest group (those with incomes below \$4 per day in 2005 PPP) and the most vulnerable groups (those with incomes of \$4–\$10 in 2005 PPP) through better targeting. Once the burden of taxation is taken into account, the combination of direct and indirect taxes puts a considerable burden on the vulnerable income group, which makes up 37 percent of the population and who are net payers into the fiscal system. On average, when only the cash components of fiscal policy are taken into account (and not the imputed value of in-kind transfers in education and health), this income group pays direct and indirect taxes of about 8 percent of their market income. Those in the vulnerable income group become net beneficiaries only if the monetized value of in-kind benefits in education and health are included: final income is 17.3 percent higher than market income for the vulnerable group, on average.

4.4. *Second-order Effects*

This section looks at how inequality in different income categories would differ before and after tax and transfers programs, which this analysis did not capture through the direct effect.

In addition to the direct effect, transfers and taxes will also alter income distribution by generating second-round effects through behavioral changes, induced effects, and indirect effects. Behavioral responses are long-term changes, and they are not covered in this analysis of short-term effects. The induced effect is evaluated as an income change within the same income category related to demand and supply elasticities after implementation of fiscal programs. The indirect effect is generated when income is redistributed from one income category to another through interdependent sectors in the economy. For instance, assume two individuals (one rich and one poor) and two economic sectors (1 and 2). If the rich individual consumes from sector 1, then the production of sector 2 (an input in sector 1) will increase. Additional revenue in sector 2 will be distributed more proportionally to the poor individual if this sector employs poor people. In the literature, the process described here is captured by the use of a fiscal multiplier: a change in prices is assumed to alter the consumption structure, thereby altering the inter-industry mix, which in turn alters the income structure, and the process start over again (Hewings *et al.*, 2013).

On the income side in Tunisia, the income payments by sector to each decile²⁷ show that vulnerable population groups (the first three deciles) are relatively more concentrated in low-technology sectors, such as food and beverage, clothing, and hotels and cafes, while high-income groups are more concentrated in sectors like telecom, leisure and culture, education, and housing. On the consumption side, any additional income for low-income groups is more likely to be consumed in sectors like food and beverages, clothing, while any income increase for the rich will be propagated through other sectors in the economy where vulnerable categories are left out. Overall, the consumption and income payment structure suggests that income redistribution toward the poor will be more likely to occur if any additional income moves through sectors in which the poor are more concentrated.

For example, for the bottom three deciles, their income share is 2.1 percent of production in the food and beverages sector but 0 percent in telecom, and their consumption share is 14 percent of consumption in the food and beverages sector but 8 percent in the telecom sector. Conversely, for the top three deciles, their income share is 25 percent of production in the telecom sector but 1.9 percent in food and beverages, and their consumption share is more than 60 percent of consumption in the telecom sector but 49 percent in food and beverages. Thus, any

²⁷The income here is approximated mainly by wages and salaries, which represent only 41 percent of GDP in the national accounts, while dividends and other income types have not been accounted for, given data constraints. The wage and salary matrix for each sector by income decile is retrieved from the labor market survey of 2013, published by Economic Research Forum. This labor market survey is the only survey containing data on salaries for Tunisia.

additional income for the bottom three deciles will be more redistributive than any additional income for the top three deciles.²⁸

More generally, cash transfers are expected to generate an indirect redistributive effect, because a high proportion of cash transfers goes to the poor. In this case, the Gini index would fall. However, subsidies will have less of an indirect redistributive effect because, after one economic cycle, these transfers will benefit the non-poor. The Gini index will be higher after one cycle.

Conversely, the induced redistributive effect seems to be trivial in the case of Tunisia. The induced effect depends on the magnitude of price changes and the elasticities of the relevant demand and supply functions. The smaller the price change and the lower the elasticity, the lower the induced effect. Relevant products in the consumption basket include foods and beverages (32 percent); housing, water, and energy (14 percent); transport (12 percent); clothing (9 percent); and housing furniture and maintenance (8 percent).

The assumption of low demand and supply elasticities seems to be broadly supported by empirical estimates. Available estimates on demand and supply elasticities for Tunisia indicate that they are small. For example, demand elasticity is estimated at -0.4 for public transport (Daldoul *et al.*, 2016); between -0.2 and -0.8 for meat (Dhraief *et al.*, 2013); and -0.25 for residential, industrial, and transport energy (Talbi and Nguyen, 2014). The labor supply responses to changes in contributions to social insurance pensions are estimated at just 0.033 (Othman and Marouani, 2016), which indicates that changes in tax rates will not have much of an impact on the supply of labor. An analysis of tax reform in a general equilibrium framework showed that a 10 percent reduction in the labor tax rate will increase labor but will reduce tax revenues in most scenarios by 5–9 percent, meaning that the supply elasticity is well below 1 (Alm, 2015).

What about price changes? The highest potential price variation is for energy. Energy subsidies range from 35 percent for gasoline to 100 percent for electricity and 250 percent for butane. Of course, removing these subsidies will not result in “marginal” price changes. However, the induced effect might be limited because average spending on energy represents just 5.6 percent of total spending (Arrar and Verme, 2012). Thus, at least in the short run, our exercise is likely to capture changes in the post-tax/subsidy price variation mainly by the first order effect and the indirect effect. Even if the expected price change is large, the induced effect will be limited because of the low elasticities of the relevant sectors and the small weight of the relevant goods in total spending.

5. CONCLUSION

Using the 2010 National Survey of Consumption and Household Living Standards, this study estimated the incidence of the national government's taxation and spending in Tunisia. On the tax side, the analysis included personal income taxes, VAT, and excise taxes on consumption goods and services. These

²⁸Contrary to the other case, a high proportion of their revenues will end up in the pockets of the low-income category.

collectively account for 86 percent of total general government revenues. On the expenditure side, the analysis included the cash transfer program PNAFN, scholarships, contributory pensions, subsidies, and spending on education, health and housing for students. These items account for 43 percent of general government expenditures.

The market income Gini coefficient falls from .44 to .35 (after taxes and transfers), mainly due to taxes and in-kind services, which each account for about 30 percent of the decrease. Personal income taxes and contributions to social security produce most of the equalization. Direct taxes are progressive, and the VAT is regressive. Cash transfers contribute little to redistribution. Although the cash transfer program PNAFN is strongly progressive and equalizing, its share in the budget is very small (only 0.15 percent). Subsidies are equalizing, though much less than cash transfers, because benefits to the nonpoor are higher than their population share (subsidies are progressive, but only in relative terms). An additional level of inequality arises from the indirect effect of channeling more subsidies to the nonpoor than to the poor. However, the indirect effect of cash transfers is to reduce inequality, because a high proportion of cash transfers, after consumption, end up increasing revenues going to the poor. The induced effect, however, is neutral with respect to inequality.

Primary and secondary education is strongly redistributive and equalizing, while tertiary education is progressive only in relative terms, because the poor still have limited access to higher education. Health spending is progressive and equalizing for primary health care, whereas hospitalization services are progressive only in relative terms. When all transfers and taxes are taken into account, the ratio of the top decile's average per capita income to the poorest decile's average per capita income drops from 18 to 6.

The impact of fiscal policy on poverty is less favorable. While fiscal policies reduce poverty as measured by the two lower international poverty lines, the headcount ratio for consumable income is higher than the headcount ratio for market income for the national poverty line and the international moderate poverty line of US\$4 per day (2005 PPP). Only the bottom 20 percent of the population receive more, on average, in transfers and subsidies than they pay in direct and indirect taxes. The remaining 80 percent are net payers. The main factor behind this result is that even low-income households pay relatively high rates of personal income taxes and contributions to social security. To improve the poverty-reducing impact of fiscal policy, the government should increase the budget share allocated to the cash transfer program PNAFN and improve targeting of subsidies to the poor.

Two lessons can be drawn for developing countries from this study for Tunisia. First, to reduce both inequality and poverty, fiscal programs have to be shaped toward more redistribution. In particular, taxes should play a key role in reducing inequality, even under an excessive tax burden, to make additional transfers sustainable. Second, countries should increase the efficiency of transfer programs by better targeting vulnerable groups. This includes targeting subsidies and reviewing criteria for cash transfer allocations and, more important, tackling the unequal distribution of education and health benefits between and within income categories.

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