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ABOUT THE JOURNAL

The Journal of Tax Administration is a peer-reviewed, open access journal concerned with all aspects of tax administration. Initiated in 2014, it is a joint venture between the University of Exeter and the Chartered Institute of Taxation.

JOTA provides an interdisciplinary forum for research on all aspects of tax administration. Research in this area is currently widely dispersed across a range of outlets, making it difficult to keep abreast of. Tax administration can also be approached from a variety of perspectives including, but not limited to, accounting, economics, psychology, sociology and law. JOTA seeks to bring together these disparate perspectives within a single source to engender more nuanced debate about this significant aspect of socio-economic relations. Submissions are welcome from both researchers and practitioners on tax compliance, tax authority organisation and functioning, comparative tax administration and global developments.

The editorial team welcomes a wide variety of methodological approaches, including analytical modelling, archival, experimental, survey, qualitative and descriptive approaches. Submitted papers are subjected to a rigorous blind peer review process.

SUBMISSION OF PAPERS

In preparing papers for submission to the journal, authors are requested to bear in mind the diverse readership, which includes academics from a wide range of disciplinary backgrounds, tax policy makers and administrators, and tax practitioners. Technical and methodological discussion should be tailored accordingly and lengthy mathematical derivations, if any, should be located in appendices.

MESSAGE FROM THE CHARTERED INSITUTE OF TAXATION

The Chartered Institute of Taxation is an education charity with a remit to advance public education in, and the promotion of, the study of the administration and practice of taxation. Although we are best known for the professional examinations for our members, we have also supported the academic study of taxation for many years and are pleased to widen that support with our involvement with this journal.

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The Journal of Tax Administration website can be found here: www.jota.website

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EDITORIAL NOTE

We are pleased to present the first 2018 issue of the Journal of Tax Administration which once again contains a geographically dispersed and methodologically diverse set of papers. We are grateful to all contributors to this issue, both authors and reviewers.

In this issue we present four research articles. In the first paper, James Alm presents a fascinating analysis of the costs of setting up a new tax administration in Kuwait. The second paper, by Joel Slemrod and Tejaswi Velayudhan, explores firm tax remittance in India, providing important evidence from a developing country that its remittance rates are very similar to those arising in OECD countries despite significant differences in the composition of tax revenue. The third paper, by Zvika Afik and Yaron Lahav, is concerned with transfer pricing, developing a model that sheds light on the costs of entering into advance pricing agreements. The fourth paper is by Kalliampkos and Kotzamani who examine the economic impact of variations in the rate of Value Added Tax in Greece.

A new feature in this issue of JOTA is a Commentary section, which provides a space for both academic and non-academic writers to share their views on aspects of tax administration, without full peer review. In the first commentary, Amerandu Nandy and colleagues explore the potential for adopting an inheritance tax in India, observing that with advancement in technological capacity in tax administration such a move is more feasible than previously. The authors caution against assuming that the introduction of inheritance tax will be easy or even successful in reducing inequality in the absence of other measures. The second commentary by Eleanora Johanna Kuiper and Marjin Janssen provides insights into how tax related data can be harnessed for the benefit of taxpayers, and indeed society. They draw on the conceptual tools from wealth management to explore such an innovation.

Finally, this issue contains several review pieces. Antoine Malézieux provides an extremely useful guide to tax evasion games, bringing together a wide range of studies to provide an overview of the design of experiments to better understand the phenomena. Edidong Bassey reviews a recently published book by the Intra-European Organisation of Tax Administrations entitled “Disruptive Business Models – Challenges and Opportunities for Tax Administrations. Finally, a group of scholars from the University of Exeter provide a review of recently published literature from a variety of sources.

Lynne Oats & Nigar Hashimzade (Managing Editors)

WHAT ARE THE COSTS OF A NEW TAX ADMINISTRATION? THE CASE OF A PERSONAL INCOME TAX IN KUWAIT

James Alm[1]

Abstract

This paper assesses the viability of introducing a new personal income tax (PIT), focusing on the administrative costs of new tax. I first present a methodology for calculating the one-time start-up costs and the ongoing administrative costs of a new PIT. I then apply this methodology to the specific case of Kuwait. I estimate that the first-year total administrative costs of a new PIT tax administration in Kuwait range from Kuwaiti dinars (KWD) 46.8 million to KWD 90.9 million (or from USD 154.4 million to USD 300.0 million), depending on how the construction costs are financed. However, after the initial construction costs are incurred, I find that the annual total administrative costs of a PIT fall significantly to about KWD 50 million (or about USD 164 million), regardless of specific financing methods, and then rise at an annual rate of less than 6 percent per year to reach KWD 82.0 million (or USD 270.6 million) by year 2020, driven mainly by labor force growth. I also estimate that the likely revenues of a new PIT far exceed these administrative costs, even if the PIT is imposed at low rates.

Keywords: Public administration, tax administration, administrative costs.

INTRODUCTION

Nearly all oil-rich countries in the Middle East and beyond are heavily reliant on oil revenues to finance their government expenditures. Especially in the countries included in the Cooperation Council for the Arab States of the Gulf, typically referred to as the Gulf Cooperation Council (GCC) countries, oil revenues have financed between 70 and 95 percent of total government expenditures during 2011-2016, with non-oil tax revenues generating only a minor share of revenues.[2] With the decline of oil prices in recent years, these countries have experienced significant fiscal problems. These problems, together with uncertain long term prospects for oil-

[1] Tulane University. Please address all correspondence to: James Alm, Department of Economics, Tulane University, 208 Tilton Hall, New Orleans, LA 70118 (email jalm@tulane.edu; phone +1 504 862 8344; fax +1 504 865 5869). I am grateful to Malise Madura for help on the calculations in earlier versions. This paper began after a request from some individuals in the Kuwait Ministry of Finance to consider the effects of introducing a personal income tax. The Ministry was most interested in the costs of a new tax administration and the expected revenues for the new tax. It was also interested in constructing various models to estimate the subsequent effects of a new tax on such variables as employment, savings and investment, the trade balance, inflation, foreign investment, gross domestic product, and the like. Ultimately, the Ministry decided not to proceed on the project. However, the initial discussions were intriguing, and they led ultimately to this paper.

[2] These countries include: the Kingdom of Bahrain, Kuwait, the Sultanate of Oman, Qatar, the Kingdom of Saudi Arabia, and the United Arab Emirates (UAE).

based revenues, have led them to consider alternative, non-oil-based, revenue sources. Although GCC countries have sometimes experimented with traditional tax instruments over the years, these experiments have typically been short-lived.[3] At present, there is virtually no personal income tax in any GCC country, despite its nearly universal presence in other countries around the world. Indeed, international organizations like the International Monetary Fund (IMF) have begun calls for the transition from an oil-based to a non-oil-based tax system, and GCC countries themselves are starting to respond to these calls.[4]

A crucial issue in these considerations is the cost of establishing a new tax administration. There is a substantial theoretical literature on designing an "optimal" tax system and also one on reforming existing tax structures.[5] There is also a large literature on the many administrative aspects in the design of taxes[6], including a growing literature that estimates the costs to the government of administering the taxes (often termed the "administrative costs" of taxation).[7] However, there is little research on what it would cost a country, with virtually no pre-existing tax system, to build one totally from scratch. The administrative cost of a new tax administration is clearly a crucial consideration for GCC countries. More generally, the administrative cost of a new tax administration is a central issue for any government contemplating the introduction of a new tax. Even so, there is little systematic analysis of these administrative costs.
This paper assesses the viability of introducing a new personal income tax (PIT) in one GCC, Kuwait. I first present a methodology for calculating the one-time start-up costs and the ongoing administrative costs of a new PIT. I then apply this methodology to the specific case of Kuwait. I believe that this methodology, when applied to other countries, has the ability to generate useful measures for the overall administrative costs of a new tax administration.

I estimate that the *first-year* total administrative costs of a new PIT tax administration in Kuwait range from Kuwaiti dinars (KWD) 46.8 million to KWD 90.9 million (or from USD 154.4 million

[3] For example, Saudi Arabia introduced various forms of income taxes in 1950 on nationals and non-nationals, but the taxes were quickly reformed to exclude nationals and in 1975 income taxes on foreigners were suspended. Also, Kuwait introduced a corporate tax in 1955, and then other GCC countries followed suit, including UAE and Oman in the early 1970s. However, corporate taxes in the GCC countries were reduced substantially during the first decade of the 21st century, largely to encourage foreign direct investment. The

[4] For example, see Harrison (2010), International Monetary Fund (2011, 2015), Mansour (2015), and Shukurov (2015). Also, Kuwait approved the introduction of a corporate income tax in 2016, along with other measures designed at collecting additional taxes. To date, these reforms do not appear to have been put in place.

[5] See Auerbach (1985), Auerbach and Hines (2002), and Boadway (2012) for discussions of optimal taxation.

[6] See especially the seminal works by Goode (1981), Bird (1989), and Bird and Casangera de Jantscher (1992). Also, see Slemrod (1990), Alm (1996), Slemrod and Gillitzer (2014), and Keen and Slemrod (2017) for discussions that incorporate "optimal" tax administration considerations.

[7] Note that "administrative costs" are only part of the overall "operating costs" of taxation. As discussed by Evans (2001, 2003), the "operating costs" of taxation are typically defined to include both the costs to the government of administering the taxes (or the "administrative costs") and the costs to taxpayers of complying with the taxes (or the "compliance costs"). Discussions of the operating costs of taxation go back to Smith (1776) and his four maxims of good tax practice (e.g., equity, certainty, convenience, and economy), of which the latter three clearly emphasize the operating costs of the tax system. Measurement of these operating costs has attracted significant scholarly attention since the pioneering work by Haig (1935) and especially by Sandford (1973), Vaillancourt (1989), and Sandford, Godwin, and Hardwick (1989). For insightful discussions of much of this literature, see again Evans (2001, 2003). Note also that are other costs of taxation, notably the efficiency costs of taxation. Both compliance costs and efficiency costs are discussed later.

to USD 300.0 million) depending on how the construction costs are financed.[8] However, after the initial construction costs are incurred, I find that the *annual* administrative costs of a PIT fall significantly to about KWD 50 million (or about USD 164 million), regardless of specific financing methods, and then rise at an annual rate of less than 6 percent per year, to reach KWD 82.0 million (or USD 270.6 million) by year 2020, driven mainly by labor force growth. I also estimate that the likely revenues of a new PIT far exceed these administrative costs, even if the PIT is imposed at low rates.

INSTITUTIONAL BACKGROUND[9]

Kuwait is a high-income country with the world's sixth largest oil reserves. It is one of the largest exporters of oil products, with estimated reserves of about 102 billion barrels (U.S. Energy Information Administration, 2016). Crude petroleum, natural gas, and other oil-related activities account for the majority of gross domestic product, export revenues, and government revenues. Other than petroleum and gas reserves, Kuwait has very few natural resources. Adjacency to the Persian Gulf has led to minor development of a shrimp and fish industry. Due to limited natural freshwater resources and virtually no arable land, any other form of agricultural production is impossible (U.S. Central Intelligence Agency, 2012).

In 2010, Kuwait had a GDP of 35,633.7 million Kuwaiti dinars (KWD) (or USD 117,591.2); GDP per capita was KWD 10,225 (or USD 33,743), making Kuwait one of the highest income countries in the world. The extraction of crude petroleum and natural gas accounted for 51.5 percent of total GDP. Other economic activities comprising a significant part of GDP included manufacturing (5.3 percent), financial services (14.9 percent), transport, storage and communications (8.8 percent), and public and social services (15.6 percent). Kuwait's exports were valued at KWD 14.9 million in 2010, 90 percent of which came from petroleum. Imports totaled KWD 5.7 million, consisting primarily of intermediate and consumption goods. The largest imports were food and beverages, industrial and construction supplies, clothing and other manufactured goods, and vehicles and parts.

Government revenues for the 2009 to 2010 period totaled KWD 17,687.0 million (or USD 58,367.1), at almost 50 percent of GDP. Nearly 94 percent of these revenues came from oil receipts, which are collected through the fully government-owned Kuwait Petroleum Corporation (KPC). The KPC and its subsidiaries control virtually any oil or natural gas-related activity in the country, ranging from resource extraction to marketing refined products to foreign buyers. Additional revenue was generated by custom duties and fees, electricity and water services, and transport and communication services. Total government expenditures of KWD 11,250.0 million (or USD 37,125.0) included salaries, purchase of goods and services, construction projects, and other unclassified transferable payments.

The mid-year population of Kuwait for 2010 was 3,484,900, of which nearly 70 percent were immigrants. The primary sources of immigrants are India, Egypt, Sri Lanka, Bangladesh, Syria,

[8] The Kuwaiti dinar (KWD) is among the highest valued currency units in the world. The exchange rate between the KWD and the U.S. dollar (USD) is currently 1 KWD = 3.3 USD, and has been at about this level since 2010.
[9] Unless otherwise indicated, all statistical information comes from various annual publications of the Kuwait Central Statistical Bureau.

Iran, and Pakistan. From 2000 to 2010, the average annual population growth rate was about 2.8 percent. The increase in total population over this period was due primarily to increasing growth rates of the non-Kuwaiti population. The growth of the Kuwaiti population has been relatively stable.

The supply of labor is largely dependent upon the inflow of foreign workers. In 2010 there were over 1.7 million non-Kuwaitis, age 15 and older, in the labor force, compared to about 338,000 Kuwaitis. On average, Kuwaiti workers have much higher levels of education than foreign workers. The 2010 Census reported that over half of foreign workers were either illiterate or only able to read and write. Non-Kuwaiti workers are concentrated almost entirely in the private sector, primarily in construction, retail, and service occupations, and a significant number work as domestic servants for private households. The vast majority of Kuwaiti workers have completed secondary school at the least. Just as foreign workers work almost entirely in the private sector, Kuwaiti workers dominate the public sector. Public sector employment is much more appealing due to higher wages, fewer work hours, and generous benefits and pensions. For over a decade, the government has passed measures, such as job training and subsidized benefits, to encourage Kuwaiti employment in the private sector.

METHODOLOGY

There is to my knowledge no systematic empirical research on calculating the costs of establishing an entirely new tax administration. These costs can be usefully classified into one-time capital costs required to construct a new tax administration facility and that are part of the start-up phase, annual ongoing administrative staff salary costs of operation, and annual ongoing maintenance and capital costs that are associated with the new facility.[10] The one-time capital costs are mainly the construction costs of a new tax administration facility; the annual ongoing staff costs of operation are mainly salaries for the PIT staff; and the ongoing capital costs are associated with depreciation expenses and salary costs of maintenance staff. Following standard terminology, I refer to these three components of costs as the total "administrative costs" of taxation. Even so, I use two scenarios to estimate the total administrative costs, in which the construction costs of a new building are fully paid in the initial year of construction ("Full Payment") and in which the construction costs are financed by borrowing ("Borrowing"). I present the results for each scenario separately.

I make several assumptions in my estimation methodology. First, I use the characteristics of tax administrations from 27 Organisation of Economic Co-Operation and Development (OECD) and 15 non-OECD countries as baselines for determining the staffing requirements of a new tax administration in Kuwait, using information largely from the OECD (2015), with wage costs estimated using data from the International Labor Organization (ILO) and the Kuwait Central Statistical Bureau. Second, I use construction cost estimates from the International Facility Management Association (IFMA), again supplemented with the relevant wage information. Third, these construction cost estimates also allow me to estimate ongoing depreciation expenses, and I supplement these depreciation expenses with IFMA estimates for maintenance staff requirements (together with wage information) to estimate ongoing maintenance staff costs.

[10] Note that the one-time capital costs have been called "commencement costs", while the ongoing costs are sometimes referred to as "recurrent costs". See Sandford, Godwin, and Hardwick (1989) for discussion.

Finally, I total all costs to generate my estimates of the costs of a new tax administration, again distinguishing these estimates by the method of financing the construction costs. I also estimate these costs over a 10-year time horizon, using estimated rates of labor force growth as drivers of the costs.

Consider each of the main cost components, and the ways in which I operationalize the estimates.

One-time Construction Costs

I estimate the construction costs of a new facility by first estimating the total number of square feet necessary for the staff size and then applying region-specific construction costs. The U.S. General Services Administration (GSA) asked the U.S. Office of Real Property Management Performance Measurement Division to conduct a survey in order to estimate a benchmark for optimal workplace size and utilization (U.S. Office of Real Property Management Performance Measurement Division, 2011). Data on workspace use and size was collected from numerous public and private organizations, and then disseminated to identify standards for specific types on the basis of USF and RSF measurements for a domestic public organization. I estimate construction costs using *Spon's Middle East Construction Costs Handbook*, as compiled by Franklin (2005), which provides approximate estimates for the construction of different types of facilities by unit of area. Note that these estimates include base, preliminary, overhead, and general costs, and do not reflect any unpredicted costs, availability of resources, or professional fees.

More precisely, the benchmark for a domestic government organization from the GSA analysis is 190 "usable square feet" (USF) or 218 "rentable square feet" (RSF) per employee. Typical workspace allocations for different administrative positions are shown in Table 1. An administrative staff of 3027 therefore requires 575,130 USF or 659,886 RSF of workspace. I use the RSF figure in the estimates.

Table 1: Workspace Allocation for Domestic Government Institution, by Staff Position

Position	**Usable Square Feet (USF)**	**Configuration**
Executive	400	Private office
Director	300	Private office
Manager	200	Private office
Supervisor	120	Private office
Technical	120	Private office
Support Staff	80	Cubicle
Clerical	48	Cubicle

Source: Office of Real Property Management Performance Measurement Division (2011).

Again using estimates from *Spon's Middle East Construction Costs Handbook*, the cost per square foot for office facilities is KWD 70.42, so my estimate for the construction costs of a new building with 659,886 RSF is KWD 46.5 million.

I consider two alternative scenarios for these construction costs. In one scenario, I assume that the government pays all construction costs in the initial period. In a second and perhaps more realistic

scenario, I assume that the government borrows to finance the construction costs, at an annual cost of 5 percent.

Annual Ongoing Administrative Staff Salary Costs

Table 2: Number of Registered PIT Taxpayers Per Administrative Staff for OECD and Non-OECD countries, 2010

Country	Citizens (millions)	Labor Force (millions)	Registered PIT Payers (millions)	Total Staffing (millions)	Registered PIT Payers/Staff
Australia	21.96	11.5	20.63	21,910	941.6
Austria	8.36	4.28	6.30	7,761	811.8
Belgium	10.79	4.80	6.80	14,931	455.4
Canada	33.74	18.43	30.00	39,757	754.6
Chile	16.76	7.45	7.72	3,995	1932.4
Czech Republic	10.51	5.29	3.90	15,533	251.1
Denmark	5.52	2.92	4.60	7,680	599.0
Estonia	1.34	0.69	0.75	878	854.2
Finland	5.34	2.70	5.20	5,595	929.4
France	62.63	28.51	36.40	72,814	499.9
Germany	81.90	41.70	26.80	112,291	238.7
Hungary	10.02	4.20	4.69	15,182	308.9
Iceland	0.32	0.18	0.26	97	2680.4
Ireland	4.46	2.20	3.10	6,105	507.8
Israel	7.23	3.02	0.62	5,618	110.4
Italy	59.75	24.97	41.80	33,584	1244.6
Japan	127.51	66.17	23.69	56,216	421.4
Korea	48.75	24.39	5.23	19,779	264.4
Mexico	107.55	45.40	23.60	26,129	903.2
Netherlands	16.45	8.78	8.64	30,707	281.4
New Zealand	4.32	2.32	5.72	6,038	947.3
Norway	4.83	2.59	4.40	6,434	683.9
Poland	38.15	17.28	17.42	60,401	288.4
Portugal	10.64	5.58	7.00	11,055	633.2
Slovak Republic	5.42	2.69	2.56	5,686	450.2
Slovenia	2.04	0.95	1.02	2,470	413.0
Spain	45.93	23.04	19.46	27,755	701.1
Sweden	9.30	4.91	7.40	10,419	710.2
Turkey	71.90	71.90	23.81	41,341	575.9
United Kingdom	60.93	31.24	31.30	70,700	442.7
United States	307.01	155.54	258.20	92,577	2789.0
Argentina	40.13	16.40	0.93	23,206	40.1
Bulgaria	7.57	3.20	0.64	7,976	80.2
Cyprus	0.80	0.40	0.29	855	339.2
India	1,199.06	467.00	32.65	42,108	775.4
Indonesia	231.55	113.30	12.70	31,825	399.1
Latvia	2.26	1.19	0.88	4,300	204.7
Malaysia	27.76	11.38	8.86	9,942	891.2
Malta	0.42	0.18	0.26	396	656.6
Romania	21.47	9.33	6.10	25,387	240.3
Singapore	5.01	3.03	1.62	1,712	946.3
South Africa	49.32	17.38	5.54	14,751	375.6
Average					**680.3**

Source: OECD (2015).

I estimate the number of staff required to administer a new PIT by using comparative data from existing revenue bodies in OECD and non-OECD countries, as estimated by the OECD (2015). See Table 2. Using staffing and taxpayer information for OECD and non-OECD countries, I estimate that the average number of registered personal income taxpayers per tax administration staff member is 680.3, with substantial variation across countries. Table 2 shows population and tax administration characteristics for the 42 countries. For each country, I calculate the number of registered PIT payers per administrative staff member, and this average ranges between 40 and 2800. I assume that the potential PIT tax base of Kuwait is the total number of employed workers, which is about 2.1 million people. The most similar countries in the sample, in terms of the number of registered PIT taxpayers, are Slovenia (1.02 million), Singapore (1.62 million), Slovak Republic (2.56 million), and Ireland (3.1 million). The proportion of PIT payers per staff member ranges from 413 in Slovenia to 946 in Singapore, leading to the conclusion that similarities in population do little to indicate what would be the most appropriate staffing size. Therefore, I use the overall average across all 42 countries, or 680.3 registered PIT taxpayers per staff, as a baseline. For the 2.1 million potential taxpayers in Kuwait, the administrative staff would require about 3027 employees.

I then estimate the annual salary costs for the administrative staff by differentiating staff members by function and vocation using cross-country comparisons, and then applying region-specific wage rates. Across the 42 comparison countries, staff is divided into five broad categories: audit (32 percent), client account management (30 percent), debt collection (10 percent), corporate management (15 percent), and all other functions (12 percent). Account management refers to all activities required to maintain a taxpayer's account, such as registration, filing, data entry, and tax withholding; corporate management deals with all overhead costs, including information technology.

I obtain regional wage and salary rates from the International Labor Organization (ILO) (2012) and the Kuwait Central Statistical Bureau.[11] The OECD benchmark of 32 percent auditors implies the tax administration would need to hire at least 982 accountants, each with annual earnings of about KWD 11,050. I assume that client account management and debt collection require only clerical staff, that corporate management requires central government executive officials, and that all other functions are performed by information technology (IT) specialists. This implies the hiring of 1227 office clerks each earning KWD 5931 annually, 364 IT specialists each earning KWD 15,925 annually, and 454 executives each earning KWD 14,056 annually. The total annual administrative salary costs are KWD 30.3 million. A breakdown of administrative salary costs is shown in Table 3. According to recent OECD (2015) estimates, aggregate salary costs, on average, account for 70 percent of all administrative costs. Therefore, total annual administrative costs should be about KWD 43.3 million.

[11] See also International Labor Organization (2016).

Table 3: Annual Administrative Salary Costs by Occupation

Occupation	Number of Employees	Individual Annual Wage or Salary (KWD)	Aggregate Annual Wage or Salary (KWD millions)
Accountants	982	11,050	10.851
Office Clerks	1,227	5,931	7.277
IT Specialists	364	15,925	5.797
Executive officials	454	14,056	6.381
Total	3,027	46,962	30,307

Source: International Labor Organization (2012).

Annual Ongoing Maintenance Costs: Salary and Depreciation

The International Facility Management Association (IFMA) (2008, 2016) benchmark for the size of facility maintenance staff is one full-time employee for every 47,000 RSF. Therefore, a facility of the estimated size needs at least 14 full-time maintenance employees. The maintenance staff would be required to fulfill a number of responsibilities, such as routine repairs and janitorial work, each requiring different skills. I assume that 3 electricians, 3 plumbers, 3 repairmen, and 3 cleaners will be hired, each earning annual salaries of KWD 4712.5, KWD 2437.5, KWD 2892.5, and KWD 1706.3, respectively. Maintenance staff therefore costs KWD 11,748.8 annually.

As for capital depreciation costs, I estimate these using a depreciation rate of 2.5 percent per year, based on the assumption of straight-line depreciation and a tax life of 39 years.

Growth over Time

I simulate changes in the costs over a ten-year period. I use IMF data from 2004 to 2009 to find an average annual employment growth rate for domestic and foreign workers in the years past 2010. The average rate of growth of the labor force between 2004 and 2009 was 4 percent, and Kuwaiti and non-Kuwaiti employment grew at respective rates of about 3 percent and 5 percent. These growth rates are assumed to remain constant, and are then used to project employment levels up to 2020. The changes in employment are in turn used to determine the yearly change in the size of the PIT administrative staff, the associated salary costs, and total administrative salary costs; the change in size of the administrative staff is also used to estimate how many additional square feet of office space would be needed, which necessitates additional construction costs, additional maintenance staff costs, and additional depreciation expenses. In all cases, I assume that the labor force growth rates remain at 3 percent and 5 percent over the 10-year period and that regional salary rates and construction costs also remain constant over this time. All values are expressed in constant 2010 KWD.

RESULTS

Recall that I use two scenarios to estimate the total administrative costs, in which the construction costs of a new building are fully paid in the initial year of construction ("Full Payment") and in which the construction costs are financed by borrowing ("Borrowing"). I present the results for each scenario separately.

Scenario 1 (Full Payment)

The total administrative costs of a new PIT are estimated in 2010 at **KWD 90.9 million** (or USD 300.0 million). These costs are broken down as follows.

With an initial administrative staff of 3027 employees, the first-year salary costs are KWD 30.3 million, which translate to total first-year administrative staff salary costs of KWD 43.3 million on the assumption that the OECD average of 70 percent for administrative salary costs to total administrative costs holds. A new facility of 660,000 rentable square feet costs KWD 46.5 million to build. This facility also requires KWD 11.7 thousand in first-year salaries for the full-time maintenance employees, and KWD 1.2 million in depreciation expenses.

Therefore, total *first-year* (or 2010) administrative costs are **KWD 90.9 million** (or USD 300.0 million). See Table 4.

Table 4: Scenario 1 (Full Costs) – Annual Costs of PIT Tax Administration, 2010 to 2020 (KWD thousands)

Year	Administrative Staff Salaries	Construction Costs	Maintenance Staff Salaries	Depreciation Expenses	Total Costs
2010	43,295	46,467	12	1,162	90,935
2011	45,927	2,409	13	1,222	49,571
2012	48,699	2,537	13	1,225	52,474
2013	51,617	2,671	14	1,228	55,531
2014	54,690	2,813	15	1,232	58,750
2015	57,927	2,962	16	1,236	62,141
2016	61,335	3,120	17	1,240	65,711
2017	64,924	3,285	18	1,244	69,471
2018	68,705	3,460	18	1,248	73,431
2019	72,686	3,644	19	1,253	77,602
2020	76,880	3,838	20	1,258	81,996

Source: Calculations by author.

Given the huge initial capital construction expenses of KWD 46.5 million, this total *first-year* administrative cost figure considerably overestimates the *annual*, or ongoing, administrative costs of a new PIT administration. The growth of these costs over a 10-year period is more representative of these annual costs, and these are also shown in Table 4 along with Figure 1. Once the initial construction costs are paid, the *annual* salary costs of administrative staff and maintenance staff, along with annual depreciation expenses and additional construction costs required by a growing administrative staff, is only **KWD 49.6 million** (or USD 163.7 million) in 2011. This annual administrative cost estimate grows accordingly over time, reaching **KWD 82.0 million** (or USD 270.6 million) in 2020.

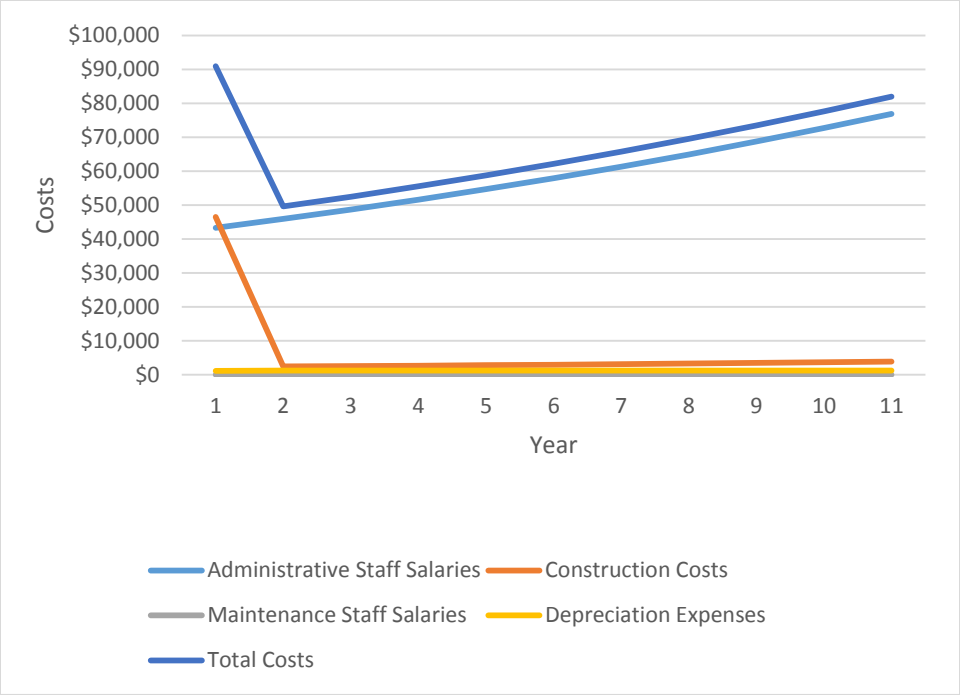

Figure 1: Scenario 1 (Full Costs) – Projected Changes in Costs, 2010 to 2020 (KWD thousands)
Source: Calculations by author.

Scenario 2 (Borrowing)
The main difference between Scenarios 1 and 2 is in the initial 2010 costs. With borrowing rather than full payment of construction costs, the 2010 borrowing costs are KWD 2.3 million. The other cost components are the same as in Scenario 1, so the total *first-year* administrative costs now become **KWD 46.8 million** (or USD 154.4 million). After 2010, the total costs in the two scenarios are very similar. See Table 5 and Figure 2.

Table 5: Scenario 2 (Borrowing) – Annual Costs of PIT Tax Administration, 2010 to 2020 (KWD thousands)

Year	Administrative Staff Salaries	Borrowing Costs	Maintenance Staff Salaries	Depreciation Expenses	Total Costs
2010	43,295	2,323	12	1,162	46,792
2011	45,927	2,444	13	1,222	49,605
2012	48,699	2,571	13	1,225	52,508
2013	51,617	2,704	14	1,228	55,564
2014	54,690	2,845	15	1,232	58,782
2015	57,927	2,993	16	1,236	62,171
2016	61,335	3,149	17	1,240	65,740
2017	64,924	3,313	18	1,244	69,499
2018	68,705	3,486	18	1,248	73,457
2019	72,686	3,668	19	1,253	77,627
2020	76,880	3,860	20	1,258	82,018

Source: Calculations by author.

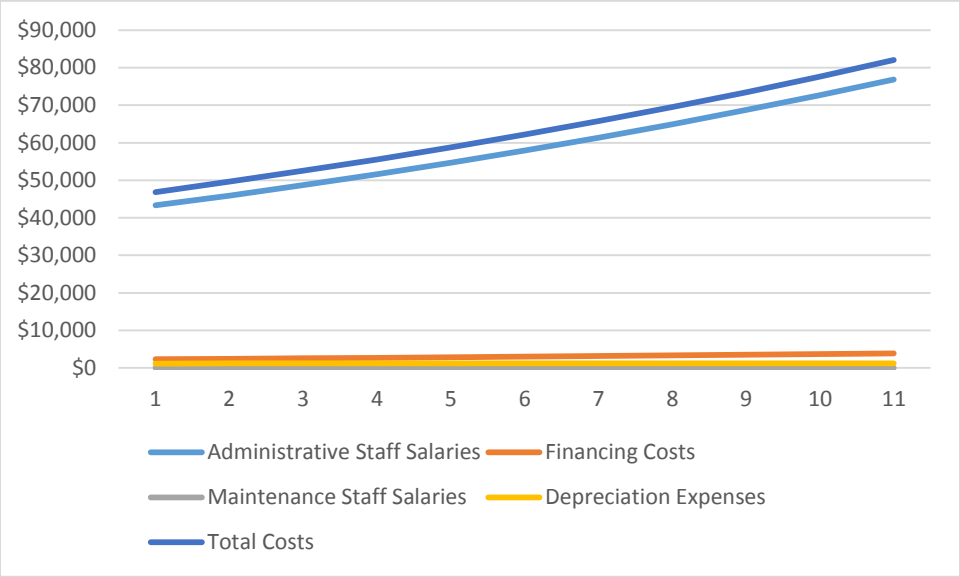

Figure 2: Scenario 2 (Borrowing) – Projected Changes in Costs, 2010 to 2020 (KWD thousands)

DISCUSSION

These estimates indicate that the initial *first-year* administrative costs of new PIT tax administration in Kuwait range from KWD 46.8 million to KWD 90.9 million (or from USD 154.4 million to USD 300.0 million), depending on how the construction costs are financed. However, after the initial construction costs are incurred, the *annual* administrative costs of a PIT fall significantly to about KWD 50 million (or about USD 164 million), regardless of specific financing methods, and then rise at an annual rate of less than 6 percent per year, driven mainly by labor force growth.

These estimated administrative costs are clearly a principal component of the relevant economic costs of a new tax administration, but they ignore some additional cost – and benefit – considerations that are relevant to a new tax administration.

Quantifying Some Benefits of Taxation

The benefits of a new PIT are of several types. One benefit is the reduction in the variability and uncertainty of a tax system heavily reliant on a single source of revenues. Further, with a progressive rate structure, a PIT is income elastic, so that its revenues grow over time relative to income. A PIT can also be used to redistribute income in ways consistent with societal preferences. Of perhaps most importance, these benefits include the revenues that a PIT would generate.

The revenues depend on the specific features of a PIT. Purely for illustrative purposes, I specify a particular tax rate and tax base structure, and I then use the most recently available economic information to estimate these revenues.[12]

Specifically, I assume that a flat rate tax of 5 percent is enacted. Given the absence of detailed individual information, I assume that there are no personal exemptions, deductions, or exclusions. I include only employed persons in the tax base. I estimate average annual income using the Kuwait 2014 Annual Statistical Abstract and the Kuwait 2013 Household Income and Expenditure Survey published by the Central Statistical Bureau of Kuwait, in which all income information is differentiated by nationality. I assume that income subject to taxation is the sum of gross current income, gross current transfers, and non-periodic revenue, and I estimate the annual tax liability for an average Kuwaiti and non-Kuwaiti worker using a 5 percent flat rate tax applied to income.[13] I assume that foreign and domestic workers are treated exactly the same, so that all annual income earned in Kuwait is taxes at the same rate regardless of nationality. Finally, I assume full compliance with the PIT.

I then multiply the average individual liabilities by the total number of Kuwaiti and non-Kuwaiti workers to calculate the potential PIT revenues. I also simulate the growth of these PIT revenues over time, using the same assumptions as in the cost simulations, where all KWD units are converted to constant 2010 KWD. Note that is straightforward to estimate the impact of, say, a 10 percent (or a 1 percent) flat rate PIT simply by multiplying the estimates of a 5 percent flat rate PIT by 1 (or by 1/5). Note also that it is straightforward to estimate the impact of a less-than-full compliance rate.

The revenue estimates are presented in Table 6. These estimates indicate that the revenues from a 5 percent PIT far exceed even the first-year costs of the PIT. I estimate the revenues of a PIT would be **KWD 858.4 million** (or USD 2.8 billion) in 2010, relative to the higher of the estimated 2010 administrative costs of KWD 90.9 million (or USD 300.0). Both costs and revenues increase over time, but the increase in PIT revenues far exceeds the increase in costs. By 2020, estimated revenues are **KWD 1.4 billion** (USD 4.6 billion), while estimated costs are KWD 82.0 (USD 270.6 million). Even a much lower 1 percent flat rate PIT would generate in 2020 revenues (KWD 293.4 million, USD 968.2 million)) far in excess of costs (KWD 82.0, USD 270.6 million). Note that these estimates say nothing about the incidence of the PIT, although it seems likely that the burden will fall largely on the individual worker, at least if the worker is Kuwaiti.

[12] Note that the Kuwait Ministry of Finance issued a draft PIT law in 2005, with a progressive rate structure of: 2.5 percent for KD 1 to KD 10,000; 5 percent for KD 10,000 to KD 50,000; 10 percent for KD 50,000 to KD 250,000; 15 percent for KD 250,000 to KD 1,000,000; and 20 percent for greater than KD 1,000,000. This PIT law was never enacted.

[13] Gross current income includes net income from wages or salary, business activities, financial assets, and non-financial assets. Gross current transfers consist of any transfers from the government or elsewhere.

Table 6: Projected PIT Revenues with a 5 Percent Flat Rate Tax (KWD thousands)

Year	PIT Revenues
2010	858, 399
2011	900,917
2012	945,612
2013	992,599
2014	1,041,999
2015	1,093,939
2016	1,148,553
2017	1,205,981
2018	1,266,372
2019	1,329,882
2020	1,396,676

Source: Calculations by author.

Quantifying Some Other Costs of Taxation: Compliance Costs and Efficiency Costs

There are also additional aspects of the costs of a new tax administration. One added cost is the "compliance cost" of taxation, or the costs incurred by taxpayers in complying (or in not complying) with their tax obligations. There is now a large and growing literature that attempts to estimate these costs using a variety of methods, generally distinguishing compliance costs by type of taxpayer (e.g., individual versus business, small business versus large business, and the like) and by type of tax (e.g., personal income tax, corporate income tax, value added tax, and the like), and also distinguishing between the compliance costs to the taxpayer versus the compliance costs to society. According to a recent survey by Evans and Tran-Nam (2014), this research concludes (among other things) that tax compliance costs are significant and high, ranging from 2 percent to 10 percent of revenues and from 2 to 6 times administrative costs, depending on the specific features of the tax.[14] These compliance costs will depend closely upon how the tax is designed. For example, if a self-assessment system is utilized, then individual taxpayers will bear much of the costs of the system. Similarly, if the system is badly designed with high levels of uncertainty, then compliance costs may be higher than otherwise.

Even so, the compliance costs of a new PIT seem likely to lie at the lower end of these estimates, in large part because the new PIT is likely to rely heavily on employer withholding of taxes. For example, Evans and Tran-Nam (2014) estimate that the "Taxpayer Compliance Costs" (TCC) of a pay-as-you-earn (PAYE) income tax are significantly lower than the compliance costs of other taxes (e.g., capital gains tax, value-added tax, goods and services tax, fringe benefits tax, wholesale sales tax, business income tax, prescribed payment system, and the like), roughly 2 percent of tax revenues.[15]

Using this estimate of the compliance costs together with the estimated revenues of a PIT, a PIT that generated KWD 858.4 million in 2010 revenues would also create compliance costs of **KWD 17.2 million** (= 0.02 X KWD 858.4 million), or USD 56.7 million similarly, the MEB costs would rise in 2020 to **KWD 27.9 million** (= 0.02 X KWD 1,396.7 million), or USD 92.2. These

[14] Also, see Evans (2001, 2003) for useful surveys of this work.
[15] For more detailed estimates, see also Tran-Nam, Evans, Ritchie, and Walpole (2000).

compliance costs are significant if relatively small. Of course, a PIT that required individuals to calculate and file individual tax returns would impose higher compliance costs, likely by a magnitude of 2 to 3 times these estimates (Tran-Nam, Evans, Ritchie, and Walpole, 2000).

Another added cost of taxation is the distorting effects of a new PIT, although these efficiency costs may be offset by a decline in the efficiency costs of the current system of oil-based revenues. These distorting effects are best measured by the "marginal excess burden" (MEB) of a tax, defined as the additional efficiency cost of a tax that is created in raising an additional dollar (or other unit) of revenues. To my knowledge, there are no estimates of the MEB of a PIT in Kuwait, for obvious reasons. However, one can get an approximate magnitude by looking at estimates of the MEB of a PIT and of other taxes in other countries. For example, in a classic study Ballard, Shoven, and Whalley (1985) use a computable general equilibrium model to estimate the MEBs of the major U.S. taxes. Their calculations indicate that the MEB of a PIT ranges from 0.163 to 0.314, depending upon labor supply and savings elasticities, which suggest that each $1 of revenues from the PIT generates efficiency losses of about 16 to 31 cents. They also calculate that the MEB of specific excise taxes is generally quite low, in the range of 3 cents to 12 cents for each additional dollar of excise tax revenues, while the MEB of a general consumption tax is very high, in the 26 to 39 cents range.

As a rough and illustrative estimate of these efficiency costs, consider the higher MEB estimate of a PIT from Ballard, Shoven, and Whalley (1985), or 0.314, together with the estimated revenues of a PIT. A PIT that generated KWD 858.4 million in 2010 revenues would then create large and significant MEB costs of **KWD 269.5 million** (= 0.314 X KWD 858.4 million), or USD 889.4 million; similarly, the MEB costs would rise in 2020 to **KWD 438.6 million** (= 0.314 X KWD 1,396.7 million), or USD 1, 447.4 million. Even so, however, the estimates of Ballard, Shoven, and Whalley (1985) also suggest that the MEB costs of a new PIT may well be more-or-less offset by a reduction in the MEB costs from a reduction in oil-based revenues that would be allowed by the new PIT, depending on the specifics of the oil tax reduction. Other estimates of the MEB of taxation generate broadly similar results (Browning, 1987; Dahlby, 2008).

CONCLUSIONS

Overall, these many estimates indicate that the overall costs of a new PIT in Kuwait, even including compliance costs and efficiency costs, are likely to be far outweighed by the additional revenues of the tax. Of course, several considerations suggest caution in the use of all of these estimates. On the revenue estimates, reciprocal tax agreements that exempted foreign workers would reduce significantly these revenue estimates. Indeed, according to the Kuwait Ministry of Finance (2010), Kuwait has certified double taxation agreements with 47 countries. Further, the lack of detailed statistics on personal income in Kuwait may lead to the underestimation of the size of the tax base and potential revenues. Revenues from the PIT are calculated using only average annual income levels for domestic and foreign workers. This sample excludes all persons earning taxable income exclusively from sources other than employment, such as financial activities or real estate. Domestic and guest workers are treated equally in the estimates, but the potential for foreign labor supply to fluctuate each year could cause the size of the tax base also to vary from year to year.

Indeed, there is some evidence to suggest that a new PIT might affect the inflow of labor (Harrison, 2010).[16]

The administrative cost estimates should also be used with caution. These cost estimates are heavily reliant on the OECD characteristics used to determine PIT staffing needs. In particular, the number of PIT taxpayers per staff member is a very general assumption, and the reasons for variations in staffing are numerous and seldom observable. Factors ranging from population density to educational attainment to the political regime can affect the way tax systems look. The cost estimates are also heavily reliant on wage estimates that may not reflect current labor market conditions. Finally, the composition of the administrative staff by occupation cannot be accurately predicted because hiring decisions will be made on an individual basis and at the discretion of the employer, and the estimates of workspace allocation are also based upon country averages that may not apply to Kuwait. Even so, I have examined the robustness of the administrative costs estimates to variations in the major staffing assumptions, and I do not find significant effects on the estimates. Also, the compliance cost and efficiency cost estimates are based on restrictive assumptions that may not fully apply to Kuwait.

Finally, it may well be that there are alternative taxes that are less administratively costly and more revenue productive. Although almost no Kuwaiti workers are illiterate, over half of the guest workers are illiterate. When taxpayers are unable to read or write, the administrative costs of collecting income tax information are greater (Riezman and Slemrod, 1987). Also, other taxes may have lower administrative costs. For example, Kenny and Winer (2006) model the gravitation of countries towards that the types of taxes that will incur the lowest administrative costs. They find that countries that specialize in international trade will tend to use trade taxes, and countries with high population will tend to use property taxes. They also find that countries that rely heavily on oil production are more likely to rely on non-tax revenues sources, a result entirely consistent with current GCC country practices.[17]

Indeed, there are concerns that developing – or developed – countries may find it increasingly difficult to impose a broad-based global PIT, given such considerations as factor mobility, transfer pricing, and offshore financial centers, all of which are related to the broad notion of globalization and most of which reduce the ability of a taxes imposed on income to generate revenues (Alm and Wallace, 2006). These forces suggest that a more scheduler income tax, such as the one I consider here, may be a more appropriate strategy. However, moving toward any PIT, even one based on a scheduler system of wage taxation, at a time when these globalization forces are increasing may well be a risky fiscal strategy.

Despite these cautionary notes, I believe that my methodology uses plausible, realistic, and indeed conservative assumptions, along with the most reliable data available. The resulting estimates provide consistent evidence that the likely revenues from a PIT in Kuwait far exceed the initial

[16] For example, in 1988 foreign workers and investors in Saudi Arabia threatened to exit the country in response to an income tax proposal in Saudi Arabia. Proponents of the policy believed that implementing the tax would set a precedent that the other GCC countries would be inclined to follow. However, the proposal was eventually dropped. When the proposal was revived in 2002, it generated the same vehement opposition, leading the Saudi government to the official conclusion that it was unfair to tax any guest worker.

[17] See also Gordon and Li (2009).

and ongoing costs of the tax administration, even when compliance costs and efficiency costs are considered. It is now up the Kuwait government, as well as the governments of other GCC countries, to consider diversifying their tax systems.

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DO FIRMS REMIT AT LEAST 85% OF TAX EVERYWHERE? NEW EVIDENCE FROM INDIA

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Abstract:

In this note, we present new evidence about firm tax remittance in India, and discuss the remarkable similarity and prominence in the role of businesses in tax remittance in very different tax systems – India, the United States and the United Kingdom. Previous studies of developed countries have concluded that firms remit the great majority of taxes: 83 percent of taxes in the U.S., and 87 percent of taxes in the U.K. A recent OECD working paper estimates the share for a sample of 24 OECD countries, and finds an unweighted average of 89.7 percent. The proximity of these estimates suggests an emerging "rule of 85," but notably absent is any evidence for developing countries, where the tax structure and administrative capacity varies substantially from developed countries. We find, somewhat remarkably, that in India firms remit about the same fraction of total revenue as in the U.S., U.K., and other OECD countries--87 percent of the total tax revenue collected by the central and state governments. This is true even though the composition of tax revenue in India is very different from that of the U.S., U.K., and throughout the OECD.

1. INTRODUCTION

Richard Bird stated, "The key to effective taxation is information, and the key to information in the modern economy is the corporation […]" (Bird, 2002). Firms, not just those that are incorporated, are not only directly taxed (e.g., through corporate tax), they also act as withholding agent (e.g., for salary income of employees) and remitters (e.g., for sales and excise taxes). As a result, firms remit far more in taxes than their actual tax liability. In this note, we present new evidence about firm remittance in India, and discuss the remarkable similarity and prominence in the role of businesses in tax remittance in three very different tax systems – India, the United States and the United Kingdom.

Note that our discussion uses the word *remittance* with a distinct meaning, the deposit of tax with the government. This is distinct from who the statute says the tax is "on", and distinct from who bears the burden of a tax. In the case of a retail sales tax, for example, even though the retail firm remits the tax, it is generally assumed that much of the economic incidence falls on the consumer. In the case of a labor income tax, the tax is "on" the employee's income but the bulk of the tax

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may be remitted by employers because of withholding requirements. In this note, we focus only on tax remittance by firms, not the incidence of taxation.

Previous studies of developed countries have concluded that firms remit the great majority of taxes: 83 percent of taxes in the United States, and 87 percent of taxes in the United Kingdom. A recent OECD working paper estimates the share for a sample of 24 OECD countries, and finds an unweighted average of 89.7 percent (Milanez, 2017). The proximity of these estimates suggests an emerging "rule of 85," but notably absent is any evidence for developing countries, where the tax structure and administrative capacity varies substantially from developed countries.

In this paper, we present the first such estimate for a developing country, India. We find, somewhat remarkably, that in India firms remit about the same fraction of total revenue as in the United States and United Kingdom--87 percent of the total tax revenue collected by the central and state governments. This is true even though the composition of tax revenue in India is very different from that of the United States and the United Kingdom.

Who remits matters. Under conditions of complete observability of characteristics that determine tax liability, the identity of the remitter is irrelevant for the revenue, efficiency, or economic incidence of a tax. However, given key aspects of real tax systems – particularly evasion and non-trivial administrative and compliance costs, this irrelevance breaks down (Slemrod, 2008). In the case of personal income tax, for example, withholding by the employer or the originator of dividends and interest payments, has at least two advantages. It reduces administrative and compliance costs. Instead of relying on each individual employee to correctly and truthfully estimate and remit their tax liability, a human resources department can take advantage of the economies of scale from applying the same knowledge to multiple identical employees. Second, it provides a third-party check on reported tax liability. Evasion in the personal income tax subject to withholding would require collusion between the employee and the employer, which is more costly than misreporting in the absence other sources of verifiable information.

In sum, because most economic activity flows through businesses, firms play a key role in improving the efficiency of tax collection by reducing administrative and compliance costs, and gathering verifiable information.

2. REMITTANCE BY FIRMS IN DEVELOPED COUNTRIES

Christensen, Cline and Neubig (2001) and Shaw, Slemrod and Whiting (2010) follow similar methodology to estimate the proportion of total tax remitted by businesses in the United States and United Kingdom, respectively. Both studies classify the self-employed as a non-business and focus on remittance as opposed to statutory tax liability. Christensen, Cline and Neubig (2001) focus on the role of corporations in tax collection as opposed to non-corporate businesses like (pass-through) Subchapter S corporations or partnerships. The two studies first estimate the proportion of tax remitted by business in individual tax categories used by each country – personal income tax, property tax, sales tax and so on. Then the proportion of total tax remitted by businesses is a weighted average of the fraction remitted by firms in each tax category, weighted by the contribution of each tax category to total tax collection.

Categories where the tax is imposed directly on the business (e.g., corporate taxes) or that are remitted through withholding by firms, like PAYE in the United Kingdom, or through taxes such VAT that are not designated as taxes "on" business but must be remitted by businesses are classified as 100 percent remitted by firms. Others where the firm is clearly not the remitter, such as income taxes remitted through "self-assessment" by the individual or self-employed, are classified as wholly unremitted by businesses.

Some cases are more ambiguous. In the United Kingdom, for example, one ambiguous category is that of "other receipts" under income tax, which is comprised of three sub-categories: a tax deduction scheme for interest income, other "tax deducted at source" and a catch-all "others" category. In the first two subcategories, Shaw, Slemrod and Whiting (2010) claim that the withholder is the business in most cases. They assume that taxes in the "others" sub-category is wholly remitted by individuals. Weighting by the relative revenue importance of each of the sub-categories, Shaw, Slemrod and Whiting (2010) estimate that businesses remit 58 percent of taxes under the "other receipts" category. Through similar calculations, they estimate that about 97 percent of national insurance contributions come from businesses, and that businesses remit 20 percent of Vehicle Excise Duty (VED).

In the United States, Christensen, Cline and Neubig (2001) estimate that payroll taxes, property taxes and personal income taxes are at least partially remitted by firms. 95 percent of payroll taxes and 80 percent of personal income taxes are remitted by businesses, while about 42 percent of property tax is remitted by firms.

The recent study by the OECD uses data from the OECD Revenue Statistics database, which collects information in standardized revenue categories for their sample. This data is supplemented with information from surveys sent to the member countries, which further broke down revenue from certain ambiguous tax categories into the portion remitted by business. Unlike the earlier studies it includes the self-employed as a "business." Furthermore, unlike the earlier studies and our own analysis of India, where there is no reliable data on the identity of the remitter the OECD study leaves some portions of tax revenue as "unallocable" as either remitted by business or by individuals.

The OECD study also makes the distinction between the share of taxes that are both remitted by business and are the legal liability of businesses, and the share that is remitted by business but where the legal liability falls on others. To compare to our estimates, as well as those of the earlier studies of the United States and the United Kingdom, we take the sum of these two business-remitted categories. As a share of the allocable tax collection, the unweighted 24-country average of firm-remitted taxes is 89.7 percent, ranging from as low as 67.5 percent in Luxembourg[3] to as high as 98.5 percent in Chile. The United Kingdom comes in at 90.8 percent, and the United States at 97.3 percent. To calculate lower and upper bounds to these ratios, we can assign the entire unallocable portion to non-businesses or to businesses. This generates an unweighted average of between 78.8 percent and 91.1 percent.

[3] France also has a lower than average share of firm remitted taxes (about 85 percent of total allocable tax collection). It is also the only one of the 24 countries in the OECD sample without withholding by employers on personal income tax. However, France was about to introduce withholding on income tax in 2018 but has postponed by a year to 2019, which will likely raise the share of tax remitted by firms substantially.

3. FIRM REMITTANCE IN INDIA

We present the first estimate of firms' role in tax remittance for a developing country, taking a similar approach to that of Christensen, Cline and Neubig (2001) and Shaw, Slemrod and Whiting (2010) in Table 1. Firms remit a surprisingly similar proportion of total tax collection – about 87 percent – in India. As did the earlier studies (but not the OECD study), we exclude self-employed professionals from the definition of a firm.[4] Where the extent of firm remittance is uncertain, we make the most conservative assumption about the share remitted by firms.

We compile data on tax collected by the Central and State government revenue bodies between fiscal years 1998-2014, separately for each tax instrument. For each of these tax instruments, we estimate the proportion of total revenue that is remitted by firms. Some taxes like the corporate tax, VAT, excise and customs are fully remitted by firms. Others are fully remitted by individuals - like the "professions tax." Tax instruments such as the personal income tax and service tax are remitted by both firms and individuals, in varying proportions. For these instruments, we estimate the proportion remitted by businesses using available information on tax collection by type of taxpayer. The details of this estimation are provided in the data appendix.

Some smaller categories, such as stamp duties, are partially remitted by firms, but the proportion of firm remittance is apparently very small and is difficult to pin down, that we classify them as being remitted fully by individuals.

The distinction between a self-employed individual and a "firm" can be difficult to pin down. For example, a sole proprietor who is registered for VAT is treated as a "firm" whereas a consultant who is registered under the service tax is treated as an individual. This blurred line is especially relevant in India, where sole proprietorships and small firms are more prevalent than in OECD countries. We try as best we can, given the limitations of data, to decide which side of the ledger to place these small firms based on why it matters – the extent to which the entity can act as an information aggregator or provide a third-party check. For this reason, VAT-registered sole proprietors are treated as "firms" while service-tax-registered professionals are not.

[4] In the case of the VAT, excise, and customs, we cannot distinguish sole proprietors, so implicitly VAT remittances of these taxes by sole proprietorships are considered to be made by firms.

Table 1: The Role of Firms in Tax Remittance in India, Fiscal Year 2014-15

Central Government Taxes	**Receipts (₹ mn)**	**Share of Total Revenue**	**Proportion Remitted by Business**
Corporate Tax	4,289,250	20.80	1.00
Personal Income Tax	2,583,260	12.53	0.60
Other Direct Taxes	11,030	0.05	0.00
Customs	1,880,160	9.12	1.00
Central Excise	1,881,280	9.12	1.00
Service Tax	1,679,690	8.15	0.70
Other Indirect Taxes	124,190	0.60	1.00
State Government Taxes			
Taxes on Income	*53,879.8*	*0.26*	*0.00*
Agricultural Income Tax	1,614	0.01	0.00
Taxes on Professions, Trades, Callings & Employment	52,265.8	0.25	0.00
Taxes on Property and Capital Transactions	*1,005,292.5*	*4.88*	*0.00*
Land Revenue	103,396.3	0.50	0.00
Stamps and Registration Fees	889,728	4.32	0.00
Urban Immovable Property Tax	12,168.3	0.06	0.00
Taxes on Commodities and Services	*7109526.8*	*34.48*	*1.00*
Sales Tax	5,218,532.8	25.31	1.00
State Excise	941,601.2	4.57	1.00
Taxes on Vehicles	410,292	1.99	1.00
Taxes on Goods and Passengers	203,657	0.99	1.00
Taxes and Duties on Electricity	266,125.3	1.29	1.00
Entertainment Tax	21,559.3	0.10	1.00
Other Taxes and Duties	47,759.2	0.23	1.00
Total	**20,617,559.1**	**100**	**87.35**

Note: $1 ≈ ₹65 and £1 ≈ ₹81. We make the conservative assumption that stamp duties and property taxes are fully remitted by individuals and that self-employed individuals, professionals are not "firms". Source: Author's calculations based on data from Economic and Political Weekly Research Foundation (EPWRF) India time series, http://www.epwrfits.in/index.aspx

Figure 1 shows that the proportion of total tax collection remitted by firms in India has shown a moderate but steady decline from 91 percent in 1998 to about 87 percent in 2014. This is largely because of the rising relative importance of personal income tax and service tax, which feature mixed firm remittance, and the relative decline in customs and excise tax collection, which have complete firm remittance. Personal income tax rose from 9 to 13 percent of total tax collection and service tax rose from close to zero percent to 8 percent of total tax collection between 1998 and 2014. Over the same time period, customs and excise duty declined dramatically from 44 to 18 percent of total tax collection, as India lowered tariffs to liberalize trade.

Figure 1:

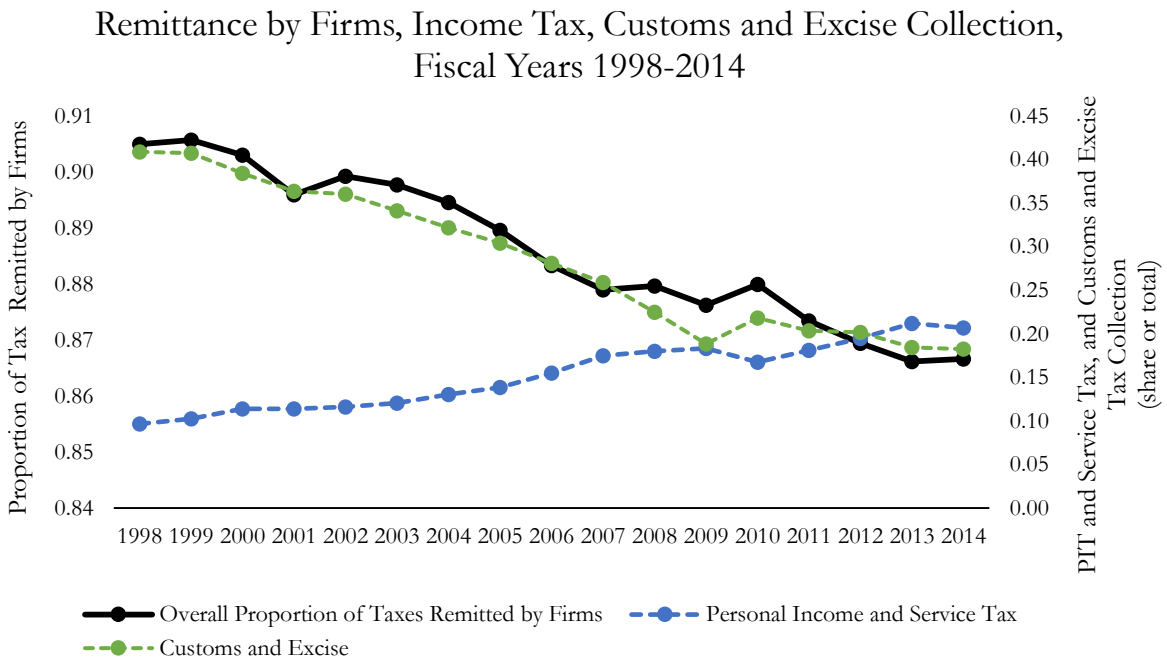
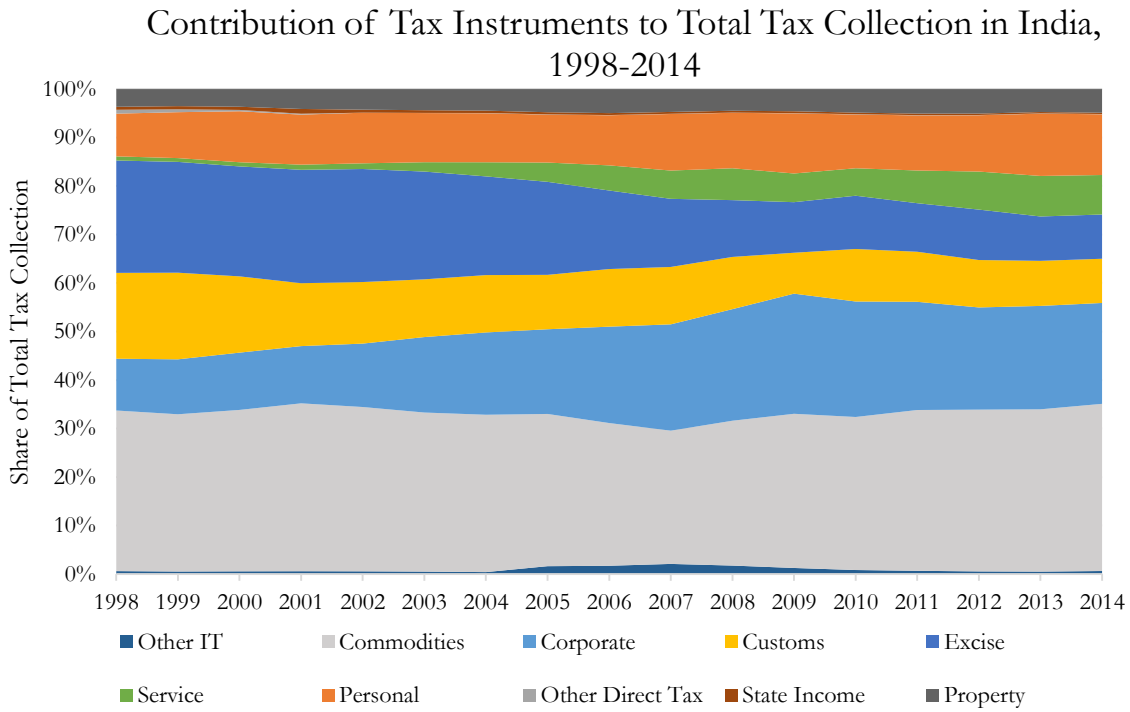


Figure 2 shows the contribution of the various types of tax instruments to total tax collection in India. The five categories starting from the bottom (up to and including the large deep blue shaded area) are wholly remitted by firms. The share of revenue from these categories steadily declines from 1998 to 2014, as customs and excise contribute a smaller share to overall tax collection. The green region represents service tax collection and the orange represents personal income tax collection, which are only partially remitted by firms. These two categories contribute an increasing share of total tax revenue mainly due to the rising importance of service tax. Service tax collection has increased from 1 to 10 percent of total tax collection over the same period, while personal income tax collection has remained unchanged at about 12 percent of total revenue. Over this time period, the service tax base was expanded to cover almost 200 services from the initial three that were covered. Taxes on property, state taxes on income and other direct taxes levied by the national government-- remitted entirely by individuals--have remained an approximately constant proportion of total tax collection over the entire period. Taxes on commodities, entirely remitted by firms as well, have also stayed steady as a constant proportion of total tax collection. Corporate taxes increased as a proportion of total tax collection from about 10 percent in 1998 to 20 percent in 2014.

Figure 2:



In sum, the small decrease in the share of total tax collection remitted by firms comes from the substantial decline in the contribution of customs and excise taxes and the relative increase in the contribution of the service tax, which is only partially remitted by businesses.

4. SO DIFFERENT, AND YET THE SAME

Some readers will undoubtedly be struck by the fact that the extent of firm tax remittance is about the same in India as it is the United Kingdom and United States, in spite of the vast differences in the economic environment and other aspects of the tax system. In this section we inquire further into this phenomenon. Because we consider the self-employed as non-business remitters and attempt to divide all tax revenue into the portion remitted by business and others, our estimates are more comparable to that of Cline, Christensen, Neubig (2001) and Shaw, Slemrod, Whiting (2010) than to the OECD.

One striking contrast between the United States and United Kingdom on the one hand and India on the other hand, shown in Table 2, is the difference between the proportions of personal income tax remitted by firms. Firms in the United Kingdom and United States remit over 80 percent of personal income tax, while firms in India remit only 60 percent of personal income tax.[5]

[5] This is estimated as the proportion of income tax remitted by non-corporate taxpayers as "tax deducted at source," i.e. tax withholding. This is a conservative estimate because non-corporate taxpayers can also include partnerships, which remit tax directly (not through withholding). However, we do not have an estimate of tax deducted at source for non-corporate, non-partnership taxpayers.

Table 2: A Comparison of the Role of Firms in Tax Revenue Collection in the United States, United Kingdom and India

	Proportion Remitted by Business			Share of Country's Total Tax Revenue		
Tax	US	UK	India	US	UK	India
Personal Income Taxes	0.80	0.82	0.60	41.64	30.28	12.53
Capital Gains Tax	*	0.00	*	*	0.78	*
Corporate Income Tax	1.00	1.00	1.00	8.84	9.12	20.80
Payroll Taxes/ National Insurance	0.95	0.97	n.a.	24.53	17.96	0.00
Property Taxes	0.42	0.49	0.00	9.34	8.89	0.56
Stamp Duties	n.a.	1.00	0.00	0.00	2.76	4.32
Sales Taxes/ VAT	1.00	1.00	1.00	8.23	15.92	25.31
Excise Taxes	1.00	n.a.	1.00	6.05	0.00	13.69
Service Tax	n.a.	n.a.	0.70	0.00	0.00	8.15
Estate Taxes	0.00	0.00	0.00	1.42	0.73	n.e.g.
Other Taxes	n.a.	0.94	0.98	0.00	14.33	14.64
Indirect	n.a.	0.94	1.00	0.00	14.33	14.33
Customs	n.a.	*	1.00	#	*	9.12
Tax on Vehicles	n.a.	0.20	1.00	0.00	1.05	1.99
Petroleum Tax	n.a.	1.00	n.a.	0.00	0.44	0.00
Other	n.a.	1.00	1.00	0.00	12.84	3.22
Direct	n.a.	n.a.	0.00	0.00	0.00	0.31
Total Taxes	**83.74**	**87.74**	**87.35**	**100.0**	**100.00**	**100.00**

*: Indicates categories that are included in the aggregate but for which disaggregated amounts are not known. Capital Gains Tax collection is included under personal income tax collection reported for the U.S., Customs is included under "indirect tax" for the U.K.
#: The United States collects some customs but Christensen, Cline and Neubig (2001) do not provide information on this category.
U.S. figures are from Christensen, Cline, Neubig (2001), U.K. figures are from Shaw, Slemrod, Whiting (2008). Indian estimates are for tax revenue in the year 2014-15. $1 ≈ ₹ 65 and £ 1 ≈ ₹ 81.

However, in India personal income taxes are a much smaller proportion of total tax collection. Personal income tax is about 12 percent of total tax collection in India in 2012, but 40 percent in the United States and 30 percent in the United Kingdom. While firms in India remit a lower proportion of income tax collection, Indian tax revenue also relies less on personal income tax revenue.

On the other hand, taxes on commodities are much more important in India, a tax category where firms remit nearly all the revenue. State VAT, excise and other forms of taxation on commodities and services represent about 33 percent of total tax collection in India in 2014, while central taxes on commodities (customs and excise) are about 20 percent of total tax collection. Together, these forms of commodity taxes account for over half of Indian tax revenue. In contrast, sales tax and VAT are just 8 percent of total tax collection in the United States and 15 percent in the United Kingdom.

Is the similarity in the aggregate firm remittance ratio a coincidence, or is there something more fundamental involved? These differences could be partially driven by the difference in amenability to firm remittance. Gordon and Li (2009), for example, suggest that the ease of enforcement and reliance on the formal financial sector can explain many features of developing country tax systems. Tax systems rely more heavily on revenue from instruments that are easier to enforce. As the amenability of firm remittance increases, tax revenue from that instrument is higher because enforcement is relatively less costly.

One reason for the increase in revenue is that remittance by businesses increases the likelihood of truthful reporting. Take for example, the stark contrast in evasion on self-employed income (64 percent) and income from salaried employees (1 percent) in the United States. As the proportion of salaried employees increases, compliance is higher and therefore we would expect tax revenue from personal income tax to be higher.

Increased amenability to remittance by firms also increases revenue from that tax instrument through a second channel. Tax authorities broaden the base and increase the tax rate as well once a tax becomes easier to enforce. Dusek and Bagchi (2016) exploit the staggered introduction of withholding in personal income tax by U.S. states to find that introduction of withholding led to an immediate and permanent increase in tax collection by about 24 percent. Because of this increase in tax collection efficiency, state governments also raised the importance of the income tax as a tool for tax collection. The share of income tax in total tax collection increased by 19 percent.[6] Jensen (2016) shows how the rise in personal income tax collection has tracked the growth in salaried employees across countries and over time. He shows how government policies designed to increase the share of employees has a causal impact on state income tax collection. Besley and Persson (2014) also show suggestive evidence that increases in the size of government (tax to GDP ratio) occurred at the same time as the introduction of income tax withholding and is correlated with improvements in financial markets and formalization. Improvements in amenability to remittance by firms not only raises the reliance on certain tax instruments, but raises overall tax collection as well.

These findings are consistent with the patterns we observe in the tax systems of the three countries. Amenability to firm remittance is much lower in the personal income tax in India than in the United States or United Kingdom. On the other hand, withholding is in some respects more expansive in India than in the United States. Rules for "tax deducted at source" requires withholding not only on salary but also on interest income, dividends, payments to contractors, life insurance payouts, rent, payment for professional services, and a few other payments. Even so, salary income – an

[6] This is despite their finding that an increased demand for government revenue motivated the introduction in withholding, which also drove the increase in corporate and sales tax rates at the same time. The authors suggest that this points to an increase in reliance on the gains in efficiency in income tax collection.

important source of income that is subject to withholding - comprises about half of total reported gross income compared to 70 percent of total adjusted gross income in the United States.[7,8] Accordingly, the statutory income tax base in India is more limited than in the United States and United Kingdom; it excludes all agricultural income and has a high exemption threshold at the top decile of the income distribution (Jensen, 2016). Income tax rates are also lower in India. The highest marginal tax rate is 30 percent in India compared to 39.6 percent in the United States and 45 percent in the United Kingdom.

5. FIRMS IN INDIA VERSUS THE UNITED STATES AND UNITED KINGDOM

Of course, even though firms play a similar role in all three countries, India has a much lower tax-to-GDP ratio. Are firms more efficient intermediaries in the United States and the United Kingdom than in India?

Two things distinguish firms in India relative to the typical developed country – the predominance of cash transactions and the extent of many small informal firms. Most employment in manufacturing in India is in firms with less than 10 workers (Hsieh and Klenow, 2014). The advantages to firm remittance through information aggregation and reduction in administrative and compliance costs are therefore more limited in India.

Transactions in cash are widespread, which limits the paper trail and other information useful to tax authorities. It has been estimated that 87 percent of all consumer transactions in India take place in cash.[9] Low level of digitization of returns and lack of coordination between multiple tax authorities also limit the potential of information generated by businesses. For instance, if the customs authority does not share information with a state VAT department, the paper trail generated by a sale by an importer cannot be used as third-party verification of reported costs. Not only is amenability to firm remittance lower in India for taxes like the personal income tax, firm remittance also does not provide the same level of information and compliance advantages as in the United States and the United Kingdom.

6. THE OTHER 15 %

Given the substantial advantages of firm remittance, it is perhaps surprising that governments collect 15 percent of their revenue directly from individuals. The tax categories that rely on individual remittance share a common feature – the tax base is highly observable or to some extent self-enforcing. A large portion of the revenue in this 15 percent category comes from taxes on immovable property. Another large category is stamp duties, which are taxes on various transactions and legal documents. A large portion of stamp duty revenue comes from duties on

[7] https://www.irs.gov/uac/soi-tax-stats-individual-statistical-tables-by-filing-status, Table 1.3 for 2014.

[8] The threshold for income tax is set quite high at ₹0.25 million (approx. $3870) today (₹0.2 million ($3094) in 2013-14). There are only about 71 million individuals of working age who are regular wage/salaried workers in non-agricultural industries, earning an average of about ₹0.1 million ($1547) a year, out of a labor force of about 400 million.

[9] http://fletcher.tufts.edu/~/media/Fletcher/Microsites/Cost%20of%20Cash/IBGC%20WP13-01%20Cash%20Outlook%20India.pdf.

sales, particularly of property. Non-payment of these stamp duties would hinder an individual's ability to enforce their property rights.

CONCLUSION

We are not ready to declare a "rule" of (at least) 85% for firm remittance. After all, in a graph of the fraction of taxes remitted against real GDP per capita, we really now have just two distinct points, one for India and one cluster for most of the OECD countries. An infinite number of polynomials fit these two points and, even if we restrict ourselves to second-order polynomials, we cannot rule out either a U-shaped or inversed-U-shaped relationship. Of course, the relationship could be more complex than this.

More data points for the developing world are needed. The calculation of the fraction of taxes remitted by firms is not conceptually complex. For example, it does not require one to classify taxes into ultimately somewhat arbitrary categories, such as consumption versus income, business versus non-business, direct versus indirect. Nor are the data requirements particularly onerous. Once we have more data points, we can begin to understand the relationship of the firm remittance ratio not only to the level of per capita real income, but also to other country and tax-system characteristics such as sectoral composition.

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DATA APPENDIX

I. Estimate of Income Tax Remitted by Firms

Compliance Audit Reports (various years) by the Comptroller and Auditor General of India present personal income tax collections from non-corporate taxpayers by mode of payment, that is, whether it was remitted directly as part of self-assessment, advance tax collection or tax deducted at source (TDS). The only mode remitted by firms unless the taxpayer is a firm themselves is TDS. Under the TDS rules, certain entities – mostly firms - are required to act as withholding agents for personal income tax. The proportion of income tax collected under TDS from non-corporate taxpayers has averaged around 60 percent between 1998 and 2014.

The category of non-corporate taxpayers also includes partnership firms. Ideally, we would want to know the proportion of income tax collected through TDS from non-corporate, non-partnership taxpayers. Because this figure is unavailable, 60 percent is actually a lower bound on personal income tax remitted by firms.

We estimated the share of personal income tax remitted by businesses as the share of revenue coming from "Tax Deducted at Source."[1] This includes income tax withheld by employers as well as tax on interest income, capital gains or dividends that are withheld and remitted by firms. In 2011-2012, approximately 59 percent of personal income tax was collected as tax deducted at source.

II. Estimate of Service Tax Remitted by Firms

Service tax can be remitted by firms and individual taxpayers. However, the breakdown of service tax collection by type of taxpayer is not publicly available to the best of our knowledge. To estimate the proportion of service tax remitted by firms, we make use of the fact that individuals are only required to remit the tax quarterly, but firms are required to remit monthly. Figure 3 plots in blue monthly service tax collections between fiscal years 2010 and 2015. In the month following the end of each quarter (July, October and January), there is a spike in service tax collection. There is also a significant spike in March but we exclude March, which we discuss later.

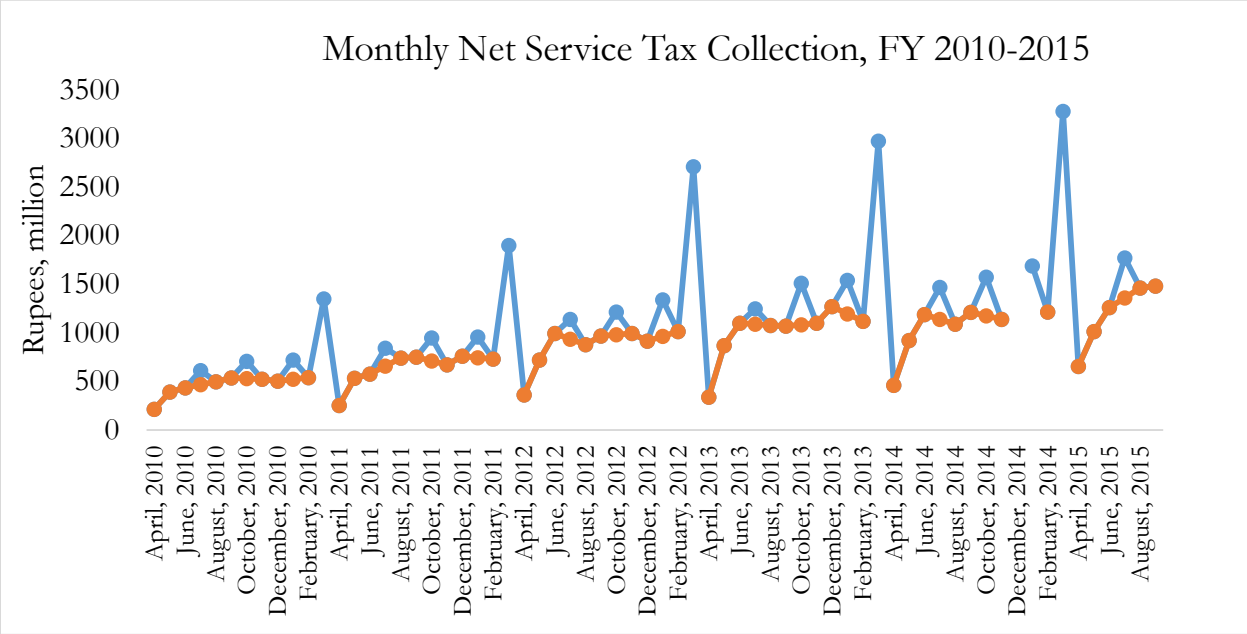
The spike in the months of July, October and January is plausibly due to individuals making their quarterly payments. Assuming that the payments we see in all other months (aside from March and April) are from firms, we impute the collection from firms in July, October and January as the average of collection in the two adjacent months. That is, we impute collection from firms in July 2010 as the average of collection in June 2010 and August 2010. The orange line in Figure 3 shows the collection from firms with these imputed figures for the quarter-end months.

The collection from individuals is estimated as the difference between actual collection in the quarter-end months and the imputed collection. The estimated collection from individuals is remarkably stable at about 30 percent of actual collection in these months. We therefore make the assumption that firms remit 70 percent of service tax collected. Because the service tax comprises only about 8 percent of total revenues, some divergence from an imputed firm remittance share would not have large effects on the overall estimate of the firm remittance ratio.

[1] Table 1.6, Report of the Comptroller and Auditor General of India.

March is the last month in the last quarter of the financial year. The largest spike occurs in this month and is plausibly because payments for annual contracts might be received in this month. This could be true for firms and individuals. If firms are more likely to remit most of their tax owed at the end of the financial year (which is a more relevant concept for firms rather than individuals), then our assumption of 70 percent remitted by firms would be an underestimate.

Figure 3:



Source: Author's calculations based on data from Principal Chief Controller of Accounts, http://pccacbec.nic.in/, accessed 2/25/2017

III. Union Excise

The union excise tax, also known as the central excise tax, is levied on the value of production. It is collected at factory gate for manufacturing firms only. Therefore we assume that the union excise tax is fully remitted by firms.

IV. State Taxes on Income – Agricultural Income and Professions Tax

We treat self-employed professionals", which forms the bulk of tax collected in this category, as "individuals" rather than "firms.

V. Taxes on Property and Capital Transactions

Most of the revenue in this category comes from stamp duty. We have the breakdown of stamp duty revenue by source (type of document/transaction) in one state – Andhra Pradesh from 2010 to 2015. We use the patterns in this state as a proxy for all other states. The data reveals that 88 percent of stamp duty revenue comes from sale of property. Other major categories are gifts and mortgages. It is impossible to distinguish whether these property transactions are made by individuals or firms and therefore we assume that these taxes are entirely remitted by individuals. These comprise only 4.32 percent of total revenues in 2014-15.

PRACTICAL VALUATION OF RISK TRANSFER IN ADVANCE PRICING AGREEMENTS[1]

Zvika Afik[2] and Yaron Lahav[3]

Abstract

A recently published paper argues that Advance Pricing Agreements adopting the Comparable Profits Method or the Transactional Net Margin Method, overlook the risk transferred from the tested party (subsidiary) to the party related to the transaction (parent) - a shift caused by fixing the profitability of the tested party. In this paper, we propose a practical implementation methodology to estimate the model parameters and discuss the theoretical and practical reasons for our proposed method. Finally, we also provide numerical examples demonstrating the miss-allocation of profits and taxes. According to our examples, fixing the profitability level of a manufacturer equals a shift of 0.5% of its profitability, while fixing the profitability of a management entity means a shift of 0.85% of its profitability. These amounts can be significant on aggregate levels.

JEL classifications: G38, K29, K34, M42

Keywords: Transfer Pricing, Advance Pricing Agreement, Risk Valuation, Multinational Enterprise, Intercompany Transaction.

1. INTRODUCTION

An advance Pricing Agreement (APA) is a long-term agreement signed between at least one tax authority and a Multinational Enterprise (MNE) according to which, both sides agree on the future pricing of a cross-border intercompany transaction for a specified number of years. As long as the MNE prices its related transactions according to the APA, the tax authority agrees to accept this price as the arm's length price for the duration of the APA.

The pricing of intercompany transactions (sometimes referred to as "related transactions" or "internal transactions") is called "Transfer Pricing" (or "TP"). While determining its value for internal reasons, TP influences the profitability of the parties to the transaction. When both related parties reside in different tax jurisdictions, it can affect tax revenues. For this reason, TP regulations around the world require cross-border intercompany transactions to be priced at arm's length (as if the transaction was between two unrelated parties).

Naturally, any cross-border transaction involves at least two tax authorities. Therefore, it is possible that when setting a transfer price, while the MNE is in compliance with TP regulations in one jurisdiction, it is not in compliance in other jurisdictions. In such case, the MNE may elect to sign a unilateral APA (UAPA) with one tax authority, a bilateral APA (BAPA) with

[1] We wish to thank Reuven Avi-Yonah, Kimberly Clausing and Michael Durst for helpful and invaluable comments. All mistakes – if made – are solely ours.

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two tax authorities, or a multilateral APA (MAPA) with more than two tax authorities for a transaction that is between more than two entities.

TP regulations around the world are similar and based on the arm's length principle, in which related transactions should be priced as if the parties to the transaction are unrelated. Usually, TP documentation compares either prices or profitability. When data is available, the taxpayer can comply with TP regulations by showing that the transfer price is similar to that of comparable transactions made between unrelated parties. Alternatively, if data on prices of similar transactions is not available, the TP documentation would compare the profitability of one entity (the Tested Party) to a range of profitability levels of similar companies that operate in the same industry, engage in the same activities, and bear similar risks.

It is common knowledge among TP practitioners that most related transactions are unique, in the sense that comparable transactions are hard, if not impossible, to find. Examples are the transfer of rights to use certain intellectual property, or the sales of some patented device, or a pharmaceutical formula. Consequently, in most cases of TP documentation, the chosen method for the analysis is based on a comparison of profitability rather than prices. For the same reason, profit-based comparison is also applied in most APAs. While a contemporaneous (annual) TP documentation analyzes transactions that were already made in the past, an APA locks the future profitability level of a chosen tested party for the duration of the agreement.

Afik and Lahav (2014) argue that this practice contradicts the arm's length approach because such fixing of a company profitability level for a number of years is analogous to a free insurance policy that eliminates the risk of incurring a loss. TP regulations require that the comparable companies bear the same risks born by the tested party. When searching for comparable companies, TP analysts cannot find firms that are protected from profitability fluctuation risk because such risk can be avoided only by entities that entered a long term APA. Such firms cannot, of course, be used as comparable companies as a reference for arm's length trades because they are involved in intercompany transactions.

This inconsistency is settled by the model suggested by Afik and Lahav (2014). Building on their work, in this paper we show how to practically apply the model and estimate its parameters. We also provide two numerical examples that demonstrate the practicality, importance, and effect of the model.

Other papers also suggest modifications to APAs. Tomohara (2004) measures efficiency losses and proposes that tax authorities negotiate in order to split tax revenues between jurisdictions. Broomhall (2007) criticizes the dependence on the past performance to determine future prices and suggests a moving average as a measure of profitability. Broomhall also suggests linking performance of the tested party to its parent or to relevant stock indexes. Finally, Felgran et al. (2009) propose that transfer prices for APAs would be adjusted during economic downturns.

The rest of the paper is structured as follows: Section 2 presents transfer pricing regulations and APAs, Section 3 describes the profit fixing valuation model, Section 4 presents the details of the model parameter estimation, Section 5 demonstrates the model application on two examples, and Section 6 discusses the results and concludes.

2. TRANSFER PRICING REGULATIONS AND ADVANCE PRICING AGREEMENTS

TP regulations change from country to country, as each structures its own regulations based on its financial needs and on its political and industrial structures. However, most countries implement either the U.S. regulations as specified in section 1.482 of the U.S. department of treasury regulations ("U.S. Treas. Regs. 482") or the Transfer Pricing Guidelines for Multinational Enterprises and Tax Administration specified by the OECD ("OECD Guidelines").[4] These two sets of regulations specify several methods available to the MNE to document the appropriateness of its transfer prices. Used both in APAs and in contemporaneous documentation, these methods can be divided into two groups: price-related (i.e., the Comparable Uncontrolled Price/Transaction, the Cost Plus and the Resale Price methods) and profit-related (the Comparable Price Method – or CPM – and the Profit Split Method). Since most related transactions involve proprietary products or services, the most common method used is the CPM/TNMM.[5] According to these two methods, at least one side to the transaction (the tested entity) should earn a profitability level[6] that lies within a range corresponding to similar companies that engage in similar activities, operate in similar environment and bear similar risks as the tested entity.

The first official APA was signed in Japan by the Japanese National Tax Association (NTA) in 1985. Soon to follow were the tax authorities of the U.S. (IRS) in 1991, Canada (CRA) in 1994, and Australia (ATO) in 1995.[7] According to annual reports published by the U.S. APA program, the number of APAs in the U.S. is increasing annually. This is not surprising, considering the complexity inherent in navigating cross-border tax issues. Indeed, the main advantage of entering an APA lies in its main objective - to reduce the costs and risks associated with tax compliance[8]. A taxpayer that signs an APA ensures a transfer pricing arrangement accepted by the tax authority (and therefore free from risk of dispute by the tax authority) for several years, as long as the taxpayer follows the requirements laid out in the APA. In addition, the tax authority usually agrees to a 'rollback,' whereby the APA is implemented retroactively for the fiscal years during which the taxpayer negotiated its APA. This is highly advantageous to taxpayers who agree to enter the APA program as a result of an existing audit. In such a case, the tax authority would most likely agree to the taxpayer's request to apply the APA to the audited period. De Waegenaere et al. (2007) show that MNEs are more likely to enter an APA when the tax difference between jurisdictions is relatively high and the amount of tax subject to double taxation is relatively low.

However, this is not the only advantage. It is possible that a taxpayer would be audited by more than one tax authority. In such cases, occasionally what is adequate for one tax authority is

[4] See Internal Revenue Services (2006) and Organisation for Economic Co-operation and Development (2010), respectively.

[5] The CPM is specified in the U.S. Treas. Regs., while the equivalent, almost identical, Transactional Net Margin Method – or TNMM –is specified in the OECD Guidelines.

[6] Transfer pricing regulations specify several profit level indicators (PLIs). The operating margin is the ratio of operating profit to revenues. The Net cost plus ratio is the ratio between operating profit and total cost (cost of goods sold and operating expenses). Return on assets is the ratio of operating profit and total assets. The Berry ratio is the ratio of gross profit and operating expenses. Regulations also allow other unspecified PLIs when appropriate.

[7] See Borkowski (2000, 2008) for historical review of APAs.

[8] This is known among TP practitioners involved with APAs, and insinuated in several papers, e.g. Felgran et al. (2009) and Fan (2008).

insufficient for another. By signing either a BAPA or MAPA, the taxpayer can avoid this problem. Another advantage is that the APA changes the relationship between the tax authority and the taxpayer, who work together during the preparation of the APA. Such collaboration with the tax authority can be highly beneficial to the taxpayer when it is audited by another tax authority. In addition, the taxpayer's risk is further reduced because there is a pre-filing process during which the taxpayer can still opt out without scrutiny by the tax authority.

There are also inherent disadvantages to arranging an APA. First, the process is long and costly. The economic and business analyses are much more rigorous than the average annual documentation, and consequently, they demand more resources such as manpower and the use of proprietary databases. Second, because of this strict analysis, the taxpayer is more exposed to the tax authority, as it reveals more confidential information such as production expenses and the real values of intangible assets, among other closely guarded information. Although the tax authority is obliged under the APA not to use this information in other cases, there is always the fear that it will be used inappropriately by the tax authority in future audits. Additionally, there is always a chance that the tax authority will disagree with the transfer pricing method suggested by the taxpayer. Under these conditions, the taxpayer can always choose to withdraw from the program, but in doing so, it forfeits the money and effort it already invested in the program.

The American and Canadian APA programs issue (separately) annual reports documenting the activity of each program. According to the U.S. annual report of 2015 (issued on March 31, 2016), a total of 2,147 applications have been filed since the program was initiated in 1991, including 183 APA applications filed in 2015. Since 1991, 1,511 APAs were executed, of which 110 were executed during 2015. Of this total, 539 are UAPAs, 958 BAPAs, and 14 MAPAs. On the other hand, 211 applications were either revoked, cancelled or withdrawn since 1991, 10 of them during 2015. The difference between the numbers of submissions and executions indicates how much time it takes, on average, to execute an APA. According to the 2015 report, APA execution takes on average 34 months, while the average duration of an actual APA is about seven years.

According to the U.S. report, 81% of the covered transactions in the APAs executed during 2015 were analyzed using the CPM as the transfer pricing method. Adjusting for the number of APAs executed over the years means that approximately 1,746 entities were given profit guarantees 'for free' for an average duration of approximately six years.

3. A MODEL OF PROFIT MARGIN GUARANTEE

In this section, we briefly describe the model of Afik and Lahav (2014). The model is based on an MNE with a local parent company and a foreign subsidiary. To avoid TP compliance conflicts, the parent agrees to enter into an APA program with the tax authority, and the two sides agree to use the CPM/TNMM as the transfer pricing method and the profit margin (defined as EBITA divided by revenues) as the PLI.

After negotiations, the MNE and the tax authority agree on a profit margin θ^0 that the foreign subsidiary will earn annually in the next T fiscal years. Any deviation from this PLI at a given year t to, say, $\theta_t \neq \theta^0$ will result in a cash transfer between the two related entities to regain θ^0. Fixing the profitability level of the subsidiary, the parent absorbs the operating margin risk originally faced by the subsidiary. This transfer of risk can be considered as a hidden benefit (τ) that should also be priced. Instead of earning θ^0 on each unit of local currency revenues,

the subsidiary should earn $\theta^0 - \tau$, where τ represents the premium (a fraction of each dollar of revenues) that the subsidiary should pay for "insuring" its operating margin.[9] According to the APA:

(1) $$\theta^0 = \frac{R_t - C_t + x_t}{R_t} = \theta_t + \frac{x_t}{R_t}$$

where C_t is the subsidiary's total cost incurred in the tested transaction, R_t is the transfer price, θ_t is the uninsured subsidiary's operating margin and x_t as the amount the parent pays to the subsidiary at the end of year *t* to achieve the fixed profitability level.[10] To be able to fix its operating margin and avoid risk, had it dealt with a third party, the subsidiary would be willing to pay a premium, P_t, and the profit margin of the subsidiary would then be:

(2) $$\hat{\theta} = \frac{R_t - C_t + x_t - P_t}{R_t} = \theta_t + \frac{x_t}{R_t} - \frac{P_t}{R_t} = \theta^0 - \tau$$

Now, each relevant cash flow is discounted with a proper risk-adjusted discount rate. Starting with a single period model, because τ and θ^0 are fixed by definition and θ_t is a stochastic outcome, the present value of the APA cash-flow results in:[11]

(3) $$\frac{\tau}{1+r_f} = \frac{\theta^0}{1+r_f} - \frac{E[\theta_t]}{1+k}$$

where r_f is the risk-free rate, and *k* is the risk-adjusted rate appropriate for the random future profit, and can be estimated by:

(4) $$k = r_f + \beta\left(r_M - r_f\right)$$

where r_M is the market expected return and $\beta = cov(r_M, r_s)/\sigma_M^2$, r_s is the returns on the subsidiary stocks, and σ_M^2 is the variance of the market returns.[12] Rearranging Eq. (3), the premium can be calculated as follows[13]:

(5) $$\tau = \theta^0 - \frac{(\theta^0 - \Delta\theta)(1+r_f)}{1+r_f+\beta(r_M - r_f)}$$

Extending the model to *T* periods, the annual premium in a multi-period model is:

[9] The model assumes that the subsidiary provides a proprietary intermediate good or service and that its sole customer is the parent company.

[10] If the operating margin of the subsidiary is higher than the agreed value, then $x_t < 0$.

[11] Formally both sides of equation (3) are multiplied by one unit of revenues, thus the equation represents an equality of discounted cash-flows and not of rates.

[12] r_s should formally be the relative changes (returns) of the subsidiary's profit over time, for which we believe the best practical proxy is its equity returns. See more details of beta estimation in Section 4.

[13] The model allows the targeted operating margin of the APA to be different than the average historical operating margins of the subsidiary by setting $\theta^0 = E[\theta_t] + \Delta\theta$, where $\Delta\theta$ represents any deviation from the expected value.

(6) $$\tau_t = \theta^0 - (\theta^0 - \Delta\theta)\left[\frac{(1+r_f)}{1+r_f+\beta(r_M-r_f)}\right]^t$$

The term in the brackets of Equation (6) is the market risk factor (*MRF*). We elaborate on this measure and analyze its sensitivity to its components in Appendix A.

Since by definition APAs are long-term agreements, instead of setting a premium τ_t for each period *t*, an equivalent constant premium (ECP) is:

(7) $$\tau_{ECP} = \sum_{t=1}^{T} \frac{\tau_t \cdot R_t}{(1+r_f)^t} \Big/ \sum_{t=1}^{T} \frac{R_t}{(1+r_f)^t}$$

where R_t is the expected revenue of the subsidiary for period *t*.[14] If revenues are expected not to change significantly over time, the ECP becomes:

(8) $$\tau_{ECP} = \frac{r_f}{1-(1+r_f)^{-T}} \sum_{t=1}^{T} \frac{\tau_t}{(1+r_f)^t}$$

4. PARAMETER ESTIMATION

To apply the model presented above, all of its parameters and variables must be estimated and set. As explained above, θ^0 has to conform to a comparable industry benchmark. However, $\Delta\theta$ is somewhat particular to the specific subsidiary, as it is the difference between θ^0 and the expected profit of the firm $E[\theta_t]$. Unless there is a valid argument otherwise, $E[\theta_t]$ can be assumed to be equal to the subsidiary's profitability in recent years. However, when a technological or a market structural change is verifiable and clearly affects $E[\theta_t]$, then an arm's length valuation must deviate from the historical average.

This section discusses the financial variables, namely, β, r_f, and r_M, of Equation (6). The financial literature often treats their estimation as trivial and avoids discussing the ambiguity and uncertainty involved in their practical use. The following discussion, except where specified otherwise, is based on Damodaran (2010).[15]

Choosing $\boldsymbol{r_M}$

The market return affects two variables in Equation (6), the market risk premium ($r_M - r_f$) and β. As additional information is generally not available (and in accordance with the CAPM), r_M is the expected market return. Whether it should be the global wealth return or an alternative return has been discussed at length by the research community. For example, Fama and French (2004) provide a perspective on the CAPM, including prominent examples of its tests over the years. Roll's critique (1977) raise doubts about the testability of the model and about market

[14] To calculate τ_{ECP}, it is sufficient to estimate the rate of annual change in revenues, as long as it can be estimated in advance, at the time of signing the APA.

[15] Damodaran (2010) discusses at length the pros and cons of the selection of each component and its estimation and includes references to prior research and empirical evidence to support the discussion and recommendations. Repeating the details and depth of Damodanran (2010) is obviously beyond the scope of this paper.

proxy efficiency. Bounds on the deviations from exact CAPM pricing were developed based upon the relative efficiency of the proxy (i.e., its distance inside the mean-variance frontier). Examples of this analysis include Shanken (1987) and Kandel and Stambaugh (1987, 1995). Prono (2009) extends this research. Additional research evaluate the definition of the market portfolio. For example, Jagannathan and Wang (1996) investigate a conditional model of the CAPM (as opposed to a static model) and add the effect of human capital to the market portfolio proxy. We adopt the most popular benchmark widely used by practitioners and academics, as explained above. An often accepted proxy for r_M is the return on a large index such as the S&P 500.[16]

While the backwards estimation of beta is based on historically available data, the forward market premium ($r_M - r_f$) remains an unsolved puzzle. Historically, experts of the academic and practitioners' communities have missed in their predictions. The current "common" knowledge is that the premium is around 4.5-6%, yet even this range has no solid scientific basis, and opinions about its validity vary.[17] A proper replacement to the above guesses is a forward-looking implied market premium, such as the one suggested by Damodaran (2011), who estimate a market risk premium of 5.2%.[18]

Estimating β

To estimate beta, the common practice in research, and often the choice of practitioners is to use Equation (4) with an appropriate r_s.[19] When the subsidiary stock is traded (and liquid enough), its returns seem the most suitable proxy for its operating profits for the calculation of beta. When the subsidiary's stock data is not available or is improper, the most suitable proxy is the stock of a comparable firm, whose operating environment and size are similar to those of the subsidiary.
Bloomberg calculates beta using weekly returns of the tested asset and the S&P 500 most recent two years of data (this default can be changed to suit user preference). Bloomberg and other beta providers, such as BARRA, quote an adjusted beta, which is a weighted average of Equation (4) estimate and 1. They justify this adjustment by the expectations that in the long-run, a specific firm beta tends to revert to the market beta which equals 1 by definition.

The estimation of beta is usually very noisy. The standard error is often similar in magnitude to that of the estimated beta itself. In corporate finance and valuation, since the time horizon is often 5-10 years and even longer, the practice is to use five years of monthly data,[20] which is what we recommend for the APA case.

To reduce the noise in beta estimation, as an alternative to using Equation (4) directly, Damodaran (2010) suggests using instead the average beta of related firms (of the same business sector, with similar characteristics). Because typically, the set of comparable

[16] In certain situations (see, for example, Damodaran 2010) a particular market index may be a more appropriate proxy to the market portfolio. However, often such a choice requires additional adjustments to the expected market premium. These cases are beyond the scope of this paper.
[17] A perspective on the diversity of opinions about this matter is available in Fernandez et al. (2011a and 2011b). The first summarizes a survey on the U.S. market premium and the second explores the market premium demanded in 56 countries
[18] Estimates for the implied market risk premium are available at: http://pages.stern.nyu.edu/~adamodar/
[19] See, for example, Bodie, Kane, and Marcus (2009)
[20] See, for example, Fama and French (2004) and Damodaran (2010).

companies is relatively small and in line with common transfer pricing practices, we recommend using the median beta, estimated for the subsidiary proxy firms, from the set that is used to form the benchmark profitability. This practice is a solution to most cases of APAs, where the tested party is not traded and its beta cannot be directly estimated.

Choosing r_f

For estimating the historical beta using Equation (4), we adopt the common default choice of 4- or 13-week U.S. T-bills, that are highly liquid and whose data is easily accessible. For r_f in Equation (6), we match the maturity of the risk-free rate with that of the cash flows, following the suggestion of Damodaran (2010), and use U.S. T-bonds with 5-10 years to maturity. When the S&P 500 (index or sub-index) is not r_M and when the currency is not denominated in U.S. dollars, other risk-free rate benchmarks should be considered.

5. APPLICATION EXAMPLES

To illustrate risk transfer valuation under the presented model, we use the hypothetical example of a U.S. car manufacturer ("US Inc.", or "the parent") that owns several subsidiaries around the world. For two related transactions, US Inc. is interested in entering into an APA with the relevant tax authorities. The first transaction is the purchase of auto parts from US Inc.'s Canadian subsidiary "Canada Inc.", a manufacturer of auto parts ("the auto parts transaction"). The second is the provision of management services by the UK headquarters, "UK PLC", to US Inc. ("the management transaction"). In agreement with the tax authorities, US Inc. uses the CPM in both transactions. Furthermore, the firm agrees that in both transactions, the tested party will be the subsidiary (i.e., Canada Inc. and UK PLC in the auto parts and the management transactions, respectively), and the profit level indicator will be the operating margin. For both APAs, the most recent five years of available financial data is used and the duration of both APAs will be seven years. To ensure availability of financial and other data, and to include some "contraction" years, we use years 2006-2010 for data.

Table 1a: the manufacturing transaction

Annual and multi-annual interquartile ranges and median values of profit margins based on the companies comparable to Canada, Inc. (the first list of Appendix B). Standard deviation is presented in italics.

Fiscal Year	Quartile 1	Median	Quartile 3
2006	2.3%	3.2%	6.3%
2007	0.1%	3.3%	6.7%
2008	-2.2%	3.9%	6.9%
2009	-1.8%	-0.4%	2.2%
2010	2.5%	3.8%	5.6%
2006-2010	-0.3%	2.5%	4.9%
	(2.2%)	*(1.8%)*	*(1.9%)*

Table 1b: the management transaction

Annual and multi-annual interquartile ranges and median values of profit margins, based on companies comparable to UK, PLC (the second list of Appendix B). Standard deviation is presented in italics.

Fiscal Year	Quartile 1	Median	Quartile 3
2006	4.1%	6.0%	9.9%
2007	4.8%	7.6%	12.1%
2008	4.4%	7.6%	12.2%
2009	2.0%	6.1%	7.1%
2010	1.6%	4.2%	6.3%
2006-2010	3.2%	6.3%	7.2%
	(1.5%)	*(1.4%)*	*(2.7%)*

In the search for comparable companies, the parent found six Canadian auto parts manufacturers comparable to Canada Inc. and 22 UK management firms comparable to UK PLC.[21] The lists are presented in Appendix B. Tables 1a and 1b present interquartile ranges and median operating margins for each year for Canada Inc. and for UK PLC, respectively. Beginning with the auto parts transaction, the six companies listed in Appendix B have a median profitability (θ^0) of 2.5% and a median beta of 1.17.[22] The five-year T-bond rate is 0.917%,[23] and the market risk premium is assumed to be 5.2%, as explained above. Hence, for Canada Inc., the *MRF* of the Canadian auto parts manufacturer is 0.9372. Assuming that the expected profit of Canada Inc. resembles the median profitability ($\Delta\theta = 0$), substituting into Equation (6), we calculate the annual premium for the seven-year APA (Table 2).

Table 2: Annual Premiums of seven-year APA examples.

Premiums that should be deducted from the profit margins of Canada, Inc. (Auto parts) and of UK, PLC (Management) each year if it enters into an APA with US Inc. ECP (last column) is the equivalent constant premium for the seven-year APA, assuming constant yearly revenues over the duration of the APA.

t	1	2	3	4	5	6	7	*ECP*
τ_t *(Auto parts)*	0.14%	0.28%	0.40%	0.52%	0.64%	0.74%	0.84%	0.50%
τ_t *(Management)*	0.23%	0.46%	0.67%	0.88%	1.08%	1.27%	1.46%	0.85%

To complete the above example, assuming a constant revenue stream, we use Equation (8) to calculate its flat rate *ECP*, which is 0.50% for Canada Inc. This means that for the purposes of the APA, the actual profit margin of Canada, Inc. ($\hat{\theta}$) should be 2.00% and not 2.50%, an adjustment that increases the profit of the U.S. parent accordingly. In terms of tax revenues, the tax authority of the US parent would collect from it higher revenues, on the expense of the revenues that should have been collected from the subsidiary.

[21] For comparable companies in the auto part transaction, we searched Compustat North America using SIC code 3714 for companies headquartered in Canada. For comparable companies in the management transaction, we searched Compustat Global using SIC codes 874X for companies headquartered in the UK. In both searches, we excluded companies that did not have financial information available for the last five fiscal years or that showed operating losses for more than three years within the last five fiscal years. With regards to the UK management set, we could not find financial information for two companies, therefore we excluded these companies form the final set. See Appendix A for more details.

[22] Alternate Fuel Systems (see Appendix B) was acquired and Linamar Corp's price quotes have only been available since mid-2010, and thus we exclude these companies' beta from our sample.

[23] Late December 2011 (source: Yahoo! Finance).

Similarly, for UK-PLC the median profitability (θ^0) is 6.3% and the median beta is 0.743.[24] The five-year Gilts rate is 1.06%,[25] and the market risk premium is assumed to be 5.2%, as explained above. Hence, for UK-PLC, the *MRF* of the UK management firm is 0.9632. Assuming that the expected profit of UK-PLC resembles the median profitability ($\Delta\theta = 0$), substituting into Equation (6) we find the corresponding annual premiums for the seven-year APA (Table 2). Again, we assume a constant revenue stream and use equation (8) to find the *ECP* (0.85%) for the UK-PLC seven-year APA. This effectively reduces the UK-PLC profit margin from 6.3% to 5.45%, the relevant tax impact of which would be felt by its U.S. parent.

These premia seem significant to us and merit the attention of the regulator, the taxed firms, and their tax consultants.

DISCUSSION AND CONCLUSIONS

We limit our discussion and examples to simple setups to avoid cluttering the exposition with special circumstances and ramifications. However, real cases may not be as simple as the examples above, instead requiring special consideration. In this section, we discuss a few examples showing the potential complexity of APA management.

In the first case, in which the tested party does not reside in a developed market, APA considerations should address issues such as the marginal investor (and the type of portfolio held by the marginal investor). This may lead to beta estimation using a specific market, with country specific risks, where even the relevant local "risk-free" rate of the domestic government bonds may not be risk-free. In such cases adjustments for country risk and currency are required.

The second case is when the guarantor is not a diversified investor, and it is agreed by the firm and the tax authorities that the risky payoffs should be discounted appropriately, accounting for the total risk, including the idiosyncratic risk of the business.[26]

The third case is subtle, as it links the APA with the tested party's capital structure. A firm's beta depends on its leverage, and as such, the financing decisions of the subsidiary affect the premium τ. In our examples, we assumed that the tested party's leverage is similar to that of its peers. When the financial leverage of the tested party diverges from that of its peer group, or when the parent and subsidiary can easily modify the leverage, the capital structure of the tested party should be considered. Therefore, when our model is used, researchers, practitioners, or transfer pricing analysts may suggest relevant adjustments to account for and even to benefit from this issue.

Like any model, especially in economics and finance, it relies on its underlying assumptions and the accuracy of its variables. To avoid trivial and tedious discussion of these sensitivities, we prefer to present a practical numerical example. However, we also provide the mathematical

[24] We deleted Ashley House PLC, Brainjuicer PLC, Hasgrove PLC, Jelf Group PLC, Office2Office PLC, Styles & Wood Group PLC, and Tribal Group PLC due to the short histories of their stock prices and Atkins PLC and Penna Consulting PLC due to questionable liquidity, noticeable by "frozen" prices over periods spanning successive months. For beta estimation, we use the short rate (3 months) UK government bond yield (monthly data from http://www.bankofengland.co.uk) and comparable firm stock and FTSE data from Yahoo! Finance.

[25] Source: http://markets.ft.com/research/Markets/Bonds.

[26] This parallels the cost of equity of a private firm that is owned by an undiversified investor. In such cases the proper beta is the market risk beta divided by the correlation of the sector with the market.

expressions for the sensitivity of the premium τ to its various parameters in Appendix A. While θ^0 is a negotiated variable and based on well-established practices followed by practitioners and accepted by the tax authorities, the estimation of beta is notoriously noisy and thus requires special attention.

For a broad perspective about beta we refer to Damodaran, who collects a wide variety of useful data, process it and posts useful results on his website.[27] Using his extensive beta calculations of 7,480 firms we calculate a large sample mean and its plus/minus one-standard-deviation range of [0.82, 1.45].[28] We use this range to calculate respective ECPs of 0.37% and 0.6% for the auto-part firm and 0.93% and 1.52% for the management firm. Such a simple analysis may provide tax authorities and practitioners with a useful range of ECPs to substantiate their claims and agree on values that are founded on facts despite the noise and uncertainty of the specific parameter values.

This paper sheds light on an economic aspect of APAs which seems to have been ignored by researchers and practitioners until Afik and Lahav (2014). They show that in addition to the high cost of an APA, negotiating profits in advance creates an obscure expenditure to the parent company. Fixing a future profit margin of a subsidiary is an insurance policy whose cost is overlooked. Obviously, such a service that the parent provides its subsidiary for free is not an internal matter of the MNE under the arm's length approach, it has consequences which concern policy makers and regulators. While Afik and Lahav (2014) seem to be the first to raise this issue and to provide an economic model to evaluate the arm's length cost of this insurance to the parent company, the current paper focuses on the practical implementation of the model and its parameters' estimation.

As of this writing, unlike similar intercompany services such as loans and guarantees, the cost of profit level insurance is ignored, meaning that one country is gaining tax revenues at the expense of another. This paper presents a methodology to practically apply Afik and Lahav (2014) model for pricing such a service, adhering to arm's length principles, when profit-based methods are used. However, critics may argue that the pricing of such a service is negligible and therefore not worth the analysis effort. There are three answers to this argument. The first lies in the amounts. We provide two examples that show the opposite. Neglecting the cost of the profit fixing service results in shifts of pretax profit from one country to another of 0.5% and 0.85%. Hence, significant additional tax revenue can potentially be collected from such profit increments. To enforce our point, we cite the research of Clausing and Lahav (2011), who computed the foreign taxable income of 50 'Fortune 100' companies. They found that the aggregate foreign taxable income was approximately $202.6 billion during fiscal year 2007, which means an average foreign taxable income of approximately $4 billion per company. Assuming a premium of 0.5%, the transfer of taxable income was approximately $20.3 million. Assuming an effective tax rate of 35% (if, for instance, the parent resides in the U.S. and the subsidiary is abroad), the additional tax revenue to the IRS would have been approximately $7.1 million per company per year. We are aware that MNEs do not enter into APAs for all of their intercompany transactions, yet APAs will likely involve at least the most important, and therefore larger, transactions, thus resulting in a material tax revenue effect.

[27] http://www.stern.nyu.edu/~adamodar/New_Home_Page/data.html

[28] These values are for levered beta. It is likely that management firms are only slightly levered and thus their betas are lower than this range. The mean of the large sample is 1.134, it is an equally weighted average, unlike the market beta which is a value weighted average.

The second answer is tax uncertainty which MNEs face. In March 2017, the International Monetary Fund (IMF) and the OECD issued a report, addressing the G20 leaders' concerns about tax uncertainty and its impact on cross-border trade and investment (at their September 2016 summit in Hangzhou, China). The IMF/OECD report (OECD and IMF, 2017; henceforth: "the Report") acknowledges the tax uncertainty risk and its negative effect on international trade and investment. The Report suggests four remedies: (i) reducing complexity of legislation; (ii) increasing consistency by tax administrations; (iii) creating effective dispute resolution mechanisms; and (iv) reducing tax uncertainty on the international level. Of all these four ideas, only the last one seems practical, and the first step to reduce tax uncertainty according to the Report is to engage in early resolution procedures such as APAs. The Report therefore acknowledges the role of an APA as a procedure aimed at reducing the risk of uncertainty. In economic theory, this role should be priced.

Finally, of particular interest is economic recession periods. From time to time, economies enter into periods of distress, in which many companies incur losses that may even result in bankruptcy. Some of these companies are potential comparables of tested entities in an APA conducted a few years back. While the arm's length principle dictates that these tested entities would also experience lower profits or even incur losses like their comparables, their APAs protect them from losses and this protection is backed by tax authorities.[29]

The valuation model of Afik and Lahav (2014) and our application methodology rely on financial theory and conventions that are widely used and accepted by academics, investors, accountants, and economic and business consultants around the world. It is straightforward and when needed may be quite easily adapted to fit the specific settings, exhibiting a flexibility that is essential for APAs as these are factual and often depend on the interpretations of the negotiating parties.

This work leaves a few open issues that need further study such as those we list in the beginning of this section. However, we believe that the methodology presented in this paper is appropriate for many intercompany transactions around the world, and we encourage both MNEs, policy makers, regulators, and transfer pricing professionals to implement it to preserve the arm's length approach and to promote the accuracy and reliability of the tax systems.

[29] Interestingly, during contracting years, when filing for an APA, tax authorities may request that the interquartile range of profit level indicators consist of previous rather than recent years, arguing that financial data from the recession years are not representative of long-term profitability.

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APPENDIX A: SENSITIVITY OF THE PREMIUM TO ITS COMPONENTS

To complete the exposition of the model in Equation (6), we now analyze its properties using simple comparative statics. We first define a market risk (adjustment) factor *MRF* as follows:

i. $$MRF = \frac{(1+r_f)}{1+r_f+\beta(r_M-r_f)}$$

Since *MRF* affects the derivatives in Equations (ii) – (vi), it deserves a closer look. The expression in Equation (i) is the risk-free discount factor over the risk adjusted discount factor (appropriate for the expected profits of the subsidiary). Hence, in a world of risk-neutral investors, $MRF = 1$ and $\tau_t = \Delta\theta$. The same result is obtained when $\beta = 0$ (i.e., the profit risk is uncorrelated with the market risk and is therefore perfectly diversifiable by large investors). In this case, it does not warrant a risk premium above the deterministic $\Delta\theta$. The case of $\beta < 0$ is that in which the subsidiary profits hedge the market risk, thereby reducing the risk of the parent (and of an arm's length diversified investor), ultimately lowering the premium. Naturally, we relate to the vastly common cases where $\beta > 0$ resulting in $0 < MRF < 1$.

The following are simple partial derivatives of Equation (6) using *MRF* for convenience. We start with the effect of θ^0 on the premium:

ii. $$\frac{\partial\tau_t}{\partial(\theta^0)} = 1 - MRF^t = 1 - \frac{\partial\tau_t}{\partial(\Delta\theta)}$$

When $MRF = 1$ (i.e., risk-neutral investors or fully diversifiable profit risk), τ does not depend on θ^0. Otherwise, in the common case, τ positively depends on θ^0 because a higher profit margin implies higher expected annual payments on behalf of the parent. This dependence, however, increases as *MRF* decreases.

Since β is a "noisy" estimate statistically, its estimation method deserves special attention.[1] Equation (*iii*) describes the influence of β on the premium – it is positive and diminishing with β. In addition, higher levels of θ^0 also increase the effect of β on the premium for reasons discussed above.

iii. $$\frac{\partial\tau_t}{\partial\beta} = t(\theta^0 - \Delta\theta)\frac{r_M-r_f}{1+r_f}MRF^{t+1}$$

The market premium and β product affects the valuation formulas (5) and (6), and their related sensitivities are similar:

iv. $$\frac{\partial\tau_t}{\partial r_M} = \frac{\partial\tau_t}{\partial\beta}\frac{\beta}{r_M-r_f} = t(\theta^0 - \Delta\theta)\frac{\beta}{1+r_f}MRF^{t+1}$$

[1] See, for example, Damodaran (2010) and our discussion below on parameter estimations and practical implantation matters.

The higher the risk premium $r_M - r_f$ is, the higher the systematic risk to the parent, and therefore, the premium requirement is higher. As expected, this connection is increasing with β and with the target profit margin θ^0. On the other hand, the premium's sensitivity to the risk free rate is negative. This sensitivity is included here for completeness:

v. $$\frac{\partial \tau_t}{\partial r_f} = -(\theta^0 - \Delta\theta)\frac{MRF^t}{1+r_f}[1 + MRF(\beta - 1)]$$

The sensitivity of the premium to the time horizon is described in Equation (*vi*):

vi. $$\frac{\partial \tau_t}{\partial t} = -(\theta^0 - \Delta\theta) \cdot ln(MRF) \cdot MRF^t$$

In normal circumstances, $MRF < 1$ and thus τ increases as t grows. The rate of increase depends on θ^0.

APPENDIX B: LIST OF COMPARABLE COMPANIES

a. Manufacturing (Canada)
1. Alternative Fuel Systems (AFX.V)
2. Automodular Corp (AM.TO)
3. Linamar Corp (LIMAF)
4. Magna International Inc (MGA)
5. Pacific Insight Electronics (PIH.TO)
6. Wescast Industries (WCSTF)

b. Management (UK)
1. Management Consulting Group*
2. Interior Service Group PLC (ISG)
3. Savile Group PLC (SAVG)
4. Serco Group PLC (CRP)
5. Christie Group PLC (CTG)
6. Huntsworth PLC (HNT)
7. Mitie Group PLC (MTO)
8. Mears Group (MER)
9. Penna Consulting PLC (PNA)
10. Atkins PLC (ATK)
11. Parkwood Holdings*
12. Tribal Group PLC (TRB)
13. Mouchel Group PLC (MCHL)
14. Office2Office PLC (OFF)
15. Begbies Traynor Group PLC (BEG)
16. Jelf Group PLC (JLF)
17. Driver Group (DRV)
18. Altitude Group PLC (ALT)
19. Styles & Wood Group PLC (STY)
20. Hasgrove PLC (HGV)
21. Brainjuicer Group PLC (BJU)
22. Ashley House PLC (ASH)

* missing ticker and stock price data. We did not include these companies as comparables.

AN ALTERNATIVE PROPOSAL FOR VAT ON CONSUMPTION IN GREECE

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Abstract

It is well established that a reduction in consumption VAT rates during an economic crisis, followed by the introduction of a single VAT rate rather than multiple rates, may significantly increase tax revenues through improved collectability of VAT due to increased consumption as well as reduction of tax evasion and avoidance. This paper presents the economic impact on the Greek economy of the establishment of a basic VAT rate of 20 per cent for most consumer goods and services, with a reduced VAT rate of 10 per cent for certain socio-economically important goods and services.

Keywords: VAT rates; consumption; elasticity of demand; tax revenue; Greece

INTRODUCTION

VAT has been a major issue in Greek fiscal reforms in recent years. Successive increases in VAT rates following the country's entry into financial surveillance programmes, combined with a decline in household incomes owing to recession, have resulted in a considerable reduction in government revenues from VAT (Skintzi, 2015). Consumption has dropped dramatically, while tax evasion and avoidance have increased (Artavanis, 2015). Several studies (Hakim, 2009; Bye et al., 2003; OECD, 2010a; Hall, 2005; Boeters et al., 2006; Artavanis, 2015; Hellenic Parliament, 2015) show that a reduction in VAT rates during an economic crisis, followed by the introduction of a single VAT rate (with a few exceptions for essential goods) may significantly increase tax revenues without increasing the tax burden. This can be achieved through improved VAT collectability resulting from a subsequent increase in consumption, as well as by broadening the VAT base, lowering administrative costs and reducing tax evasion and avoidance.

In this study, we present the economic impact on Greece of the establishment of a uniform basic VAT rate of 20 per cent (rather than the existing 23 per cent) for most consumer goods and services, with a reduced VAT rate of 10 per cent for certain socio-economically important goods and services. Various compensation measures might be adopted for those likely to suffer most from the suggested VAT reform, for example as a result of higher VAT rates or abolition of exemptions, but these are beyond the scope of this study.

We apply two alternative scenarios ("economic" and "social"), using a combination of socio-economic criteria such as the elasticity of demand, the level of social preference, the degree of competitiveness and the share of consumer goods in household budgets. We conclude that VAT

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revenues from the suggested reform would result in a quite significant increase on current (2014) VAT revenues, with a lower tax burden for the majority of consumers.

PROBLEMS OF THE CURRENT VAT SYSTEM IN GREECE

The current (2014) VAT system consists of a basic rate of 23 per cent, a reduced rate of 13 per cent, and an over-reduced rate of 6.5 per cent for certain essential goods. In the Aegean Islands, all VAT rates have been further reduced by 30 per cent, although this reduction was partially removed in 2016 and will be totally removed by the end of 2017. The available data suggest that successive VAT rate increases introduced over a short period of time (from 19%, 9% and 4.5% in March 2010 to 23%, 13% and 6.5% in November 2011) were intended to increase public revenues. However, as shown in Table 1, VAT revenues have not only failed to rise, but have actually fallen by 21 per cent over the last five years (Skintzi, 2015). This may have resulted from reduced consumption owing to higher prices and the post-crisis recession, as well as higher tax evasion and avoidance.

TABLE 1: TAX BASE AND REVENUES FROM VAT

Category (amounts in € billion)	2010	2014	Δ 2014/2010
Taxable individual income	**100.6**	**64.0**	**-36%**
Taxable corporation income	**15.1**	**9.9**	**-34%**
Total taxable income (tax base)	**115.7[1]**	**73.9[2]**	**-36%**
GDP[3]	**226.0**	**177.9**	**-21%**
VAT revenue[4]	**16.0**	**12.7**	**-21%**

Source: [1] www.gsis.gr; [2] www.cnn.gr; [3, 4] Eurostat (http://ec.europa.eu/eurostat/web/national-accounts/data/database)

In 2010, the reported total income from both individuals and corporations was €115.7 billion, while in 2014 it was less than €74 billion. Thus, the reduction in the tax base over the last five years of changes (and especially increases) in VAT rates was 36 per cent, much higher than the 21 per cent fall in GDP over the same period (Table 1, Column Δ 2014/2010), resulting in a loss of revenue due primarily to tax evasion and avoidance and partly to recession. This is supported by other studies (Artavanis, 2015; OECD, 2016a). Since VAT revenues account for about seven per cent of annual GDP and are the largest source of tax revenues after insurance contributions, their efficient collection is crucial to improving the country's consolidated budget.

One method of measuring the efficiency of VAT collection, which focuses on the effectiveness of compliance and collection (compliance efficiency), is to calculate the VAT gap. The VAT gap is the difference between actual VAT revenues (VR), calculated by Eurostat, and the potential income from VAT (VAT total tax liability, VTTL), measured by the national accounts and the current structure of VAT rates. The VTTL is calculated by mapping information on standard and reduced rates and exemptions onto available data on final and intermediate consumption. The VAT gap is usually expressed as a percentage of VTTL. The higher the VAT gap, the higher a country's tax evasion, bankruptcies, late payments and avoidance (Skintzi, 2015). According to data from the European Commission (Barbone et al., 2014, 2015), the average VAT gap in Greece between 2000 and 2010 was 28 per cent (or 2.8 per cent of GDP). However, since 2011 when the current VAT rates were applied, it has increased to an average of 32 per cent (or 3.5 per cent of GDP), despite an improvement in 2014 (Poniatowski, 2016) owing to a significant fall in VTTL together with temporarily higher tax compliance (Bank of Greece, 2016). The EU average is less than half that of Greece, at around 14 per cent.

An alternative method of measuring VAT collection efficiency, used by the OECD, is to calculate the VAT revenue ratio (VRR). This is defined as the ratio of realised revenues from VAT to potential incomes from VAT, when applying the basic VAT rate to the potential tax base. The difficulty with VRR lies in determining the potential tax base, although it is usually expressed as the difference between final consumer expenditure and actual VAT revenues. Essentially, the VRR combines policy efficiency (i.e. the amount that could theoretically be collected if the basic VAT rate were applied across the tax base in the absence of reduced VAT rates and exemptions) and compliance efficiency (i.e. the amount that could theoretically be collected by the state if all VAT were collected). If a country has a very low VRR (close to zero), this means either that reduced VAT rates are being applied in many cases, or that there are many exceptions to the basic VAT rate, or that there is a failure in the collection of VAT, or a combination of all three (Skintzi, 2015). For Greece, the VRR in 2014 was 0.37, well below the average of 0.56 for OECD countries (OECD, 2016b). A study by the Bank of Greece (2014) shows that low efficiency for VAT in Greece compared with other OECD countries is due largely to the considerable number of exemptions and exceptions from the basic rate.

From both methods, it is evident that Greece has a significant VAT collectability problem (OECD, 2016a), resulting in an annual average loss of €7.5 billion per year from 2009 onwards (Skintzi, 2015). To improve the situation, a series of interventions is required, including mandatory use of electronic transactions, enhanced tax assessment mechanisms, fiscal stability, and reduction of the tax burden by selecting the most appropriate (lower) tax rate (Hakim, 2009; Bye et al., 2003; Bank of Greece, 2016). The latter seems particularly necessary since, intuitively, during times of recession the ability to pay taxes decreases. As predicted by the Laffer curve, which relates income to the tax rate, increasing tax rates beyond a certain point begins to have the opposite effect on government revenues, mainly due to reduced economic activity and increased evasion. Studies of fiscal policy on tobacco products in Greece (Foundation for Economic and Industrial Research, 2014; Center of Planning and Economic Research; 2014) show that the rise in tax rates was followed by a reduction in government revenues and, above all, a huge rise in smuggling. Similar results occurred following a tax increase on heating oil. Therefore, the appropriate economic policy during times of recession is to reduce rather than increase the tax burden. This argument is also supported by the international literature (Hakim, 2009; Bye et al., 2003; Artavanis, 2015).

Moreover, strengthening consumer confidence is as important as structural reforms, since tax evasion is not a cause but a result of a lack of confidence in the state (Wintrobe & Gërxhani, 2004; Hayoz & Hug, 2007). A so-called "tax consciousness" develops in countries where governments use taxpayers' money on merit, rationally and in the interests of society. A straightforward way to accomplish this in Greece is to adopt a stable taxation system with a uniform tax rate.

CHANGES IN CONSUMPTION DURING RECESSION

To determine the impact of the proposed VAT reform on consumption and, more generally, on the economy, our primary data source is the Household Budget Survey of the Hellenic Statistical Authority, spanning the period 2010–2014 (HSA, 2010–2014). The impact of the financial crisis on the consumption of various products and services by Greek households (see Table 2 and Figures 1A and 1B) depends on changes in preferences relating directly to basic consumer needs and, at the micro level, the price elasticity of demand, e (p).

TABLE 2: CHANGES IN HOUSEHOLD CONSUMPTION (2010–2014)

CATEGORY	2010	2011	2012	2013	2014	Δ 2014/ 2010	VAT (2014)	|ε(p)|+sde.
Food	**18.0**	**19.5**	**20.1**	**20.4**	**20.5**	**13.9**	**13**	**0.5 ± 0.1**
Housing/heating/water/electricity	**11.7**	**12.6**	**13.9**	**13.7**	**13.4**	**14.5**	**23/13**	**0.4 ± 0.1/ 0.2 ± 0**
Transport/fuel	**13.5**	**13.2**	**12.8**	**12.5**	**12.7**	**-5.9**	**13/23**	**0.5 ± 0.1/ 0.2 ± 0**
Hotels/restaurants	**10.7**	**10.4**	**9.8**	**9.6**	**9.8**	**-8.4**	**6.5/13**	**1.1 ± 0.1/ 1.7 ± 0.7**
Various goods & services	**10.4**	**10.0**	**9.5**	**9.3**	**9.2**	**-11.5**	**23**	**0.8 ± 0.3**
Health/medicine	**6.4**	**6.3**	**6.4**	**6.9**	**7.2**	**12.5**	**13/6.5**	**0.3 ± 0/ 0.1 ± 0**
Clothing & footwear	**7.2**	**6.2**	**5.8**	**5.8**	**5.9**	**-18.1**	**23**	**0.9 ± 0.1**
Durable goods	**6.7**	**6.0**	**5.8**	**5.6**	**5.0**	**-25.4**	**23**	**1.3 ± 0**
Leisure/culture/books/theatre	**4.7**	**4.7**	**4.5**	**4.6**	**4.7**	**0**	**23/13/6.5**	**1.1 ± 0/0.6 ± 0/ 0.1 ± 0**
Communications	**4.0**	**4.0**	**4.2**	**4.1**	**4.1**	**2.5**	**23**	**1.6 ± 0**
Alcohol/tobacco	**3.5**	**3.6**	**3.8**	**4.2**	**4.0**	**14.3**	**23**	**1.1 ± 0/0.4 ± 0**
Education	**3.3**	**3.5**	**3.5**	**3.4**	**3.5**	**6.1**	**0**	**0.4 ± 0.1**

Notes: values given are the percentage contribution of each category to total annual consumption; sde = standard deviation error

According to basic economic theory, the price elasticity of demand describes the ratio of the percentage change in the quantity demanded of a good to the percentage change in its price. By introducing into our analysis the inverse elasticity rule,[3] which assumes that demand for each good depends only on its own price, we conclude that the rate at which a commodity is taxed should be inversely proportional to the absolute value of its elasticity of demand. Thus, goods with low elasticities of demand should be taxed relatively highly. Of course, the application of this rule to every different kind of good or service (as suggested by economic theory) is not administratively feasible; therefore, the application of different elasticities to broader categories is more efficient.

The last column of Table 2 shows the elasticity of demand as an absolute (positive) number, with prices drawn from average elasticities established by various studies (see Appendix). The calculated error is the standard deviation error derived from relevant statistical theory. Thus, if $|e(p)| < 1$, the demand is considered inelastic, i.e. the quantity demanded of that good will decrease (increase) less than the corresponding increase (decrease) in its price; while if $|e(p)| > 1$, the demand is considered elastic and changes in the quantity demanded vary more than price changes. Goods that have zero elasticity of demand are completely inelastic, i.e. whatever the change in price, they will still have a steady demand. One such good is medicine (with $|\varepsilon(p)| = 0.1$), as shown in Table 2.

Note that for the major category, "Housing/heating/water/electricity" presented in Table 2, two different elasticities are adopted: one is the average of the elasticities of sub-classes with a 23 per cent VAT rate (housing and heating) and the other is the average of the elasticities of sub-classes with a 13 per cent VAT rate (water and electricity). These elasticities are given in the last column of Table 2. There are also different elasticities for different VAT rates on transport and fuel, the provision of health services and medicines, hotels and restaurants, and the major

[3] The inverse elasticity rule is also called the Ramsey rule for optimal excise taxation and is often followed in designing tax policy (Selim, 2007)

category "Leisure/culture/books/theatre" (the latter is subject to the over-reduced VAT rate of 6.5%). On the other hand, items in the "Alcohol/tobacco" category have very different elasticities, even though the VAT rate is the same (23%); this relates to consumer behaviour trends with respect to these goods.

Based on the data shown in Table 2 Column Δ 2014/2010, which describes the percentage change in the contribution of each category to total consumption for the period 2010–2014 compared with consumption in 2010, the proportion of household budgets spent on basic consumer goods (food, housing and health) increased as consumption shifted to these necessary categories of goods owing to reduced available income. Such behaviour would be expected, given their low elasticity of demand, with the price reduction resulting from the recession leading to an increase in quantity demanded. The relatively large percentage increase in the proportion of the "Alcohol/tobacco" category in the average household budget (14.3% greater in 2014 than at the beginning of the crisis) may be because this category is viewed as a substitute for some luxury goods or for psychological reasons relating to the prolonged crisis (higher unemployment, lower income). Some goods and services with increased significance in the family budget remained almost unchanged (transport, leisure, communications and education), while the share of consumption of other goods decreased following the economic downturn. Of all goods and services, those that increased in value from 2011 onwards were housing (CPI change 13m/m) and "Alcohol/tobacco" (CPI change 8m/m) (HSA, 2015).

Figures 1A and 1B represent changes in the proportion of various categories of consumption by the average household for the period 2010–2014. Consumption trends for several categories of goods changed significantly. Figure 1A shows the five largest categories of goods as a percentage of total household consumption (using values from Table 2). This shows that the curve for "Housing/heating/water/electricity" rose above the "Transport/fuel" curve, since housing services acquired greater importance in the household budget as a more necessary commodity than transport services, while the "Food" curve steepened because food accounted for a greater proportion of the household budget.

Figure 1B presents the remaining consumption categories from Table 2 (with lower contributions to the household budget). The categories "Clothing & footwear" and "Durable goods" fell dramatically during the period under investigation (as secondary and more flexible goods), while health services increased their contribution to the household budget (as more essential goods).

FIGURE 1A: % CHANGE IN MAIN CONSUMPTION CATEGORIES (2010–2014)

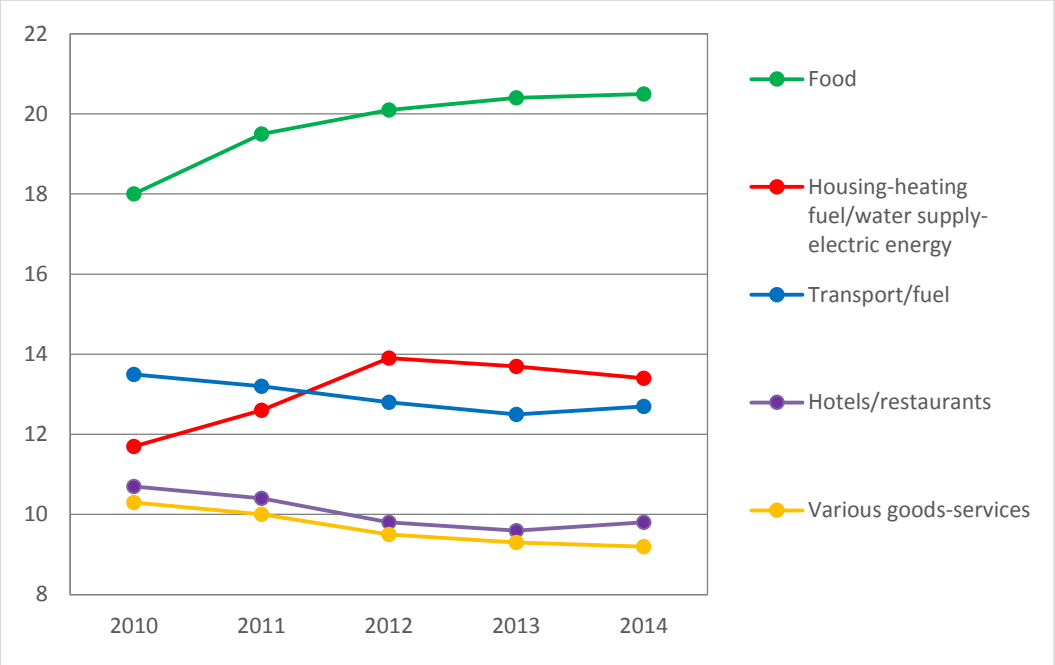
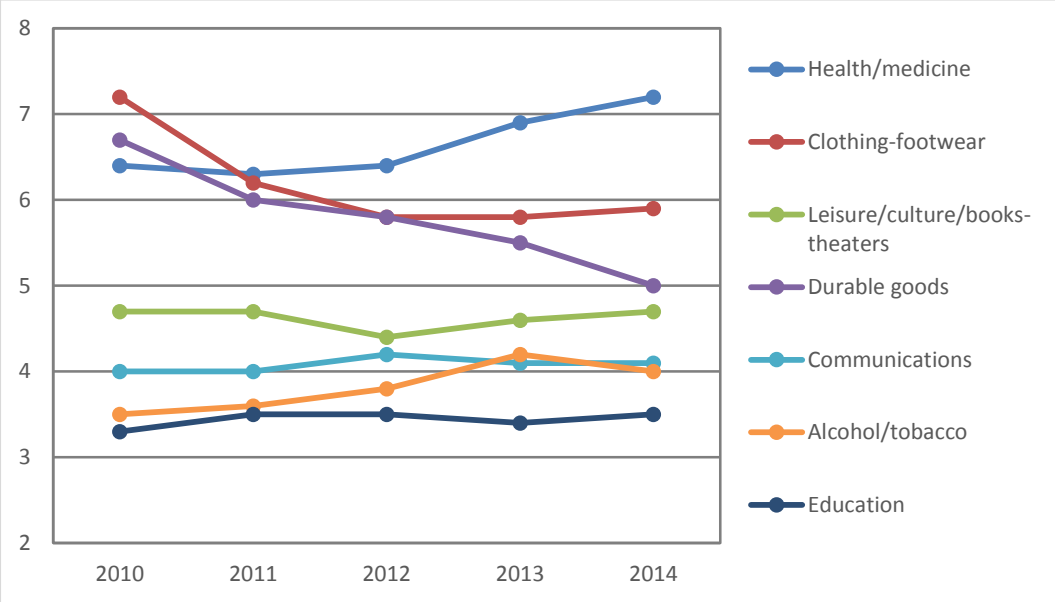


FIGURE 1B: % CHANGE IN REMAINING CONSUMPTION CATEGORIES (2010–2014)



The observed shift in household consumption priorities arose from the beginning of the crisis (2010), leading to a considerable loss in household income, while the increase in VAT rates after 2011 and the subsequent increase in prices led to further deterioration.

Useful conclusions relating to changes in VAT rates and consumption can be drawn by investigating fluctuations in VAT rates applicable to restaurants to identify the relevant elasticity for that particular sector. The high VAT rate of 23 per cent for restaurant services lasted for almost two years, until in August 2013 the rate returned to 13 per cent. The sharp change in this sector, combined with consumer preferences, had an impact on these services. The relevant financial results are described in detail by Artavanis (2015), who shows that the increase in VAT on restaurants during the recession also affected tax revenues, owing to higher tax evasion and avoidance and a shift in consumption to substitute goods and services. In

contrast, the reduction of the VAT rate from 23 to 13 per cent led to far lower revenue losses, indicating an increase in consumption due to falling prices and improved VAT compliance by entrepreneurs.

Focusing now on the most important category of household budgets, the "Food" category, Table 3 presents the various food sub-categories as a percentage of the major category, for the period 2010–2014. This shows that for the most important sub-categories for the average household, the trend either increased (flour/bread/cereals) or remained almost unchanged (meat, dairy, vegetables, oils), while the proportion of some other sub-categories that might be considered to be "luxury" goods (fish, soft drinks, sugar and sweets) tended to decline. Overall, this supports the intuition that during a recession, consumption by the average household shifts toward more appropriate or "accessible" food. Similar conclusions can be drawn from the elasticities of demand, $|\varepsilon(p)|$ shown in Table 3 for the various food sub-categories, showing that the proportion of more elastic foods (e.g. fish, fruits) in the household basket reduced significantly between 2010 and 2014.

TABLE 3: CHANGES IN HOUSEHOLD FOOD CONSUMPTION (2010–2014)

FOOD	2010	2011	2012	2013	2014	Δ (2014)/ (2010)	VAT (2014)	$\|\varepsilon(p)\|$+sde
Meat	**23.2**	**23.0**	**22.9**	**22.9**	**22.7**	**-2.2**	**13**	**1 ± 0.1**
Dairy	**17.0**	**17.2**	**17.9**	**18.1**	**18.1**	**6.5**	**13**	**0.5 ± 0.1**
Flour/bread/cereals	**14.0**	**14.4**	**14.9**	**15.7**	**15.7**	**12.1**	**13**	**0.5 ± 0.1**
Vegetables/potatoes	**11.8**	**11.7**	**11.7**	**11.7**	**11.8**	**0**	**13**	**0.6 ± 0.1**
Fish	**7.9**	**7.9**	**7.5**	**7.1**	**7.2**	**-8.9**	**13**	**0.7 ± 0.1**
Fruit	**7.6**	**7.6**	**7.6**	**7.1**	**7.1**	**-6.6**	**13**	**0.7 ± 0.1**
Fats and oils	**5.6**	**5.6**	**6.0**	**6.0**	**5.9**	**5.4**	**13**	**0.5 ± 0.1**
Sugar and sweets	**5.4**	**5.3**	**4.7**	**4.5**	**4.6**	**-14.8**	**13**	**0.4 ± 0.1**
Mineral water/soft drinks	**3.9**	**3.7**	**3.2**	**3.1**	**3.1**	**-20.5**	**13/23**	**0.5 ± 0/0.5 ± 0.1**
Coffee/tea/cocoa	**2.0**	**2.1**	**2.0**	**2.2**	**2.2**	**10.0**	**23**	**0.2 ± 0.1**
Various food	**1.6**	**1.5**	**1.6**	**1.6**	**1.6**	**0**	**13**	**0.9 ± 0.2**

Notes: values are given for the % participation of each sub-category in total food consumption; sde = standard deviation error

Two important observations can be made with respect to Table 3. The first involves the "Flour/bread/cereals" sub-category, which in the literature is associated with very different elasticities of demand for each good (see Appendix), ranging from 0.1 (flour/bread) to 0.9 (cereals) and 1.5 (various foods). The reason for this is that participants in relevant studies have exhibited considerable differences in eating habits, resulting in large variations in demand for the products concerned. The pattern of Greek consumers' behaviour over time indicates that these foodstuffs (especially flour and bread) are inelastic. However, given a lack of reliable studies to support this, the weighted average elasticity of 0.5 for the "Flour/bread/cereals" sub-category is used in this study, in view of the much greater proportion in the more inelastic food sub-category (flour and bread). The second point concerns the "Mineral water/soft drinks" sub-category. From 1 September 2011, soft drinks were taxed at the 23 per cent VAT rate, so two weighted average elasticities are calculated, depending on the VAT rate. These are used later when considering the economic impact.

FIGURE 2A: % CHANGE IN THE MOST BASIC FOOD SUB-CATEGORIES (2010–2014)

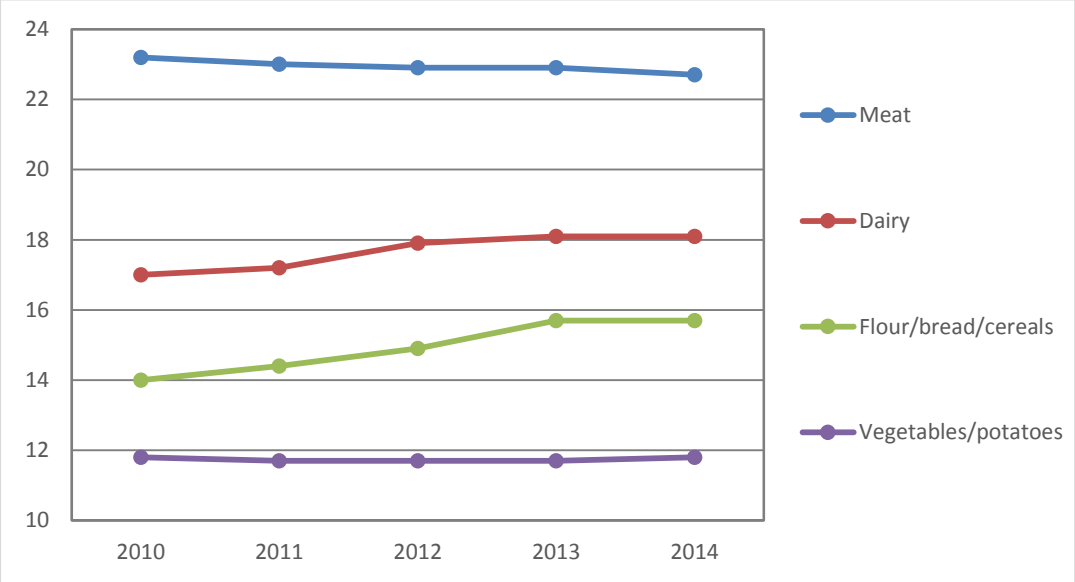
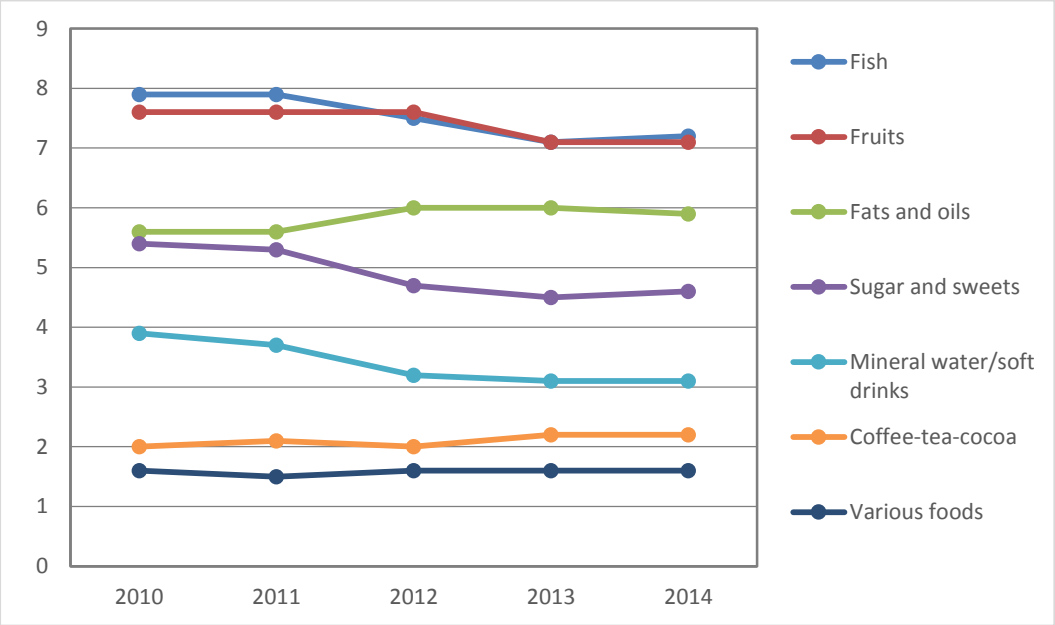


FIGURE 2B: % CHANGE IN THE REMAINING FOOD SUB-CATEGORIES (2010–2014)



Figures 2A and 2B present the changing curves for the various sub-categories of food for the period 2010–2014 with respect to the total food consumption of the average household. From 2011 onwards, higher VAT rates on food were applied (13% rather than 11%), and taxes on certain food sub-categories (soft drinks, coffee/tea/cocoa) and restaurant services ranged from 13 to 23 per cent. Thus, there were sharp drops in consumption of "Mineral water/soft drinks" and "Sugar and sweets" (non-essential goods) and a less significant decrease in "Fish" consumption (expensive food), with a shift to a greater proportion of household expenditure on the sub-categories of "Flour/bread/cereals" (necessary and cheap consumer goods) and to a lesser degree "Dairy" and "Fats and oils" (more staple foods). One exception is the

"Coffee/tea/cocoa" sub-category, which exhibited resistant behaviour, despite the rise in the VAT rate. However, this can be explained by their almost inelastic demand (elasticity of demand = 0.2, see Table 3 and Appendix).

PROPOSED DISTRIBUTION OF PRODUCTS AND SERVICES BETWEEN VAT RATES

In Greece, in 2014 (year of reference) the basic VAT rate of 23 per cent applied to car services and transportation, telecommunications, house construction and alcoholic beverages. The reduced VAT rate of 13 per cent was applied to food, restaurants, electricity, water, public transportation and medical equipment, while medicine, hotels, books, newspapers, magazines and theatre tickets were subject to the over-reduced VAT rate of 6.5 per cent. There were also exceptions/exemptions from VAT for several goods and services, of which the most important were the "Education" category (excepted from the basic VAT rate) and diplomatic missions, international organisations, charity events, casinos, gambling, national TV/radio and postal services (exempted from taxation). The latter are described in detail in the Tax Expenditure of State Budget 2016.[4]

Reforming the existing VAT regime to increase economic and social benefits, combined with wider structural reforms of the economy, would result in increased state revenues and fewer distortions in consumers' preferences (Mirrlees et al., 2011; Borselli et al., 2012) and enhanced tax awareness by citizens. This study proposes the transfer of most consumer goods and services (including specific exceptions/exemptions) to a basic VAT rate of 20 per cent, and of certain socially-sensitive items to a reduced VAT rate of 10 per cent (described in detail below). The suggested VAT rates of 20 and 10 per cent are selected on the basis of being close to (but not exceeding) the current average VAT rate[5] on the one hand (since a larger reduction would probably generate unwanted distortions in both consumer and business preferences), and not reducing the respective revenues on the other hand (since a basic VAT rate below 19% or a reduced VAT rate below 9% would lead to lower revenues). It should be mentioned that our analysis integrates the VAT changes, the elasticity impact on modified consumption and the resulting revenues from each category of consumer good. Thus, the results of this study are not significantly affected by the fact that goods markets in Greece do not work under conditions of perfect competition.

The main advantages of adopting a uniform basic VAT rate, lower than the currently prevailing rate (23%), are the following (Hakim, 2009; OECD, 2010a; Boeters et al., 2006; Artavanis, 2015; Hellenic Parliament, 2015; Mirrlees et al., 2011; OECD, 2010b):

- Increased consumption through lower prices and broader consumer base
- Reduced evasion through better compliance
- Less distortion of household consumption decisions resulting in increased prosperity
- Reduction of administrative burden through simplification of the tax system
- Lower tax burden on the weakest social groups though lower prices on basic consumer goods and services
- Improved business and general economic climate (in the long term).

[4] http://www.hellenicparliament.gr/UserFiles/c8827c35-4399-4fbb-8ea6-aebdc768f4f7/9391377.pdf

[5] The current (2014) average VAT rate is estimated to be 18 per cent.

Conversely, there are some drawbacks to the adoption of a basic VAT rate, for example (Hakim, 2009; Hall, 2005; Boeters et al., 2006; OECD, 2010b):

- Possible reduction in public revenues from special cases (mainly inelastic items on which the rate is reduced)
- Loss of competitiveness of certain products and services that are currently in a special status of exemption or lower VAT and would lose this advantage with the single tax
- Possible distortions due to uneven distribution of the tax burden across various social groups.

However, following Artavanis' (2015) study on restaurants, and in combination with other parallel measures to improve citizens' tax compliance, revenue losses from migrating (primarily inelastic) goods to a lower VAT rate would arguably be much less than estimated.

At this point, it should be mentioned that we are not suggesting a tax revenue-neutral reform. We intend to increase public revenues by improving VAT collectability and compliance, and to reduce the tax burden by introducing lower VAT rates for most households, since the suggested VAT reform would result in reduced rates for 70 per cent of total consumption of goods/services. We do not ignore the fact that a few categories of goods and services would lose the lower (or exempted) VAT advantage[6] given for competitive or social reasons, nor that the (suggested) higher VAT rates might cause distortions in consumers' preferences. For these cases, additional measures such as income subsidies or partial tax refunds (Hakim, 2009; Hall, 2005; Boeters et al., 2006; Hellenic Parliament, 2015; Remeta et al., 2015), for example for medicine/health or educational services, might be adopted to compensate the social groups most affected. These are not considered in this study.

Several studies, both in Greece (Hellenic Parliament, 2015; HSA, 2010–2014; Foundation for Economic and Industrial Research, 2015; INEMY, 2013) and internationally (OECD, 2010a; Hall, 2005; Boeters et al., 2006; Lechene, 2000), have shown that if the main goal is to increase revenues, the prevailing economic opinion is that VAT rates should be increased on luxury consumer goods, which are more inelastic in demand, and reduced on the most necessary and/or elastic goods. Indeed, relevant economic theory predicts that the more elastic the demand curve for a product, the lower the proportion of tax borne by consumers. However, several aspects relating to the significance of some goods in household budgets, especially for the weakest social groups (food, medicine, etc.), and the competitiveness and growth potential of specific services and goods (e.g. tourism, agricultural products) should also be considered. According to related research (Remeta et al., 2015; Rizov et al., 2015), more efficient targeting, in terms of lower taxation, should address socially-sensitive goods/services other than those relating to limited household types (e.g. books). This is because low-income households derive greater benefit than the highest income groups from reductions in the prices of necessary goods and services, since the former consume the highest proportion of their income on such goods. Therefore, in order to select the goods to be included in the reduced VAT rate of 10 per cent that will result in more effective VAT collection and increased social impact, the following criteria should be taken into consideration.

1. **Social sensitivity (goods preferred mainly by poor households)**

Goods and services preferred by poor households should have reduced VAT rates to make them affordable while not significantly affecting households' economic opportunities, thereby indirectly redistributing the tax burden to benefit socially weak households.

[6] See Tables 6 and 7.

2. **Elasticity of demand to price**

As previously mentioned, demand for consumer goods with high elasticity of demand is subject to greater change at a given change in price relative to others, so including these in the reduced rate will result in much greater household demand, and hence increased revenues.

3. **Participation in the household budget (basket) for 2014**

For goods preferred by most households, integration of the reduced VAT regime will result in increased consumption with a simultaneous widening of the tax base, thus leading to increased revenues.

4. **Competitiveness and growth perspective**

Goods and services that are highly competitive and are in sectors with high growth rates should be included in the reduced VAT scheme in order to preserve their competitive advantage and increase exports, consumption, and hence public revenues. An example is the current situation of over-reduced VAT rates for the Aegean Islands.

Our socio-economic model uses these eligibility criteria to transform consumers' behavioural preferences into a more efficient VAT collection system, thus presenting the impact of the suggested VAT reform on the economy. Based on the categories of goods reported in Table 2 and the above comments, consumer goods are divided into three descriptive categories, A, B and C. Category A comprises the more preferred goods to be included in the reduced VAT rate of 10 per cent, which fulfil all the above-mentioned criteria; Category B involves "neutral" goods; and Category C includes less preferred goods. Thus, the classification is as follows:

Category A
High social sensitivity
Large contribution to household basket in 2014 (≥ 10%)
Elasticity of demand ≥ 1 (high elasticity – elastic goods)
High competitiveness and growth perspective.

Category B
Moderate social sensitivity
Medium contribution to household basket in 2014 (≥ 5% and < 10%)
Elasticity of demand ≥ 0.5 and < 1
Moderate competitiveness and growth perspective.

Category C
Low social sensitivity
Small contribution to household basket in 2014 (< 5%)
Elasticity of demand < 0.5 (low elasticity – inelastic goods)
Low competitiveness and growth perspective

Finally, preferences for various consumer goods are ranked by adding the effects of each eligibility criterion to a total eligibility index (EI) and selecting appropriate weighting factors for two different scenarios. These scenarios are selected to describe (qualitatively and quantitatively, as explained later) the general purpose of this reform of VAT rates from two diametrically opposite perspectives: economic benefits in terms of increasing government revenues (Scenario 1 – economic), and social justice and prosperity through a fair redistribution of weightings (Scenario 2 – social).

Scenario 1 (economic): Weighting factors for EI are 50 per cent for elasticity of demand, 25 per cent for share of goods in the household basket in 2014, 15 per cent for degree of competitiveness and 10 per cent for degree of social sensitivity.

Scenario 2 (social): Weighting factors for EI are 50 per cent for degree of social sensitivity, 25 per cent for degree of competitiveness, 15 per cent for share of goods in the household basket in 2014 and 10 per cent for elasticity of demand.
The total EI is calculated by multiplying the weighting factor for each scenario (economic or social) by the respective category (A, B or C) by applying to the latter the correlation A ↔ 3, B ↔ 2 and C ↔ 1 and then adding the four sub-products, resulting in a final ranking for the two scenarios. The classification of consumer goods with respect to the degree of social sensitivity is based on the poorest households' options (HSA, 2010–2014) in conjunction with the time value of certain public goods for Greek families (health/education). Thus, for example, using the data from Table 2 for the "Food" category results in the following:
Scenario 1 (economic)
Elasticity of demand = 0.5 → moderate → Category B → Impact on the overall index = 50% * 2 → 1
Participation in the household basket = 13.9% → high → Category A → Impact on the overall index = 25% * 3 → 0.75
Degree of competitiveness → high → Category A → Impact on the overall index = 15% * 3 → 0.45
Social sensitivity → high → Category A → Impact on the overall index = 10% * 3 → 0.3
→ **Total eligibility index** = 1 + 0.75 + 0.45 + 0.3 = **2.5**
2nd scenario (social)
Social sensitivity → high → Category A → Impact on the overall index = 50% * 3 → 1.5
Degree of competitiveness → high → Category A → Impact on the overall index = 25% * 3 → 0.75
Participation in the household basket = 13.9% → high → Category A → Impact on the overall index = 15% * 3 → 0.45
Elasticity of demand = 0.5 → moderate → Category B → Impact on the overall index = 10% * 2 → 0.2
→ **Total eligibility index** = 1.5 + 0.75 + 0.45 + 0.2 = **2.9**

The classification of consumer goods for each criterion and the overall EI for scenarios 1 and 2 are presented in Table 4. To select appropriate categories for the reduced VAT rate of 10 per cent, from the last column of Table 4 referring to the EI, we select categories of goods/services with an EI of 2.5 and above, since these are closest to the category A classification corresponding with more preferred goods. Thus, we conclude that the "Food" and "Hotels/restaurants" categories from scenario 1 (economic) and "Food" from scenario 2 (social) should be assigned the reduced VAT rate of 10 per cent.

To further limit the categories of goods to be included in the reduced VAT rate, we focus on the "Food" category, which has the largest EI in both scenarios and the largest share of the household budget, and also includes a variety of products considered to be "luxury" which might be transferred to the basic VAT rate of 20 per cent. In this way, income-dependent distortions in household preferences associated with food consumption can be further reduced, since a rich household is presumably able to allocate more money to buying fish or sweets, as well as maximising the potential economic benefits.

TABLE 4: CLASSIFICATION OF CONSUMER GOODS BY ELIGIBILITY CRITERIA

CONSUMER GOODS	ε(p)	Proportion of household basket (2014)	Competitiveness	Social Sensitivity	ELIGIBILITY INDEX	
					1	2
Food	**B**	**A**	**A**	**A**	**2.5**	**2.9**
Housing/heating/water/ electricity	**C**	**A**	**C**	**A**	**1.7**	**2.3**
Transport/fuel	**B/C**	**A**	**B**	**B**	**2.3/1.8**	**2.2/2.1**
Hotels/restaurants	**A**	**B**	**A**	**C**	**2.6**	**1.9**
Various goods/services	**B**	**B**	**C**	**B**	**1.9**	**1.8**
Health/medicine	**C**	**B**	**B**	**A**	**1.6**	**2.4**
Clothing & footwear	**B**	**B**	**C**	**B**	**1.9**	**1.8**
Durable goods	**A**	**B**	**B**	**C**	**2.4**	**1.6**
Leisure/culture/books/theatre	**A/B/C**	**C**	**B/A/B**	**C**	**2.2/1.8/1.2**	**1.5/1.6/1.3**
Communications	**A**	**C**	**C**	**B**	**2.1**	**1.7**
Alcohol/tobacco	**A/C**	**C**	**B**	**C**	**2.2/1.2**	**1.5/1.3**
Education	**C**	**C**	**C**	**A**	**1.2**	**2**

To calculate the respective EI for the food sub-categories, we apply the previous eligibility criteria, after allocating them to categories A, B and C previously used as general categories of consumer goods. The basic difference is that almost all food sub-categories have elasticities of demand smaller than or equal to 1 (apart from some special cases, see Appendix for more detail); therefore, food sub-categories with elasticities of demand exceeding 0.7 are classified in category A, those with elasticities of demand between 0.4 and 0.7 in category B, and the most "inflexible" foods (elasticities of demand smaller than 0.4) in category C. The proposed classifications for each sub-category, depending on elasticity, social sensitivity, share of the household basket and competitiveness, are shown in Table 5.

TABLE 5: CLASSIFICATION OF FOOD SUB-CATEGORIES BY ELIGIBILITY CRITERIA

FOOD SUB-CATEGORY	ε(p)	Participation in household basket (2014)	Competitiveness	Social Sensitivity	ELIGIBILITY INDEX	
					1	2
Meat	**A**	**A**	**B**	**B**	**2.8**	**2.3**
Dairy	**B**	**A**	**A**	**A**	**2.5**	**2.9**
Flour/bread/cereals	**B**	**A**	**A**	**A**	**2.5**	**2.9**
Vegetables/potatoes	**B**	**A**	**B**	**A**	**2.4**	**2.7**
Fish	**B**	**B**	**C**	**C**	**1.8**	**1.3**
Fruit	**B**	**B**	**A**	**B**	**2.2**	**2.3**
Fats and oils	**B**	**B**	**A**	**A**	**2.3**	**2.8**
Sugar and sweets	**B**	**C**	**C**	**B**	**1.6**	**1.6**
Mineral water/soft drinks	**B/B**	**C**	**B**	**C**	**1.5**	**1.4**
Coffee/tea/cocoa	**C**	**C**	**C**	**B**	**1.1**	**1.5**
Various foods	**A**	**C**	**C**	**C**	**2**	**1.2**

Applying the same methodology as for the food sub-categories used above (for the main categories of consumer goods), looking at the last column of Table 5 corresponding to the calculated EI for the two scenarios, the "Meat", "Dairy" and "Flour/bread/cereals" sub-categories for scenario 1 (economic) and "Dairy", "Flour/bread/cereals",

"Vegetables/potatoes" and "Fats and oils" for scenario 2 (social) should be allocated to the reduced VAT rate of 10 per cent.

Table 6 presents the proposed classification of consumer goods/services at the 20 per cent (basic) and 10 per cent (reduced) VAT rates based on the two alternative scenarios discussed above, together with expected revenues (in millions of €). The total VAT revenue for 2014 is taken from Eurostat (http://ec.europa.eu/eurostat/web/national-accounts/data/database) and is recalculated and confirmed by multiplying the VAT rate by the corresponding turnout for each good or service in the total tax base of 2014, which is estimated at €73.9 billion (Table 1). This expenditure is distributed per category/sub-category depending on corresponding data from Tables 2 and 3 and the turnouts for each case. Instead of a single "Food" category, proportions for all food sub-categories are presented in Table 6.

TABLE 6: PROPOSED CLASSIFICATION OF CONSUMER GOODS AT BASIC (20%) AND REDUCED (10%) VAT RATES, COLLECTED VAT REVENUE (2014) AND EXPECTED REVENUES FROM SCENARIOS 1 AND 2 FOR GREECE

Category of consumer goods/services	Proportion of total expenditure (%)	2014		Scenario 1		Scenario 2	
		VAT (%)	Revenue (€m)	VAT (%)	Revenue (€m)	VAT (%)	Revenue (€m)
Meat	**4.65**	**13**	**447**	**10**	**447**	**20**	**447**
Dairy	**3.71**	**13**	**357**	**10**	**351**	**10**	**351**
Flour/bread/cereals	**3.22**	**13**	**309**	**10**	**305**	**10**	**305**
Vegetables/potatoes	**2.42**	**13**	**232**	**20**	**239**	**10**	**230**
Fish	**1.48**	**13**	**142**	**20**	**145**	**20**	**145**
Fruit	**1.46**	**13**	**140**	**20**	**143**	**20**	**143**
Fats and oils	**1.21**	**13**	**116**	**20**	**120**	**10**	**115**
Sugar and sweets	**0.94**	**13**	**91**	**20**	**94**	**20**	**94**
Mineral water	**0.40**	**13**	**38**	**20**	**40**	**20**	**40**
Soft drinks	**0.23**	**23**	**39**	**20**	**39**	**20**	**39**
Coffee/tea/cocoa	**0.45**	**13**	**43**	**20**	**46**	**20**	**46**
Various foods	**0.33**	**13**	**32**	**20**	**32**	**20**	**32**
Housing/fuels	**11.00**	**23**	**1,870**	**20**	**1,831**	**20**	**1,831**
Water/electricity	**2.40**	**13**	**231**	**20**	**244**	**20**	**244**
Transport **@ 23%**	**5.00**	**23**	**481**	**20**	**504**	**20**	**504**
Transport **@ 13%**	**7.70**	**13**	**1,309**	**20**	**1,301**	**20**	**1,301**
Hotels	**1.70**	**6.5**	**82**	**10**	**81**	**20**	**81**
Restaurants	**8.10**	**13**	**778**	**10**	**795**	**20**	**740**
Various goods & services	**9.20**	**23**	**1,564**	**20**	**1,555**	**20**	**1,555**
Health	**6.20**	**13**	**596**	**20**	**625**	**20**	**625**
Medicine	**1.00**	**6.5**	**48**	**20**	**54**	**20**	**54**
Clothing & footwear	**5.90**	**23**	**1,003**	**20**	**1,000**	**20**	**1,000**
Durable goods **@ 23%**	**4.20**	**23**	**714**	**20**	**721**	**20**	**721**
Durable goods **@ 13%**	**0.80**	**13**	**77**	**20**	**75**	**20**	**75**
Leisure	**1.90**	**23**	**323**	**20**	**324**	**20**	**324**
Culture	**2.10**	**13**	**202**	**20**	**207**	**20**	**207**
Books/theatre	**0.70**	**6.5**	**34**	**20**	**38**	**20**	**38**
Communication	**4.10**	**23**	**697**	**20**	**710**	**20**	**710**
Alcohol	**0.84**	**23**	**143**	**20**	**143**	**20**	**143**
Tobacco	**3.16**	**23**	**537**	**20**	**528**	**20**	**528**
Education	**3.50**	**23**	**0**	**20**	**0 (584)**	**20**	**0 (584)**

Exemptions		**(23)**	**0**	**20**	**0 (348)**	**20**	**0 (348)**
TOTAL	100.0		12,676		12,737		12,666

Thus, for example, the "Mineral water/soft drinks" sub-category had a 3.1 per cent share of total household food consumption in 2014 (see Table 3). The "Food" category accounts for 20.5 per cent of total consumption expenditure; hence, the "Mineral water/soft drinks" sub-category contributes 3.1 * 20.5 = 0.63 per cent to total household consumer expenditure. Moreover, the proportion of mineral water in the configuration of sub-index prices for the specific sub-category is 63 per cent (Ministry of Development and Competitiveness, 2013), thus resulting in a proportion for mineral water of 0.40 per cent of total consumer expenditure. Finally, by multiplying the latter by the corresponding VAT rate (13%) and reducing the result to the total tax base (€73.9 billion), we obtain the revenue from the "mineral water" sub-category, which is estimated to have been €38 million for 2014 (Table 6).

Following the same procedure, we determine the respective revenues for the remaining sub-categories of household consumption. Note that at this point, for simplicity (relating to the calculation procedure as well as for more coherent presentation), in Table 6 we add the "Heating" and "Fuel" sub-categories (the latter from the "Transport/fuel" category) into a broader category named "Housing/fuels"; we divide both "Transport" and "Durable goods" categories into two parts, corresponding with differences in VAT rates (23% and 13%) on several goods/services in these categories; and divide the "Hotels/restaurants" category into its two constituent sub-categories, each attracting different VAT rates (see Table 2).

The "Education" category, which accounts for 3.5 per cent of household consumption, has so far been excluded from VAT taxation; thus, in Table 6 the respective revenue in 2014 is shown as zero. The VAT exemptions considered in this study, excluding diplomatic missions, international organisations and charity events, are estimated to have cost the state around €400 million (Table 7).

TABLE 7: SERVICES EXEMPTED FROM VAT (2014)

Exempted service	Revenue loss (in € million)
Postal services	**41.0**
Radio and TV (national)	**25.6**
Casinos	**56.3**
Gambling	**276.0**
Various exemptions	**1.6**
TOTAL	400.5

The expected revenues for each category of consumer goods/services in Table 6, based on scenarios 1 (economic) and 2 (social), are calculated by the basic economic relationship for revenue, E:

$E = \text{quantity} * \text{price} = Q * P \rightarrow dE = P * dQ + Q * dP \rightarrow dE/E = dQ/Q + dP/P$ (1)

and the equation for the elasticity of demand:

$$\varepsilon = -\frac{\left(\frac{dQ}{Q}\right)}{\left(\frac{dP}{P}\right)} = -\frac{P}{Q}\frac{dQ}{dP} \quad (2)$$

Combining equations (1) and (2) and using the relationship dP = P2 – P1 = (P1 + df * P1) – P1 = df * P1, where P1 is the current (2014) value of the good/service, P2 is the new value after the change in VAT rate and df represents the change in VAT rate (e.g. reduction from 13% to 10% gives a df of –0.03), we have:

$dE/E = dP/P * (1 - \varepsilon) \rightarrow dE/E = df * (1 - \varepsilon) \rightarrow E_{1,2} = E_{2014} * df * (1 - \varepsilon)$ (3)

In equation (3), $E_{1,2}$ is the expected revenue based on the respective scenarios, and E_{2014} is the revenue received in 2014. From the last equation, we observe that an increase in the tax rate ($df > 0$) results in an increase in revenues from inelastic goods ($e < 1$), but to a gradually smaller degree as elasticity of demand tends to 1, while revenues from goods with a high elasticity of demand ($e \geq 1$) decline. The opposite picture is observed in the case of a reduction in the VAT rate (increase in revenues from more elastic goods).

Comparing the resulting revenues for each category shown in Table 6, we observe a higher revenue increase for the "Health" category (additional revenue of €29 million – green squares) and a higher revenue decrease in the integrated "Housing/fuels" category (revenue loss of €39 million – red squares) in comparison with the respective 2014 revenues for both scenarios. The most significant variation between the two scenarios occurs in "Restaurants", where there is a revenue gain of €17 million for the economic scenario and a revenue loss of €38 million for the social scenario compared with 2014 revenues. In conclusion, the economic (1st) scenario leads to total VAT revenues of €12,737 million, while the social (2nd) scenario leads to total VAT revenues of €12,666 million, so the economic scenario for VAT rate reform is preferred. Compared with the VAT revenues collected in 2014 (€12,676 million), the economic scenario (1st) provides an additional benefit of €61 million (or 0.5% of total VAT revenues), while the social scenario (2nd) leads to a small loss (€10 million).

Including services that have so far been exempt from VAT (see Table 7) in the basic VAT rate (20%) results in an extra benefit of €348 million for both scenarios, while if "Education" (represented in red in Table 6) is also included, this results in an additional revenue of €584 million when the estimated revenue is adjusted to the changed VAT rate. Therefore, implementing the (preferred) economic reform scenario for VAT would result in additional revenues of €993 million (or 7.8%) compared with total VAT revenues in 2014, which are estimated to have been €13,669 million. If education is excluded, total VAT revenues reach €13,085 million, which still represents a 3.2 per cent increase in the VAT revenue collected.

Table 8 presents the collected and estimated revenues (for economic and social scenarios), together with statistical errors (standard error, $se = \sqrt{N}$). Note that, although most food sub-categories fall into the lower VAT rate – the three categories transferred to the 10 per cent VAT rate account for approximately 60 per cent of total food consumption – and one would expect large revenue losses due to the rigidity of the corresponding expenditure and the greatly reduced household tax base, the expected revenues, excluding education, are significantly higher than those collected in 2014. No change is proposed to the special status of the Aegean Islands, since a relevant study (Hellenic Parliament, 2015) suggests that the expected benefits would be almost zero if the over-reduced rate were abolished.

TABLE 8: COLLECTED AND ESTIMATED VAT REVENUES (IN € MILLION) FROM THE TWO PROPOSED SCENARIOS FOR 2014

2014	VAT revenues (collected)	1st scenario (economic) + se	2nd scenario (social) + se
Goods & services (from Tables 2 & 3 except "Education") (i)	**12,676**	**12,737 ± 113**	**12,666 ± 113**
Exemptions (from Table 7) (ii)	**0**	**348 ± 19**	**348 ± 19**
Education (iii)	**0**	**584 ± 24**	**584 ± 24**
TOTAL (i + ii + iii)	**12,676**	**13,669 ± 156**	**13,599 ± 156**
Alignment of VAT rates (iv)		**159 ± 13**	**159 ± 13**
TOTAL (i + ii + iii + iv)		**13,828 ± 169**	**13,758 ± 169**

Note: se = standard error

With regard to the economic impact of simplification of the tax administration, studies conducted in other European countries (Barbone et al., 2012) estimate the administrative costs of taxation to be 0.29 per cent of GDP, of which VAT-associated administrative costs account for about one fifth, or 0.06 per cent of GDP. Since Greece's GDP for 2014 was €177.9 billion (Table 1), the expected additional revenues from applying a basic rate without exemptions is €106 million, while applying two VAT rates instead of three results in expected additional revenues about half as great, i.e. €53 million. Therefore, adopting a basic VAT rate of 20 per cent for most consumer goods and services, and a reduced VAT rate of 10 per cent for basic food products (meat, dairy and flour/bread/cereal) and hotels/restaurants results in a €159 million growth in revenues. Thus, the aggregate gain in VAT revenues from adopting the overall VAT reform suggested by this study, i.e. the economic scenario for VAT rates together with the resulting reduction in administrative costs, is estimated to be €1,152 million (or 9.1%) more than 2014 VAT revenues, with a total VAT revenue of €13,828 million representing about 7.8 per cent of Greek GDP (see Table 8).

Another important factor is the effect on tax compliance of adopting a basic VAT rate. To this end, we calculate the VAT revenue ratio (VRR), as explained earlier, which combines policy efficiency, as determined by the policy deficit or policy gap (PG), with compliance efficiency, corresponding to the VAT gap. Thus, drawing on Barbone et al. (2015):

$$VRR = (1 - \text{VAT gap}) * (1 - PG) \quad (4)$$

Moreover, the policy deficit is the sum of two parameters: the rates deficit or rate gap (RG), which corresponds to the revenue loss rate arising from the application of reduced rates compared with the potential revenue if the basic rate were applied, and the exemptions deficit or exemption gap (EG), corresponding to the revenue loss rate attributable to various exemptions from VAT for goods/services. For 2014, the VAT gap for Greece is estimated to have been 0.28, the policy gap 0.541, the rate gap 0.139 and the exemptions gap 0.402 (Poniatowski et al., 2016), while according to the OECD, the VRR was 0.37 (OECD, 2016b).

To assess the impact of the proposed VAT reform on tax compliance, we adopt the EU's approach (Barbone et al., 2013), which concludes that a one per cent reduction in the basic VAT rate results in a 0.7 per cent improvement in compliance. Thus, reducing the basic VAT rate from 23 to 20 per cent leads to a 2.1 per cent improvement in compliance or a 2.1 point lower VAT gap, resulting in a VAT gap of 0.259**.** If a basic VAT rate of 20 per cent is adopted, the policy deficit will also be smaller than previously, since both conditions (rates deficit and deficit exemptions) will fall. If the additional revenue resulting from adopting two rather than three rates (Kulis, 2003) is €53 million, then the improvement in the rates deficit (RG) will be 53/12676 = 0.4 per cent, while the additional revenue derived from taxation of goods exempted or excluded will be €932 million and the improvement in the exemptions deficit (EG) will be 932/12676 = 7.4 per cent. Adopting the proposed VAT reform results in an RG of 0.135 and an EG of 0.328; therefore, the (reformed) policy deficit is PG = RG + EG = 0.463. From equation (4) it is deduced that the VRR is 0.398.

TABLE 9: CALCULATED (FROM EC AND OECD) AND ESTIMATED VAT EFFICIENCY RATES UNDER THE 'ECONOMIC' REFORM SCENARIO FOR GREECE (2014)

Greece (2014)	EC/OECD (calculated)	Economic scenario (estimated + se)
VAT gap	**0.28**	**0.259**
Rate gap (RG)	**0.139**	**0.135 ± 0.001**
Exemptions gap (EG)	**0.402**	**0.328 ± 0.005**
Policy gap (PG = RG + EG)	**0.541**	**0.463 ± 0.006**
VRR	**0.37**	**0.398 ± 0.006**

These results, together with the respective values calculated by the EC and the OECD, are presented in Table 9. The statistical error is the standard error corresponding to the original calculations of the respective gaps under the suggested reform, after introducing the estimated values.

Finally, to calculate the resulting change in final consumer expenditure (private, public and non-governmental organisations), we use the following formula (Skintzi, 2015):

$$\mathrm{VRR} = \frac{\mathrm{VR}}{(\mathrm{C}-\mathrm{VR})\cdot\mathrm{VAT}} \quad (5)$$

where VR is the actual VAT revenue, C is final consumer expenditure and VAT is the basic VAT rate. Implementing the suggested VAT reform (economic scenario + taxation of exemptions and exclusions + lower administrative costs) gives C = €187.5 ± 5.3 billion, while under the current VAT regime (2014), C = €161.2 billion (data from Eurostat).

Therefore, adopting the suggested VAT reform results in a significant (16.3%) increase in final consumer expenditure, with obvious collateral benefits for the country's GDP and economy.

CONCLUSION

This study focuses on the fiscal impact of a VAT reform in Greece. Large revenue shortfalls due to high VAT rates, leading to increased tax evasion and reduced consumption, and hence prolonged recession, can be treated effectively by adopting a basic VAT rate of 20 per cent for most goods/services and a reduced VAT rate of 10 per cent for specific products, while simultaneously eliminating some existing exemptions. Applying a combination of socio-economic criteria, including the elasticity of demand, the level of social preference, the degree of competitiveness and the proportion of consumer goods in the household budget, we conclude that, through two alternative scenarios ("economic" and "social"), a reduced VAT rate of 10 per cent should be introduced on the average household's most necessary foodstuffs (meat, dairy and flour/bread/cereals) and on hotels and restaurants, namely on products or services with a socially sensitive orientation or providing comparative competitive advantage to the Greek economy.

As this study clearly shows, the suggested reform will achieve €13,669 million in VAT revenues, a quite significant increase of €993 million or 7.8 per cent compared with current (2014) VAT revenues. When the impact of the reformed VAT rates on consumption and simplification of the tax administration are taken into account, a further increase of €159 million is expected in VAT revenues, despite taxing most food products at a lower VAT rate than before and a significant expected revenue loss arising from rigidity in the respective expenditure. The overall VAT revenue improvement thus reaches €1,152 million, leading to VAT revenues of more than €13.8 billion, or 7.8 per cent of the 2014 GDP.

Finally, adopting the proposed VAT model (a basic rate for most goods/services and a reduced rate for a few) has another significant benefit: improved tax compliance. The impact of improved tax compliance is captured by a 16.3 per cent increase in final consumer expenditure, with obvious knock-on effects for government revenues from GDP growth and better national economic prospects. Therefore, the suggested VAT reform, starting from consumer preferences and weaknesses in the current VAT system and integrating them into a socio-economic model, significantly improves VAT collectability and contributes to economic growth.

Although this study suggests VAT reform for Greece, a country which is experiencing special conditions due to the prolonged financial crisis, the significant conclusions that are drawn may also be applicable to other countries.

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APPENDIX

Elasticities of demand for major consumption categories

Food:	0.4 (Adam & Moutos, 2014); 0.6 (Nilsson & Wadeskog, 1998)
Housing:	0.5 (Sinai, 2007); 0.4 (Albouy et al., 2014)
Heating:	0 (Nilsson & Wadeskog, 1998); 0.1 (Litman, 2016; Adam & Moutos, 2014; Albouy et al., 2014); 0.3 (Maniatis & Danchev, 2013)
Water:	0.2 (Gratziou & Andreadaki, 2005; Gratziou et al., 2006)
Electricity:	0.2 (Nilsson & Wadeskog, 1998); 0.1 (McConnell et al., 2012)
Transport:	0.6 (Fouquet, 2012; Litman, 2013); 0.3 (Nilsson & Wadeskog, 1998); 0.3 bus, 0.8 rail (Litman, 2016; Department of Infrastructure and Regional Development, n.d.)
Hotels:	1 (Stergiou, 2005); 1.1 (Candela & Figini, 2012)
Restaurants:	1 (Stergiou, 2005); 2.3 (McConnell et al., 2012)
Various goods & services:	0.5 (Nilsson & Wadeskog, 1998); 1 (Stergiou, 2005)
Health:	0.3 (McConnell et al., 2012; Adam & Moutos, 2014)
Medicine:	0.1 (Meyerhoefer & Zuvekas, 2006)
Clothing & footwear:	1.1 (Nilsson & Wadeskog, 1998); 0.7 (McConnell et al., 2012); 1 (Martinez, 2012)
Durable goods:	1.3 (McConnell et al., 2012)
Leisure:	1.1 (Nilsson & Wadeskog, 1998)
Culture:	0.6 (D'Angelo et al., 2010)
Books/theatre:	0.1 (McConnell et al., 2012)
Communication:	1.6 (AUEB, 2015)
Alcohol:	1.1 (Pavlou et al., 2011)
Tobacco:	0.3 (Nilsson & Wadeskog, 1998; McConnell et al., 2012); 0.5 (Adam & Moutos, 2014; Anderson et al., 1997); 0.4 (Tarantilis et al., 2015)
Education:	0.1 (Vedder, 2010); 0.4 (Campbell & Siegel, 1967); 0.6 (Parker, 2010)

Elasticities of demand for food sub-categories

Meat:	0.7 (Andreyeva et al., 2010; Okrent & Alston, 2012); 1.1 (Tiffin et al., 2011; Lechene, 2000); 1.3 (McConnell et al., 2012)
Dairy:	0.3 (Andreyeva et al., 2010; McConnell et al., 2012; Lechene, 2000); 0.2 (Okrent & Alston, 2012); 0.6 (Andreyeva et al., 2010; Tiffin et al., 2011; McConnell et al., 2012); 0.4 (Lechene, 2000; Okrent & Alston, 2012); 0.9 (Rizov et al., 2014)
Flour:	0.1 (Okrent & Alston, 2012)
Bread:	0.1 (McConnell et al., 2012); 0.4 (Lechene, 2000)
Cereals:	0.6 (Andreyeva et al., 2010); 0.9 (Lechene, 2000); 1.1 (Okrent & Alston, 2012); 0.7 (Rizov et al., 2014)
Vegetables:	0.5 (Lechene, 2000); 0.6 (Andreyeva et al., 2010); 0.9 (Tiffin et al., 2011; Okrent & Alston, 2012); 1.1 (Rizov et al., 2014)
Potatoes:	0.1 (Lechene, 2000); 0.3 (Tiffin et al., 2011); 0.4 (Okrent & Alston, 2012)
Fish:	0.5 (Andreyeva et al., 2010); 0.8 (Lechene, 2000; Okrent & Alston, 2012)
Fruit:	0.7 (Andreyeva et al., 2010; Tiffin et al., 2011); 0.3 (Lechene, 2000); 0.9 (Okrent & Alston, 2012); 1.1 (Rizov et al., 2014)
Fats & oils:	0.7 (Lechene, 2000); 0.2 (Okrent & Alston, 2012); 0.4 (Andreyeva et al., 2010); 0.6 (Tiffin et al., 2011)
Sugar and sweets:	0 (Stergiou, 2005); 0.3 (Andreyeva et al., 2010; McConnell et al., 2012); 0.8 (Lechene, 2000); 0.6 (Tiffin et al., 2011; Okrent & Alston, 2012); 0.1 (FAO, 2003)
Mineral water:	0.5 (Okrent & Alston, 2012)
Soft drinks:	0.8 (Andreyeva et al., 2010); 0.4 (Lechene, 2000); 0.3 (Okrent & Alston, 2012)
Coffee/tea/cocoa:	0.1 (Okrent & Alston, 2012); 0.3 (Anderson et al., 1997)
Various foods:	0.8 (Andreyeva et al., 2010); 0.6 (Lechene, 2000); 1.5 (Okrent & Alston, 2012); 0.8 (Rizov et al., 2014)

COMMENTARY

THE CASE FOR INTRODUCING INHERITANCE TAX IN INDIA

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Abstract

In the post-liberalization era, while sustained economic growth in India has facilitated significant wealth creation, massive tax evasion and avoidance by the wealthy class had limited the government's capacity to distribute the fruits of growth, contributing to widening income and wealth inequality. This creates sufficient grounds for introducing inheritance tax to promote inter-generational equity. However, the government must tread with caution, weigh unintended consequences, and take a holistic approach to addressing issues of distributional inequity in the country.

INTRODUCTION

Several advanced economies have long relied on estate duty or its variants like inheritance tax[4], capital acquisitions tax, estate tax via stamp duties, or capital transfer tax to garner fiscal resources, and use such taxes as tools to prevent concentration of income and wealth in the hands of a few. Critics have however argued that such transfer or death taxes prohibit capital accumulation and adversely affects growth in national wealth. The contrasting views are reflected in sovereign tax policies around the world. Thus, while 19 OECD countries levy some form of inheritance tax, 15 OECD countries levy no taxes on property passed to lineal heirs. In 2015, the average estate or inheritance tax rate in all OECD countries was 15 percent - the top rates ranging between 4 percent (in Italy) to 55 percent (in Japan), indicating the relative importance that different countries assign to such tax to attain fiscal and distributional objectives.

Among developing Asian economies, estate duty or inheritance tax has not been used that extensively as compared to OECD countries. Relatively richer Asian economies such as Singapore, Brunei, and Hong Kong had estate duty, but have abolished it over the last decade (Table 1). Currently, Philippines and Taiwan levy estate tax, with the highest rates at 20 and 10 percent respectively.

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[4] In popular press, while estate duty and inheritance tax are used interchangeably, there is a subtle difference between the two. Inheritance tax is imposed on the assets inherited from a deceased person. The inheritance tax rate generally depends on the value of the property received by the heir, and his relationship to the decedent. In contrast, an estate tax is calculated based on the net value of the property owned by a deceased person at the time of death. The tax is collected only if the value exceeds the exemption limit as applicable by law.

Table 1: Brief overview of Estate or Inheritance Tax Globally

Countries with highest Inheritance or Estate Tax as of 2015				Countries that have repealed Inheritance or Estate Tax since 2000		
Sl.no.	Country	Tax rate (%)	Tax Type	Sl.no.	Country	Year repealed
1	Japan	55	Inheritance Tax	1	Macau	2001
2	South Korea	50	Inheritance Tax	2	Portugal	2004
3	France	45	Inheritance Tax	3	Slovak Republic	2004
4	United Kingdom	40	Inheritance Tax	4	Sweden	2005
5	United States	40	Estate Tax	5	Russia	2005
6	Ecuador	35	Inheritance Tax	6	Hong Kong	2006
7	Spain	34	Estate Tax	7	Singapore	2008
8	Ireland	33	Capital Acquisitions Tax	8	Austria	2008
9	Belgium	30	Inheritance Tax	9	Liechtenstein	2011
10	Germany	30	Inheritance Tax	10	Brunei	2013
11	Chile	25	Estate Tax	11	Czech Republic	2014
12	Venezuela	25	Inheritance Tax	12	Norway	2014

Source: Adapted from Cole (2015)

In India, policymakers have been toying with the idea of introducing inheritance tax for the last five years. Though speculations on its introduction gather momentum before the presentation of the Union Budget each year, it has been shelved thereafter. In this article, we argue why there is a strong case for introducing an inheritance tax in India now and why an undue delay in its announcement and implementation could lead to serious economic and social costs to the country.

BRIEF HISTORY

There is no history of the imposition of inheritance tax in India. However, estate duty was prevalent during the 1953-1985 period. The Indian Estate Duty Act of 1953 was modeled after the British Finance Act of 1894, with suitable modifications made to meet the requirements of various succession laws prevalent at that point of time in India (Bagchee, 1954). It not only encompassed the assets conferred to the descendants upon the death of an individual but also the assets transferred in contemplation of death up to two years prior to death. For individuals and Hindu Undivided Family (HUF), all assets up to a threshold limit of INR 0.1 million and INR 0.05 million respectively were exempt while determining the taxable value of the estate.

Though the purpose of the duty was to augment government revenues and remove extant inequalities in income and wealth, it failed to achieve the objectives due to the very low marginal benefit (in revenue terms) and the innumerable litigation into which the government found itself trapped, due to complex nature of the Act. The low threshold and progressively high duties led to evasion and avoidance, rendering it futile, as the yield from the tax was lower than the cost of its administration. The duty was therefore abolished in 1985. At the time of abolition, the duty was pegged at an abnormally high rate of 85 percent on an estate value exceeding INR 2 million.

THE RATIONALE

While it is true that estate duty in post-independence India was rendered ineffective in serving its objectives, there is a need to re-assess the potential role that it can play today, in a post-liberalized era[5]. The assessment also assumes importance given that India's impressive growth has also been accompanied by rising wealth and income inequality in the post-reforms period. Our argument that it is an opportune time to introduce the inheritance tax now rests on two crucial aspects of the Indian economy – fiscal and distributional.

On the fiscal side, India has been running a fiscal deficit consistently in the post-reforms period. Despite high economic growth in the 2000-2010 period, revenue remained less buoyant[6]. Since the beginning of this decade, as growth began to decelerate[7], massive government expenditure programmes were initiated at periodic intervals to reverse the slowdown. In the recent past, for example, the Union Government has undertaken bank recapitalization programme; announced massive expenditure plans to speed-up infrastructure development; and introduced various social sector programmes like farm loan waiver and a universal health insurance programme on the lines of 'Obamacare.'

The above suggests that while government expenditure rose rapidly, similar growth in government revenues was not evident. As a result, the government has failed to meet fiscal targets consistently. For example, in the current fiscal (2017-18), ending March 2018, and for the next financial year (April 2018 to March 2019) there is a clear indication of deviation from the path of fiscal discipline. The fiscal deficit in 2017-18 stood at 3.5 percent of GDP, and the budgeted deficit for 2018-19 projected at 3.3 percent of GDP. These numbers are significantly higher than the target rate of 3 percent of GDP, recommended under the Fiscal Responsibility and Budget Management (FRBM) Act[8].

The above makes it imperative that if the government has to follow the path of fiscal discipline, it needs to find out newer avenues of garnering resources. While recent implementation of the Goods and Services Tax (GST), considered a major indirect tax reform, could potentially improve the fiscal health, transitional complexities and implementation woes may mean that the benefits shall accrue only in the medium to long-term. In such a scenario introduction of inheritance tax could potentially augment government revenues, and bridge the fiscal deficit at least to some extent.

When the estate duty was abolished more than thirty years ago, it was premised on the rationale that the net benefits accruing from the tax were negative. Much of it was attributed to capacity

[5] India faced a severe balance of payments crisis in 1991, following which the country undertook structural reforms to unshackle the economy from heavy controls to market-oriented policies, following the principles of Washington Consensus. Among other things, it included privatization of domestic enterprises, interest rate deregulation, adoption of flexible exchange rate regime, trade liberalization, and reducing barriers for foreign capital flows.

[6] India compares unfavorably vis-a-vis its peers when it comes to garnering tax revenues. According to OECD Economic survey (2017), as of 2014, the tax-GDP ratio in India stood at 16.8 percent, much lower compared to Brazil (33.4 percent), China (24.8 percent), Russia (28.2) and South Africa (27.8).

[7] This was partly due to the risk-averse lending behavior of the banking sector, which became overburdened with non-performing loans. Weak investments only added to the woes, ultimately impacting the government's revenues adversely.

[8] The FRBM Act, 2003 was introduced in India to reduce revenue deficit, inculcate fiscal discipline and improve the overall macroeconomic management. The FRBM rule set a target reduction of fiscal deficit to 3% of GDP to be achieved by 2008-09. The targets were unmet. The most recent amendment in 2016 has set the fiscal deficit target at 3 percent of GDP for the years up to 2020.

constraints in tax administration involving such a complex tax. However, it is worthwhile to mention that the estate duty in India was prevalent and abolished in the pre-liberalization period. The ICT revolution that gained momentum in the mid-1990s had a significant role in modernizing and transforming the economy. Concomitantly there has also been a slow, yet discernible improvement in the government's tax administration capacity.

The current government has laid much emphasis on moving towards a digital economy. In line with it, the Indian tax authorities are in the process of using technology to widen the tax net. For instance, under Project INSIGHT initiated by the Central Board of Direct Taxes (CBDT), the principal tax governing authority in India, an integrated Data Warehousing and Business Intelligence platform has been set up. It envisages using various analytics tools and techniques like descriptive, diagnostic, predictive, and prescriptive analytics to enable broadening the tax base, enhance tax compliance, and effectively monitor tax evasion. A simple and non-intrusive compliance module for broadening of the tax base is already in place and pilot projects like non-filers monitoring system (NMS), return mismatch verification system (RVMS), verification of foreign remittances, etc. are already yielding short-term results. Further, to ensure better tax governance and to cater to the dynamic requirements of tax administration, several capacity-building partnerships have been initiated with industry, academic, and research institutions. All such initiatives can significantly reduce the marginal cost of administering the inheritance tax, help effectively monitor compliance, and thereby contribute to enhancing government revenues.

From a distributional point of view, inheritance tax can be an effective measure to promote inter-generational equity. Recent research has indicated that India's income and wealth disparity has been increasing alarmingly. Chancel and Piketty (2017), analyzing the dynamics of Indian income inequality between 1922 and 2014, had found that income inequality in India is at its peak since 1922 when the income tax was first introduced in India. While in the 1930s the top 1 percent of the earners in India accounted for less than 21 percent of total income, it dropped significantly to 6 percent in the 1980s, but thereafter steadily increased to a historical high of 22 percent in 2014. This suggests that although the per capita income of Indians have risen, growth in the post-liberalization period has failed to be inclusive. On the contrary, it has been highly skewed, favoring the rich as is evident from the rising number of Indian millionaires and billionaires.

The World Inequality Report 2018 pointed out that while the bottom 50 percent and the middle 40 percent recorded a meagre 89% and 93% growth in total income between 1980 and 2014, the top 10 percent recorded 394 percent rise in total income, which is more than twice the sum recorded by the rest 90 percent of the population. Further breakup shows that top 0.1 percent, 0.01 percent and 0.001 percent of the population received 1138 percent, 1834 percent and 2726 percent rise in total income respectively. This suggests high levels of income concentration in India.

The wealth inequality in India has also been alarming with the richest 1 percent owning 58.4 percent and the richest 10 percent accounting for 80.7 percent of the nation's wealth. In contrast, the bottom 50 percent of the population own only a meager 2.1 percent of the national wealth (Credit Suisse, 2016). A report by consultancy firm Knight Frank points out that with 500 new additions per year, the rise in high net worth individuals (HNWIs) was about 290 percent in the period between 2006 and 2016, and is expected to double with 1000 additions per year between 2016 and 2026 (Knight Frank, 2017).

However, the tax revenue accruing from this section of the population has not increased commensurately. In a country with more than 1,250 million people, only 37 million filed their income taxes in 2015-16. Amongst those paying their taxes, 5.2 million showed income between INR 0.5 million and INR 1.0 million; 2.4 million people declared income above INR 1 million; 0.17 million people declared income above INR 5.0 million, and only about 43,000 have reported taxable income above INR 10 million! Even among the 7.6 million individual assessees with a declared income of above Rs. 0.5 million, 5.6 million (about 74 percent of the total) belonged to the salaried class. Juxtaposing this with the fact that in 2015-16, about 20 million Indians flew abroad for business and tourism purposes, and more than 12.5 million cars sold in the last five years in India, it is evident that while income and wealth of the rich has increased manifold, this section of the population has found innovative means to subvert the Indian tax system.

The strange case of Mauritius, which is by far the largest source country for inward FDI, has served as a tax haven and a breeding ground for money laundering and 'round-tripping' by wealthy individuals and corporates. According to a submission by the Finance Minister to the Parliament, only 28,667 companies have shown profit between INR 10 million to INR 100 million, and only 7,781 companies have profit before tax of more than INR 100 million. Three major global financial leaks in the last three years - the Swiss Leaks (2014), the Panama Papers (2015) and the Paradise Papers (2017), which documents large-scale money laundering activity by the rich and powerful in India bears credence to the fact that it may be an opportune time to address these issues.

If such high levels of income and wealth inequality continue to grow, and no efforts are made by the government to address this by compelling the rich to contribute a larger proportion of their income and wealth to achieve more equitable distributional outcomes, it could increase social, economic, and political tensions in the country. Inheritance tax, coupled with associated tax reforms, can aid in reducing intra-generational inequality, promote inter-generation equity, and serve a meaningful purpose to address the distributional gaps that exist in India today.

TREAD WITH CAUTION

While the above suggests that there is merit in levying inheritance tax now, the government needs to tread with caution. It is imperative to take a systemic view of the malaise, rather than to approach this in an *ad-hoc* manner.

First, the government needs to be mindful of the fact that levying such a tax can have only a limited impact in increasing government revenues. In developed countries like the United States, the estate tax itself comprises of a very meager amount (US$15 – 26 billion per annum) of the total receipts of the government. Considering India in light of such statistics, where the per capita GDP and tax compliance is much lower, it can only have a low marginal impact on improving the fiscals. This should however not deter the government, as the marginal economic (fiscal) benefits need to be seen in conjunction with the large social benefits (equity) that shall accrue from such a tax.

Second, to ensure the effectiveness of inheritance tax, other related or complementary taxes, like a Gift Tax and a Wealth Tax should be introduced to deter tax-avoidance. This assumes importance in India where the *'benami property'* is a menace and there is increasing evidence of the creation of family trusts like the Hindu Undivided Family (HUF) by the high net-worth individuals for tax avoidance purposes.

Third, from a redistributional perspective, imposing the inheritance tax per se is not enough to reduce inequality, without addressing the structural problems that aggravate the income and wealth divide. The evidence of rising inequalities in income and wealth in developed countries, where such a tax is present over a substantial period, bears testimony. For example, Saez and Zucman (2016) document the U-shaped form of wealth inequality in the United States for individuals in top 1% of the wealth distribution and further notes the constant share of wealth owned by the middle class.

Also, as pointed out by Chancel and Piketty (2017) the share of GDP accruing to the bottom 50 percent of the population in India and China are almost similar since the 1980s. However, the major difference arises from the fact that whereas only 23 percent of the increase in GDP accrued to middle 40 percent in India, the same constituted about 43 percent in China. The richest 1 percent captures the difference of 20 percentage points in India. The main implication of this is that distributional efforts by the government should focus on job creation in the modern sectors of the economy, and increase expenditure on education and health, which can significantly impact lifetime incomes, and wealth creation by those at the bottom of the pyramid. Unfortunately, the expenditure on education and health has been shrinking in India continuously.

Fourth, it is advisable that an inheritance tax, which targets the beneficiaries, is better suited to promote inter-generational equity rather than re-introducing estate duty, which targets the estate owner. This will have dual implications. On the one hand, it will not disincentivize capital formation and wealth creation in the economy (Seidman 1983), and on the other, by targeting the beneficiaries, it will avoid adverse labor market implications as a large bequeath can substantially reduce work effort. To start with, a high threshold value (targeting the ultra-rich) and a moderate tax rate, benchmarked to similar developing economies, should be set to ensure better compliance.

Finally, the imposition of such a tax should not serve only a symbolic value as a step against corrupt practices of the wealthy. Lack of adequate groundwork and preparedness to administer the tax can render the exercise futile, even if introduced with honest intentions.

CONCLUDING REMARKS

No question that the divide between the rich and the poor in India has increased, and needs urgent attention of the policymakers. Inheritance tax can serve a useful objective of reducing wealth and income inequality within and across generations. However, this will require earnest intent; massive efforts in planning, execution, and monitoring; and associated tax reforms to ensure that the real objectives of imposing an inheritance tax are realized. While inheritance tax can only have a marginal fiscal impact, it can nevertheless address the substantial distributional inequities that exist in India today.

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COMMENTARY

RE-USING TAXPAYER'S DATA: SCENARIOS FOR WEALTH MANAGEMENT FOR THE PUBLIC

Eleonora Johanna Kuiper and Marijn Janssen[1]

Abstract

Tax Administrations have a huge amount of tax-related data that can be re-used for the benefit of the taxpayers, similarly to the way private banks and wealth managers use their clients' financial information. However, usage of tax data is not trivial, as Tax Administrations have to adhere to legislation that does not allow them to compete with private actors. Public organizations cannot simply provide financial advisory services, even though it could be a way to increase tax compliance. This raises the question of how taxpayer's data can be used in the future. Our objective is to explore future scenarios to empower the public in a fiscal and financial sense and improve wealth by re-using tax data. Future scenarios are described along two axes. One axis contains the content of the advice, and the other axis the participating actors. Concepts from wealth management, the wealth management pyramid and client segments, are used and extended for this purpose. To realize scenarios, barriers must be overcome in the field of law, workload, privacy, permission, quality of service and accountability, liability, consumer protection, the rights of citizens concerning data and funding. Implications are indicated in the scenarios and in further investigations. The value of this paper lies in exploring an original idea of re-using taxpayers' data and to stimulate innovation in this area.

Keywords: financial crisis, financial health, financial wealth, fiscal compliance, tax data, wealth management

1. INTRODUCTION

Tax Administrations from all over the world collect data that can provide insights for personal financial management and can be used to help the public. This data can be used to answer questions like: Are your loans in balance with your income level? Should you build up more reserves for retirement or emergencies? Are you using allowances to which you are entitled? We entered the conversation on wealth management for the public at large at a seminar in London in 2011, where the lead author discussed the future role of the Tax Administrations in relation to financial crises with a participant, who worked for a company delivering wealth management software to private banks. In this discussion the idea was developed that in the future Tax Administrations could become the wealth managers of the public by using software for the taxpayer, comparable to the software that private bankers use to advice their wealthy clients. The initial vision was "to make the Tax Authority the wealth advisor for the person in the street" (Chief enterprise architect, e-mail, September 10, 2012). However, other scenarios are possible to re-use tax data.

Tax Administrations have financial information on taxpayers and their households and gather more and more information every year to fulfil their tasks. This data might be re-used to provide

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financial advice to the public to improve their financial management, although there are barriers preventing this. In this vision, a society should be able to develop a situation in which not only the wealthy few would get proper financial advice, but every taxpayer in need of such advice. However, currently the income tax data is gathered for tax purposes only and may not be used for other purposes. The data are both personal and confidential. Data protection and privacy laws apply. Tax Administrations are tied by fiscal laws and laws on competition and have to deal with the changing tax regulations imposed upon them every year. Thus, Tax Administrations cannot simply extend their scope of work into a domain which is currently dominated by commercial actors.

The traditional roles of the government are changing. Janssen and Estevez (2013) describe three waves of government: e-government, t-government and l-government. E-government uses ICT to improve services to the public, t-government is transforming itself to reform bureaucracy, and l-government strives after lean government, doing more with less, and using actors in the environment and platforms. In the latter the government facilitates and steers rather than doing everything itself.

Roller (1995) considers wealth as a policy goal for government. In policy, wealth is associated with items such as fighting rising prices and ensuring energy supplies are maintained, but not with wealth management as such. Wealth management might empower the public and contribute to the policy goals of government.

Were government to enter the area of wealth management it would compete, to some extent, with the market. "Demands for government intervention thrive on failures of the capitalist economy" (Borre & Viegas, 1995, p. 276). Tanzi (2011) also recognizes that market failure is a guiding principle for government to act upon, but he suggests that governments should direct their efforts more to promote market efficiency and market equity, instead of trying to replace the market. According to Buchanan, cited in (Tanzi, 2005), government intervention to correct shortcomings of the market can make things worse rather than better.

Tax Administrations have the data to enable the provision of wealth advice for the public. Implementation of wealth management for the public can take various forms. The objective of this paper is to explore future scenarios using concepts from wealth management. This work is explorative in nature and wants to raise awareness of this new venue and to provide a basis for further thinking and discussion.

The following questions are asked:

- What are future scenarios to re-use income tax data for wealth management?
- Which barriers prevent realization of these scenarios?

Section 2 provides definitions and an extension of a wealth management concept as a basis for common understanding. Section 3 provides information on the method. Section 4 presents a rationale for the need for wealth management for the public based on literature review. In section 5 scenarios to implement wealth management for the public are developed. Section 6 presents a preliminary identification of barriers. In section 7 conclusions and research perspectives are provided.

2. DEFINITIONS

In this section the background and definitions of key terms are provided as a basis for mutual understanding and further discussion. New client segments and an extended wealth management pyramid are developed to make the target group larger than only the wealthy few.

"'*Financial health'* is that the money coming in is greater than the money going out when the necessary expenses are paid for" (Anonymous, 2014).

Wealth management is often associated with wealthy people and the management of their investment portfolios. Maude (2006) defines *wealth management* as "Financial services provided to wealthy clients, mainly individuals and their families. Private banking forms an important, more exclusive, subset of wealth management. At least until recently, it largely consisted of banking services (deposit taking and payments), discretionary asset management, brokerage, limited tax advisory services and some basic concierge-type services, offered by a single designated relationship manager." (Maude, 2006, p. 1). Maude's definition shows that wealth management is much broader than only managing investment portfolios, that a relationship manager provides the services to the client, and that wealth management is provided only to wealthy clients.

Wealth management is traditionally only for the rich clients. If wealth management were to become available to all, it would require a different client segmentation. *Client segmentation* is "the art and science of tailoring and delivering products and services to distinct client groups" (Maude, p. 54). The financial sector works with a client segmentation, based on the net worth of individuals or families. *Net worth* is the value of assets minus liabilities. "Private banking targets only the very wealthiest clients or high net worth individuals (HNWIs): broadly speaking, those with more than around $1 million in investable assets. Wealth management, by contrast, targets clients with assets as low as $100,000, i.e. affluent as well as high net worth (HNW) clients." (Maude, 2006, p. 2). The most basic approach is to segment the client base based on the amount of wealth (Maude, 2006, p.55), for example: Affluent, High Net Worth, Very High Net Worth, and Ultra High Net Worth, see the wealth management pyramid (PricewaterhouseCoopers, 2005) depicted in Figure 1 on the left hand side. Client segmentation typically varies in time, per organisation and per country, for instance IMCA uses a minimum net worth of $5 million in order to be considered a high-net-worth client (IMCA, 2012). More elaborate client segmentations use multiple criteria such as asset size, account age, tax situation, life-cycle status, event, product stage, risk readiness and geography (Maude, 2006, p. 61).

Wealth management could target other segments than the wealthy few, for instance segments with a lower net worth or lower income class than the affluent. These clients are particularly in need of services and regular advice on how to reach a healthy financial situation and become wealthier. Therefore, we introduce new client segments: Medium Net Worth (MNW), Low Net Worth (LNW), and Negative Net Worth (NNW) clients. The amount

of wealth associated with these segments may vary. As an initial indication for western countries the following amounts can serve: MNW ($50,000 - $100,000), LNW ($0 - $50,000) and NNW (less than $0). For non-western countries this will be different. The extension of the client segmentation results in a new wealth management pyramid, as shown in Figure 1 on the right hand side.

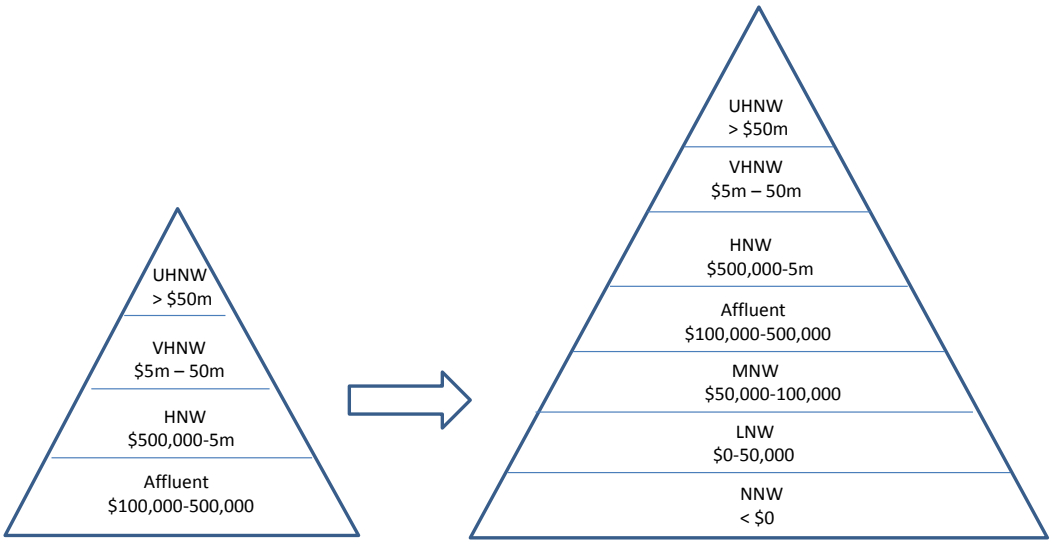

Fig. 1: Wealth management pyramids. On the left the traditional pyramid, see (Pricewaterhouse Coopers, 2005), on the right a new pyramid with an extended client segmentation for wealth management for the public.

Wealth management for the public is the provision of financial services provided to the public at large. It consists of tax advisory services to improve their fiscal self-reliance, regular signals on their financial position to remain or become financially healthy or wealthy, and references to relevant public and private actors on the financial market to follow up on advice given.

Personalized financial advice is bespoke financial advice to a taxpayer, which is based on the current fiscal and financial situation and the relevant history of that taxpayer over the past year(s). The advice may also provide a prognosis for the future by extrapolating the trends of the past and taking into account the upcoming government measures with taxes, welfare etcetera.

Fiscal self-reliance is "Being able to handle fiscal matters in an independent way, using the available information channels, understanding the fiscal rules, having a support network, knowing how to organize it and having control over one's fiscal issues" (Dutch Tax Administration, 2014).

Fiscal compliance is the "Degree to which a taxpayer complies (or fails to comply) with the tax rules of his country, for example by declaring income, filing a return, and paying the tax due in a timely manner" (MoneyControl, 2018).

3. METHOD

The suggestion to re-use tax data for wealth management for the public was further developed in discussions with managers, policy makers and employees at a Tax Administration using presentations and discussions in the period 2012-2013. One session with about ten participants took place with high level management and external people from academia.

The participants were selected based on the diversity of their roles in the Tax Administration. Some could be potential sponsors of the idea, others were policy or legal advisors. The selection of people materialized in this way because this Tax Administration asked people with innovative ideas to find a sponsor at the management level in order to proceed with the implementation of the idea and to claim resources. These discussions served to develop the two axes of the scenario logic, see Figure 2, and enriched the initial idea of wealth management for the public with implementation options related to whom was involved, how extensive the advice could be, and with descriptions of barriers to be addressed.

Scenario thinking (Schwarz, 1996) was used to explore the directions by structuring the information obtained from literature and discussions, since scenarios can describe uncertain futures. The steps for scenario development used here are, modified from (Ringland, 1998, p. 228-233):

1. Identify the focal issue or decision. Which important decision has to be made?
2. List key forces in the environment. Which key forces influence the success or failure of that decision?
3. List driving forces in the environment. Which forces are predetermined, which are uncertain?
4. Rank these key factors and driving forces by importance and uncertainty. Which factors are most important and most uncertain?
5. Select the scenario logic. Which axes can be used to depict the scenarios? The previous ranking exercise results in axes for the scenarios, which allow the selection of the most important scenarios in order to prevent proliferation of scenarios.
6. Describe the scenarios. A narrative with a scenario title should capture the dynamics of the situation and communicate the point.
7. Explore implications. What does the main decision look in each scenario?
8. Select leading indicators. Which indicators can be identified to monitor the scenarios?

These steps are described in section 5. This approach resulted in nine scenarios from which two scenarios, resulting from the discussions, will be described in detail section 5.

Subsequently barriers were identified during discussions with policy and legal advisors of a Tax Administration, see section 6.

4. RATIONALE FOR WEALTH MANAGEMENT FOR THE PUBLIC

Why is another way of looking at wealth management desirable? In this section we connect the need for wealth management to recurring financial crises, financial illiteracy of the public and fiscal self-reliance by means of a literature review. Then we describe some other initiatives to strengthen citizens to identify a hiatus.

Financial crises occur throughout history. Kindleberger & Aliber (2008) derived a timeline of nearly forty financial crises in the period 1618 till 1998. The most recent crisis has engulfed Europe since 2008. Financial crises often last for several years and have a profound negative

impact on society. The citizens are often badly hit by financial crises. Despite income tax data being available at the Tax Administrations, tax intermediaries and households, this data is not re-used to empower taxpayers and improve their wealth, such that they can better withstand new financial crises.

Over the past decades there has been a shift in responsibilities concerning financial and social care from the government to the citizens in various countries. Politicians view this as less of a job for the government and as a consequence the government provides less support. However, it is questionable whether the citizens are capable of taking financial decisions autonomously, given the complex products and regulations of the financial markets (Schoneville & Verhage, 2012). Citizens are vulnerable to financial crises. Van Rooij, Lusardie and Alessie state that "Most households lack knowledge of fundamental financial concepts" (Rooij, van, Lusardi & Alessie, 2011, p. 594). The Dutch Bank, DNB, performed research on the financial literacy of citizens and found that financial literacy of Dutch households was below the norm (Rooij, van, Lusardi & Alessie, 2007). A similar conclusion was arrived at by Schoneville and Verhage (2012). The Dutch Financial Capability Survey of the Treasury Department showed, that "the financial situation of large groups of consumers is vulnerable: one in ten consumers has difficulty in making ends meet and four in ten consumers do not have sufficient buffers to deal with large unforeseen expenditures or income shocks caused by unemployment, divorce or the onset of a chronic illness" (Rooij, van, et al., 2011, p. 604). This research showed that most Dutch households lack knowledge of financial concepts, and that "women and those with low educational attainment display the lowest levels of financial knowledge", see (Rooij, van, et al., 2011, p. 594).

Many citizens are not fiscally independent as one Tax Administration employee commented: "20 % of the citizens do not make use of their rights. This also concerns other public organizations" (Senior policy advisor of a Tax Administration, December 5, 2012).

There already exist initiatives to strengthen the citizen financially. For example in the Netherlands the following initiatives are available:

- Help to people who have debts by budget coaches, city credit banks and nutrition banks of local authorities;
- Help to survive the financial crisis by trying to lower the costs for fixed costs such as costs for energy and water of households by entrepreneurs;
- Assistance by budget institutes with general (non-personalized) advice, information and guidelines.

In the United Kingdom an organization exists, sponsored by government, where citizens can obtain advice on their financial health, see (Citizens Advice Bureau, 2016). In the United States and Austria, income tax preparation software can provide personalized financial advice in addition to fiscal advice (Peak & Buckner, 2003). Some patents are in place. For instance in (Peak & Buckner, 2003) a solution is proposed for tax preparation software, provided by private organizations, that generates a personalized tax advice based on tax return data. The contents of the personalized advice ranges from fiscal advice such as child care tax credits, financial advice such as a saving strategy for retirement, saving for children's study, and general advice to make use of certain governmental services such as a nutrition bank.

There are relatively cheap wealth management services from third parties – that accompany brokerage accounts. In the United States, annual statements are provided that disclose portfolio holdings, short/long term capital gains and losses. Social security is collected from taxpayers,

and then forecasts can be obtained from the Social Security Administration (Reviewer, e-mail, January 17, 2018).

However, none of the initiatives above reaches the public at large. This hiatus can be imbued by wealth management for the public re-using tax data.

5. FUTURE SCENARIOS FOR WEALTH MANAGEMNT

The scenarios explore ways to realize wealth management for the public, taking into account the information gathered during interviews and presentations in a Tax Administration. The scenarios serve to open up and to broaden the thinking and discussion on providing personalized wealth management to the public in the sense that actors other than the Tax Administration can be involved in the implementation of this policy idea.

Sardar's third law is "Futures studies need to be sceptical of simple, one dimensional solutions to wicked problems as well as of dominant ideas, projections, predictions, forecasts and notions of truth to ensure that the future is not foreclosed and colonised by a single culture" (Sardar, 2010, p. 183). The scenarios below implicitly question the following dominant assumptions:

- The need for withdrawal of the government. Do technological developments enable new services without costing much effort of civil servants, keeping government lean?
- The legal setting on the division of tasks between public and private actors in the financial sector, and the forms of cooperation between public and private actors. Should public and private actors cooperate more, or in different ways, to keep the public financially healthy / wealthy?
- Wealth management is only needed by the wealthy few. Why not use it for the public at large to address financial crises pro-actively?

In the text below the eight steps for developing scenarios are described.

Step1: The scenarios focus on the issue of improving the wealth of the public, such that the public can better withstand difficult financial situations. How can the fiscal / financial situation of the public be improved on a regular basis, and by which actors? Once this question can be answered and acted upon, it is likely to have a long-term, positive influence on the welfare of society and on tax revenue. The main decision to take is: Shall we provide wealth management to the public by re-using income tax data?

Step 2: The financial vulnerability of households and the financial crisis have created a difficult situation for many people in many countries. Key forces are the ongoing financial crisis combined with financial illiteracy of households. The financial crises inspire reflection on the future role and scope of Tax Administrations.

Steps 3, 4 and 5: We have identified the following driving forces:

- Personalization, or 'the action that tailors the experience to a particular user or set of users', modified from (Mobasher, Cooley & Srivistava, 2006).
- The technology hype on data. There is a trend to use data in other ways, see for instance (Shadbolt & O'Hara, 2013). This trend brings along new technologies like data analytics enabling us to move forward from general advice to the public by budget institutes to personalized advice.
- The need for fiscal compliance and fiscal self-reliance.

If we rank the key factors and driving forces in order of importance in a subjective way, the result is:

1. Financial crisis and illiteracy;
2. Need for fiscal compliance and fiscal self-reliance;
3. Personalization and the technology hype on data.

Ranking will be country specific. In the Netherlands, the financial crisis is considered to have the largest impact of all forces. Only 4% of the Dutch taxpayers is estimated to be non-compliant. This is still a large number of households to deal with for a Tax Administration. In other countries non-compliant taxpayers may be a higher percentage and a stronger force. Personalization and the technology hype on data serve as enablers for the scenarios.

The key factors and driving forces are in a way predetermined. For instance we expect that financial crises will occur again, but we do not know where and when. In derogation from Schwarz's step 5 (Schwarz, 1996), we do not base the scenario logic on the most important key factors and driving forces. Instead we base the scenario logic on what is uncertain in the solution space: first, it is uncertain which actors will provide wealth management to the public, and second, it is uncertain what the scope and content of the personalized financial advice will be, given the different legal and political settings in the countries.

The axes considered in the scenario logic are: x - Which actors provide wealth management to the public? y - What is the scope and type of content of the advice? Figure 2 shows the two axes used for the scenario logic.

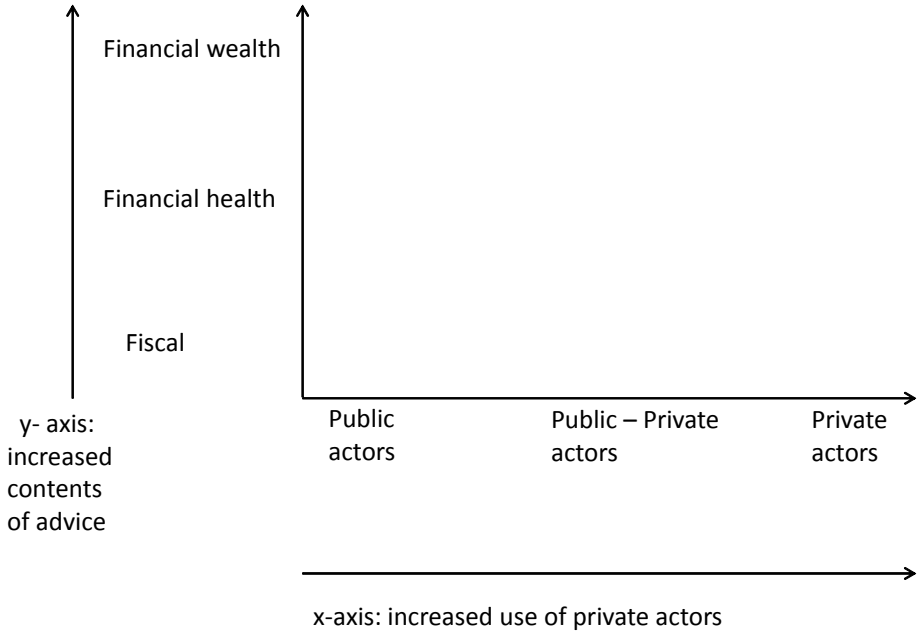

Fig. 2: Two axes for scenario logic relating to actors (x-axis) and to the scope and type of contents of the advice (y-axis)

The x-axis depicts three options on which actors provide wealth management advice to the public:

1. Public actors. These public actors can be the Tax Administration in cooperation with other public organizations such as public budget institutes, which can provide a follow-up with the taxpayers on the automatically generated advice.
2. Public-private actors, each exercising its role according to what the current legal setting in the specific country allows them to do. This can be Public Private Partnerships (PPP), Public Private People Partnerships (PPPP), see (Ng et al., 2013), or other cooperation forms between public and private actors.
3. Private actors, for instance tax preparation software providers, fiscal advisors, or financial organizations see (Peak & Buckner, 2003; H&R Block, 2014; Turbo Tax, 2014).

These options are described below.

Public actors option: By doing something in return for the data in the income tax form and the tax payment, a Tax Administration can change the relationship with the taxpayer in a positive way. The Tax Administration then uses the reciprocity principle in order to stimulate cooperation between the taxpayer and the Tax Administration for tax compliance, see (Axelrod, 1984) on using reciprocity to stimulate cooperation between actors by doing something in return for services provided. Barriers to address are first, that Tax Administrations cannot simply start an advisory service since they are bound by law in what they can and cannot do, and second, that "Tax Administrations are occupied already by their primary tasks for handling taxes and changes in laws concerning tax" (Manager in a Tax Administration, discussion, February 7, 2013).

Public-private actors option: Is the current division of tasks between public and private actors in the financial sector beneficial for addressing financial crises? The long time it takes to overcome financial crises renders that unlikely. Many financial advices do not take the interest of the client as the focal point, but are a way of selling financial products. A combination of public and private actors may bring some balance in the financial services sector and more focus on the interests of the citizens and the economy as a whole. Table 1 provides a non-exhaustive list of differences between banks and Tax Administrations. Similar to private banks, which follow the financial position of their clients during their lifetime, Tax Administrations have a lifetime overview of the financial position of the taxpayers. Banks and Tax Administrations could complement one another, especially in obtaining a more complete picture on the financial position of a taxpayer to base a proper, personalized financial advice on. Combining the financial knowledge of the private financial actors with the re-use of income tax data of the Tax Administrations may lead to increased wealth of the public and new remedies to financial crises.

Table 1: Comparison of banks and Tax Administrations

Criterion	**Banks**	**Tax Administrations**
View of the clients	Have a transactional view of their clients based on incoming and outgoing payments.	Have a lifetime and relatively complete overview of the financial position of the taxpayer based on the income tax data.
Type of actor	Private actor.	Public actor.

Client base	Clients can choose their bank. The bank only addresses its clients, so not the public.	Taxpayers have to work with their national Tax Administration. The Tax Administrations address the public.
Commercial interest	Commercial interest to sell financial products to clients, possibly leading to sub-optimal advice.	No commercial interest.

Private actors option: Private actors can provide wealth management to the public based on the income tax data made available to them by the taxpayers.

The initial suggestion was that the Tax Administration could become the wealth manager for the public, but a Tax Administration can take on various roles, for instance as:

- A public advisory actor;
- A data broker to the taxpayer and the taxpayer's advisory actors;
- A guardian, who puts requirements on the potential uses of the data by advisory actors that would safeguard the social goal of wealth management for the public.

From a broader perspective the Tax Administration can assume the role of an enabler or driver of social innovation. The role of data broker of a Tax Administration is mentioned since income tax data over the years is required to base a personalized advice on. This data need not be retrieved from a Tax Administration, but may also be directly retrieved from the taxpayers, who may have the data on their home computers. However, many taxpayers will not have these data available over all the years, only the most recent data due to computer upgrades etcetera. Then a Tax Administration may provide historical income tax data from its archives to the taxpayer, or to the taxpayer's advisory actors at the request of the taxpayer.

The y-axis represents an increased content of the advice ranging from advice for fiscal self-reliance advice to a financial wealth advice. The y-axis depicts three options on the type and contents of the advice:

1. Fiscal advice to maintain or improve fiscal self-reliance. The citizen is made aware of fiscal options that were wrongly overlooked and can then take advantage of these options.
2. Financial health advice to maintain or improve the financial health of the citizen. The citizen is made aware of a healthy balance between debts and income for the relevant income level.
3. Financial wealth advice to maintain or improve the financial wealth of the citizen. The citizen receives advice on wealth issues such as pensions, reserves needed, saving or investing etcetera.

Step 6: The two axes, each with three options, enable the creation of nine scenarios to realize wealth management for the public, as shown in Table 2.

Table 2: Scenarios

Actors -> Area of advice	**Public actors**	**Public – private actors (PPP, PPPP or other)**	**Private actors**
Fiscal advice	Scenario 1	Scenario 4	Scenario 7
Financial health advice	Scenario 2	Scenario 5: Tax Administration cooperating with start-ups.	Scenario 8
Financial wealth advice	Scenario 3: Tax Administration as a driver of social innovation.	Scenario 6	Scenario 9

Scenarios 4-6 conform to the lean government wave (Janssen & Estevez, 2013), since they describe a way of doing more with less and involving private actors. Countries can choose a suitable scenario or design their own scenarios. In scenarios 4-6 public actors provide input to private actors, but only at the request of the taxpayer. The taxpayers remain in control over their data. Below we describe only two scenarios, 3 and 5. We leave the other scenarios to the imagination of the reader.

"I would like to propose to first incorporate in the advice to the citizen the regulations of which the citizen has a right to use, but does not yet exercise that right. 20 % of the citizens do not make use of their rights. This also concerns other public organizations (than the Tax Administration). This is meant to increase the self-reliance of taxpayers. Subsequently we can start giving advice on the financial position of the citizens." (Senior policy advisor, discussion, December 5, 2012). In the Netherlands some tax regulations for the benefits of citizens require, that the citizen explicitly asks for it. When citizens do not ask, since they are not aware of (or knowledgeable on) these tax regulations, they do not receive the money associated with the regulation. This quote reveals a roadmap concerning the content of the advice, ranging from increasing fiscal self-reliance, to financial health and ultimately to financial wealth. A roadmap for the content of the advice is based on the time dimension. The personalized advice can start by looking at the past year, and then proceed to the present and future years, taking into account the tax regulations of the government for the present and future years.

The scenarios describe a way of working in analogy to what wealth managers do for their wealthy clients, but now for the public at large. The software of wealth managers compares the financial situation of a wealthy individual or family to a profile for a certain wealth and income class. Then personalized advice is generated using software for the relationship manager of the private bank as a basis for a discussion with the wealthy client. The client is advised on how to stay wealthy or, if possible, become wealthier. For wealth management for the public the solution suggested here is to provide a regular, automated advisory service based on income tax data to the taxpayers, which works with software that does not require relationship managers. The software required can be adapted wealth management software, or software that is specifically designed for this purpose. The role of the relationship managers in current wealth management can be fulfilled by public bodies, like budget institutes, or actors on the financial market if the taxpayers subsequently want more extensive explanations or follow up actions on the automated personalized advice they receive. Table 3 compares traditional wealth management and wealth management for the public.

Table 3: Comparison between traditional wealth management and wealth management for the public

	Traditional wealth management	**Wealth management for the public**
Client segment	Affluents, HNW, VHNW, UHNW.	NNW, LNW, MNW, Affluents, HNW, VHNW, UHNW.
Communication with the client	Via relationship or wealth managers.	Via an automated advice, possibly extended with public bodies and / or financial advisors for follow up.
Generation of advice	Partially automated using wealth management software, client profiles and the expertise of a wealth manager.	Fully automated using client profiles, specific software and income tax data.

Advice is based on	Data on investment portfolios, knowledge of family assets, culture etcetera.	Income tax data of households over the years, government regulations.

The public also contains affluents, HNWs, VHNWs and UHNWs. It is likely that these citizens will continue to need traditional wealth management for their assets and investment portfolios. Wealth management for the public is a way to extend traditional wealth management to other client segments with less net worth than the affluents. These segments now only have basic banking services available.

Figure 3 shows a common information exchange between the taxpayer and the actors who provide advice. The taxpayer makes tax data available to advisory actors and issues a request for an advice. The data may be the most recent tax data, or a tax data archive. The advice is returned by the advisory actors. The scenarios are created by changing the advisory actors and the content of the advice, depicted by the ovals in Figure 3.

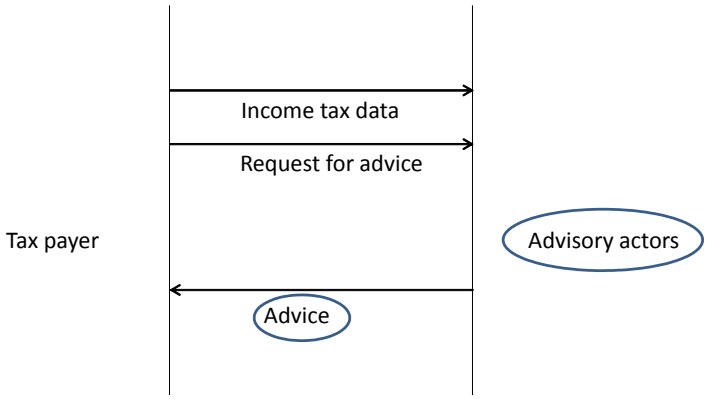

Fig. 3. Exchange between taxpayer and advisory actors, triggered by the receipt of income tax data

Scenario 3: Public actors become wealth advisors

This scenario seeks to improve the taxpayer's financial wealth in a personalized way. The following scenario description is a hypothetical implementation scenario of the policy idea.

Example of scenario 3: The Tax Administration driving social innovation

The policy idea of wealth management for the public needs to be discussed at the political and legal levels, since Tax Administrations are executing services of the Ministries of Finance and perform their tasks according to laws. To provide wealth management to the public re-using tax data is a decision to be taken by the relevant political bodies in a country. These discussions should have as an outcome whether the policy idea is accepted or not, and if it is accepted, what the preferred scenario is.

When the policy idea is accepted at the political and legal levels and scenario 3 is chosen, a possible implementation can take into account the following steps:

- Implementation of a Government Finance Database (Pierson, Hand & Thompson, 2015);
- Use of a Regulatory Sandbox, when fiscal and market laws require adjustments to enable the implementation and testing of the policy idea;
- Adjustments to fiscal and market laws;
- Education on the possibilities of re-using tax data for wealth management;

- Cooperation with organizations active in wealth management and implementation of the extension of the Wealth Management Pyramid in software;
- Cooperation with a public Budget Institute in order to enable follow up actions on the automated advice of the Tax Administration;
- Execution of a Proof of Concept at a limited scale in which security and privacy issues are addressed;
- Evaluation of the social innovation aspects to prepare decision making on scaling up to the public at large, involving user groups of taxpayers and other relevant actors in the evaluation;
- Monitoring of the effects on financial / fiscal awareness and wealth levels of the public over the years and estimating the changes in the public's resistance to new financial crises.

The Tax Administration and a public budget institute are the advisory actors, see Figure 4.

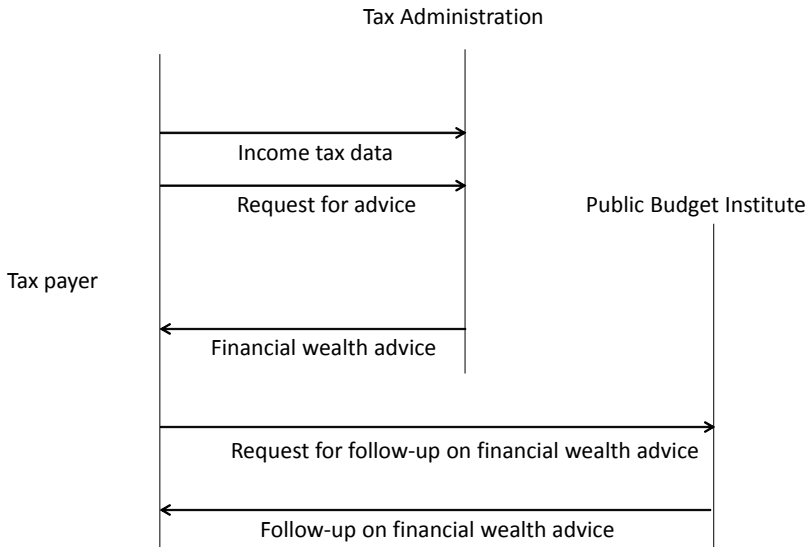

Fig. 4. Example of an exchange for scenario 3: Public actors (Tax Administration and Budget Institute) as financial wealth advisors

Scenario 5: Public-private actors become financial health advisors for the public
In this scenario a Tax Administration cooperates with a start-up, which offers a financial health service to the taxpayers, see Figure 5. This hypothetical scenario can be developed as a solution for a country, where many people are having too high loans for their income levels.

Example of scenario 5: The Tax Administration cooperates with a start-up company

When the policy idea is accepted at the political and legal levels and scenario 5 is chosen, a possible implementation can take into account the following steps:

- Implementation of a Government Finance Database (Pierson, Hand & Thompson, 2015);
- Use of a Regulatory Sandbox, when fiscal and market laws require adjustments to enable the policy idea;
- Adjustments to fiscal and market laws;
- Education on the possibilities of re-using tax data for financial health management;
- Selection and cooperation with one or more start-up companies;

- Execution of a Proof of Concept at a limited scale in which security and privacy issues are addressed;
- Evaluation of the financial health innovation aspects to prepare decision making on scaling up to the public at large involving user groups of taxpayers and other relevant actors in the evaluation.
- Monitoring the effects on financial health levels and financial literacy of the public over the years and estimating the public's resistance when new financial crises occur.

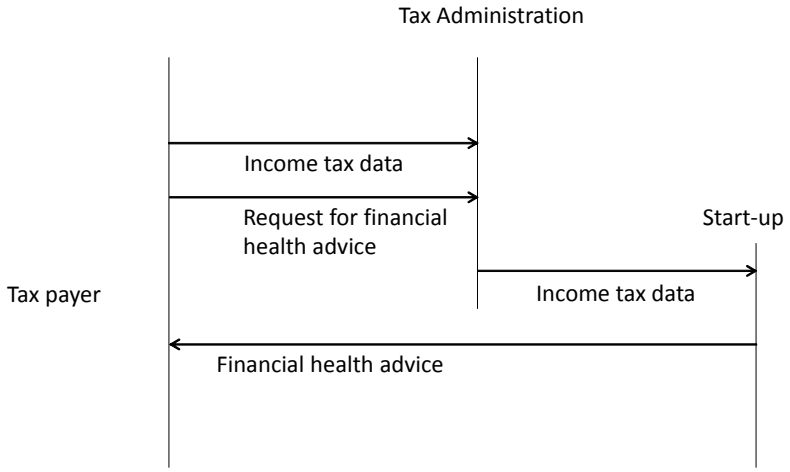

Fig. 5. Example of an exchange for scenario 5: Public actor (Tax Administration) and a private actor (start-up company) cooperate as financial health advisors

Steps 7 and 8: Implications and indicators to measure the effects of the scenarios are described in Table 4. Tax Administrations usually have a larger customer base than private organizations, and then the impact on society of scenarios1-3 and 4-6 can be expected to be larger than the impact of scenarios 7-9. Scenarios 4-6 have the advantage that tasks can be more easily allocated to the appropriate actors taking the current legislation into account. Less legal changes will be required for these scenarios.

Table 4: Implications of scenarios and indicators. Direction of effect: + means increase, - means decrease.

Implication	Relevant for scenario	Indicator	Direction of effect
Increased fiscal self-reliance	1, 4, 7	% of fiscal self-reliant taxpayers	+
Increased financial literacy	2, 3, 5, 6, 8, 9	% of financial literacy of taxpayers	-
Less calls to help desks of Tax Administrations	1, 4, 7	Number of calls to help desk for fiscal of Tax Administrations / number of taxpayers	-
More state money will be needed to pay for a 100 % usage of regulations	1, 4, 7	Government expenses on regulations for citizens / number of taxpayers	+
Improved relationship between Tax Administrations and taxpayers	1-6	Client satisfaction of the taxpayers	+
More financial health, less debts and more compliance	2, 3, 5, 6, 8, 9	% healthy households, % households with debts, % compliance	+, -, +
More financial wealth, less debts and more compliance	3, 6, 9	% wealthy households, % households with debts, % compliance	+, -, +
Increase in income tax collected	3, 6, 9	Income tax / number of taxpayers	+
Boost of the financial market	4-9	Number of services using income tax data of financial actors	+

6. BARRIERS

The realization of scenarios involving an active role of Tax Administrations encounters barriers. Barriers identified in a discussion with a company lawyer of a Tax Administration for the question: Which barriers prevent realization of these scenarios? are as follows.

Tax Administrations are bound by law in what they can and cannot do. In addition, there are laws that regulate the position of the public sector and the private sector to avoid unfair competition and to create a level playing field.

"Tax Administrations are fully occupied by their primary tasks for handling taxes and changes in laws concerning tax" (Manager of a Tax Administration, discussion, February 7, 2013).

"I have discussed wealth management for the public with an IPR lawyer. … He foresaw possible problems with the competition laws we have here. I think we can find a way out of it, but it must be investigated. Privacy issues and goal issues can be taken care of. " (Lawyer, discussion, October 1, 2012). In the Dutch privacy law, data may only be gathered for a specific, predetermined goal according to the principle of goal binding of personal data. When personal data of the Tax Administration is used for purposes other than tax, this should be made clear in advance to citizens.

Problems may arise related to permission. When a Tax Administration would enter into wealth management activities, then in the Netherlands a permit is required of the Dutch Bank (DNB). In order to advise on investment portfolio's a permit is required of a supervising authority like the Authority for Consumers and Market, the ACM. This may result in legal issues such as: Is a government organization like the Tax Administration subject to decisions of an organization like the ACM?

With respect to quality of service and accountability. Which guarantees does the taxpayer get to ensure that the advice is correct and appropriate? In the financial sector financial planners need qualifications and ongoing education to do advisory work. A similar mechanism is required for the scenarios involving personalized financial advice by public actors.

How is liability addressed in case a financial advice results in damage? Commercial parties are ensured for liability, but public sector organizations are not.

How is consumer protection arranged? When a taxpayer asks a commercial organization for financial advice, the taxpayer is protected according to the consumer laws. This is not the case when the taxpayer is advised by the Tax Administration.

Citizens should have stronger rights on data such as access and correction of personal data, a right to be forgotten, a right to object to data processing and the right to be informed when data security is breached (EU, 2015). This needs to be arranged.

Shortage in funding may also prove to be an important barrier in the sense that advisory services cannot be made available to individual taxpayers due to funding cuts[2].

In summary there are barriers in the field of law, workload, privacy, permission, quality of service and accountability, liability, consumer protection and funding. The barriers are different for each scenario. These barriers, and the measures that can be taken to address them,

[2] As pointed out by a reviewer.

require further investigation per country. The barriers might prevent the realization of certain scenarios.

7. CONCLUSIONS AND FURTHER RESEARCH

To re-use tax data for wealth management for the public, we developed nine scenarios and investigated barriers and measures to take. The scenarios can be used in different countries to make implementation plans for the scenario of their choice. Since the Tax Administrations are executing organizations of the government, it is important that the government and the political bodies embrace a certain scenario for wealth management for the public, and clarify, or redefine, the role of the Tax Administration in their country.

Our first question is: What are future scenarios to re-use income tax data for wealth management? To answer this question nine future scenarios have been identified along two axes:

1. Which actors provide wealth management to the public? These are public actors, public-private actors or private actors, and
2. What is the scope and type of content of the advice? These are fiscal self-reliance advice, financial health advice and financial wealth advice.

Scenarios 1-3 adopt a role for the public sector and require a change in the scope and role of Tax Administrations. Scenarios 4-6 use a combination of public and private actors (such as a Public Private People Partnership) and are in line with the wave of lean government (Janssen & Estevez, 2013). These scenarios seem more likely in countries where public and private actors can cooperate according to the legal and political setting, and public and private actors keep each other in balance. Scenarios 7-9 are more likely for countries, where the role of the government is kept limited.

The second question is: Which barriers prevent realization of these scenarios? The barriers for the implementation of personalized financial advice are the high workload of the Tax Administrations, which prevents them from broadening the scope of their work, and the law, regulating the tasks of Tax Administrations. Tax Administrations are positioned as executing service of the Ministries of Finance and not as entrepreneurs in the financial market. Further barriers lie in privacy, permission, quality of service and accountability, liability, consumer protection, the rights of citizens concerning data, and funding.

The following questions and topics require further research. What is the economic impact at the household and at the national level? Which multi criteria client segmentation is required, since ‘amount of wealth’ may be insufficient to segment the client base? Which technical solutions are suitable for the various scenarios?

The information on barriers should be expanded upon with lawyers, familiar with the fiscal and market laws in a country. The adoption of the policy idea and measures to address the barriers, scope and content of the advice in relation to the national financial issues, laws and regulations, require further investigation. For instance, in the UK a relation with the Making Tax Digital[3] agenda is considered relevant, and especially the idea of a personal tax account (Reviewer, e-mail, January 17, 2018).

[3] https://www.gov.uk/government/publications/making-tax-digital/overview-of-making-tax-digital

Using taxpayer data for wealth management for the public at least entails some element of education or increased knowledge about tax and wealth management at the Tax Administrations and in the countries[4]. A suitable way of educating the relevant actors on tax and wealth management and the new possibilities enabled by technology needs to be found.

What we are proposing is to think and discuss further on the topic of wealth management for the public re-using tax data.

ACKNOWLEDGEMENTS

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[4] As pointed out by a reviewer

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REVIEW

A PRACTICAL GUIDE TO SETTING UP YOUR TAX EVASION GAME[1]

Antoine Malézieux[2]

Abstract

Over the last four decades, an important stream of literature has studied tax compliance behaviour in the laboratory through tax evasion games. In this review of over 70 papers, the main results are summarised, highlighting the most prominent features of tax evasion games. The results are interpreted in terms of laboratory tax compliance. Variables that have a positive impact on compliance are a non-student pool of subjects, a loaded frame, a directive way of asking for compliance, a progressive tax regime, redistribution of tax funds, endogenous audits, increased audit probability, larger fines and a one-off tax amnesty. Self-employed income and a complex tax system are expected to have a negative impact, while the impact of earned income, tax rates and public-good funds is unclear and deserves further investigation.

Keywords: tax evasion, tax evasion game, tax compliance game, laboratory experiment.
JEL classification: C9; H26.

INTRODUCTION

This year marks the 40th anniversary of the first ever tax evasion game (TEG), published by Friedland et al. (1978) in the *Journal of Public Economics*. This marked the beginning of behavioural public economics (also referred to as behavioural public finance), a discipline studying tax evasion and compliance in the laboratory.[3] The problem of tax evasion was thus addressed quite early on, especially in experimental economics research. In comparison, the first versions of the Ultimatum and Dictator games, probably the best known and most played games in experimental economics, were not developed until 1982 and 1986 respectively (Güth et al., 1982; Kahneman et al., 1986). As noted by Torgler (2016), the number of laboratory experiments on tax has increased steadily since the 1990s, with an even more striking increase in field experiments.

There are three main reasons for the success of TEGs. First, as tax evasion deprives governments of resources, big interests are at stake in reducing it, and attention has focused on all possible ways of doing so, including experimental economics. Public administration has thus financed behavioural research to find solutions to fight tax evasion or simply provide more taxpayer-friendly services. Second, there is a need for observable and reliable data on tax evasion, since this kind of dishonest behaviour is by nature impossible or very complex to measure in the field (Muehlbacher & Kirchler, 2016). TEGs have been used as a substitute for field data. Selection bias in the available data makes it difficult to capture the bigger picture of

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[3] Tax compliance is defined in the laboratory as declared income divided by full gross income. The tax compliance rate is subtracted from one to obtain the tax evasion rate.

tax evasion, given that field data can be drawn only from evaders who are caught. Laboratory experiments also allow causal inferences to be isolated, "whereas existing institutions are adopted endogenously" (Falk & Heckman, 2009, p. 536). For example, in real life, audit rates may be reinforced when evidence of increased criminal activity appears. Lastly, the laboratory allows many different hypotheses to be tested and the results observed directly in terms of compliance. Without tax experiments, this would be much more complex or impossible.

A TEG is an experiment in which participants are asked to declare a previously earned or endowed amount of money, knowing that it will be taxed at a certain rate. This mirrors income tax declarations, where tax administrations ask taxpayers to declare their previously earned income. Research on tax evasion has undergone various changes over the past 40 years since Friedland et al.'s (1978) seminal work. Their simple experiment has been enriched with many different variations, taking into account the pool of subjects, the framing of the experiment, the origin and nature of the income, the complexity of the laboratory tax system, the tax regime and tax rate, the subsequent use of collected taxes, audit probabilities and fines. This literature review aims to summarise the results on the most prominent variables from a wide range of published research using TEGs ($N \simeq 140$). This will provide experimenters with a full picture of existing alternatives and their expected impacts on compliance. This is particularly important both because the field of research is booming and extending toward field experiments, and as a first step toward ensuring replication and comparability of experiments. This issue is receiving increasing attention, both in relation to TEGs (see e.g. Muehlbacher & Kirchler, 2016) and more generally in experimental economics (e.g. Camerer et al., 2016).

Relevant literature for the period 2013–2017 was collected through internet searches (Econlit, Google Scholar, Scopus, PsycINFO). Unless otherwise stated, only laboratory experiments with real monetary consequences were considered,[4] and only experiments relating to TEGs were selected. Standard public-good games and market games were thus excluded from the survey, since the main tasks of these games are too different from that of TEGs.
This survey drew on previous work. Alm (1991) and Andreoni et al. (1998) were the first to include experiments in their literature reviews and put them into perspective with theoretical and empirical research. Torgler (2002) was the first to focus only on experimental methods to delineate a state-of-the-art for the discipline. Special mention should be made of Kirchler (2007), who has produced the most complete work on behavioural and psychological aspects of tax evasion, including many different empirical methods. Fonseca and Myles (2011) conducted an impressive survey of 27 laboratory experiments, offering a very clear, albeit unarticulated, summary of each, while Muehlbacher and Kirchler (2016) focused more on the external validity of tax experiments.

This literature review distinguishes between two types of variables for study: those with a positive impact on compliance and those with a negative impact. Variables with a positive or somewhat positive impact on compliance are a non-student pool of subjects, a loaded frame, a directive way of asking for compliance, a progressive tax regime, redistribution of tax funds, endogenous audits, audit probability, size of fines and tax amnesties. Variables with a negative impact on compliance are self-employed income and a complex tax system. The impact of the other variables is unclear and deserves further investigation. The paper concludes with recommendations on setting up TEGs, their external validity and the limitations of the present literature review.

[4] Camerer and Talley (2007) show that incentivised and non-incentivised participants may sometimes behave differently.

TABLE 1: SUMMARY OF VARIABLES AND THEIR EXPECTED IMPACT ON COMPLIANCE

Variable	**Impact on compliance**
Professional pool of subjects	Positive
Loaded frame	Somewhat positive
Directive way of asking for compliance	Positive
Earned income	Ambiguous
Self-employed income	Negative
Complexity of the tax system	Negative
Progressiveness of tax regime	Positive
Tax rate	Ambiguous
Redistribution of tax funds to participants	Positive
Investment of tax funds in a public good	Ambiguous
Endogeneity of audits	Positive
Audit probability	Positive
Ambiguity of audits	Ambiguous
Size of fine	Positive
Amnesty	Somewhat positive

LITERATURE REVIEW

This literature review is organised in the chronological order in which experiments are generally conducted. A subject (whether a student or a professional) is invited to take part in a TEG. The TEG may be framed in a neutral or loaded way, and compliance may be sought in a directive or relaxed way. The subject's income may be given or earned, and may result from self-employment or a salaried job. The tax system may be more or less complex, and the tax regime proportionate or progressive. The subject learns about the tax rate, and that the collected taxes may be redistributed or given to an organisation. After a declaration, an audit may arise, varying by type, probability and level of ambiguity. If randomly selected, the subject may have to pay a fine, but may or may not benefit from a tax amnesty.

Students are a Valid Pool of Subjects

One criticism relating to the external validity of TEGs is that students are unrepresentative of taxpayers, as identified by Levitt and List (2007) in relation to flaws in experimental economics. Students have little or no experience of filing tax returns, and their social and demographic characteristics may differ from those of the taxpaying population (Alm et al., 2015). The results reviewed below show that students and non-students may indeed behave differently, with students being less compliant. However, student pools of subjects are valid because changes in students' behaviour go in the same direction as those for non students.

Gërxhani and Schram's (2006) experiment, conducted in Albania and the Netherlands, engaged different pools of participants in playing a TEG: high-school students, university students, high-school teachers, non-academic university personnel and academic personnel. Their results show that tax evasion rates were higher for students than for teachers. Alm et al. (2015) ran a TEG experiment in which the participants were university students or university staff and faculty, using various parameters, including audit probability, information and benefits. The results show that levels of compliance differed between students and staff members. However, across the different treatments, compliance responses were the same for both pools of subjects.

In Choo et al. (2015), 520 individuals played a framed TEG, involving 200 students with no prior experience of tax, 200 company employees who declared taxes directly through their company (third-party declaration) and 120 self-employed taxpayers who declared their own incomes. The experimenters tested different set of fines and audit probabilities, and found that there were indeed differences in compliance between groups, with students being the least

compliant, but removal of the tax framing from the experiment, i.e. making it a gamble, suppressed these differences. The enhanced compliance observed for non-student participants may have resulted from norms of compliance originating outside the laboratory.

Framing of the Experiment

The instructions given to participants may be tax-framed or neutral. A tax frame designates the use of words such as income, tax rate, audit, earnings, withholding rate and check. Compliance may be sought in a very directive or quite relaxed way.

Neutral or loaded frame

There is no automatic effect of context/framing overall, but it may have a joint effect with social and demographic variables, income source or income level. When a contextual effect exists, this almost always increases compliance. Once again, this effect may relate to social norms pushing toward greater compliance, for example where it is socially accepted that taxes should be paid.

Some experiments show that framing influences participants' behaviours. For example, Baldry (1986) studied behaviours in two experiments in which some participants played a framed TEG and others played an equivalent game (a gamble) that was not framed. The results show that the participants behaved differently: those in the framed experiment evaded less. Webley and Halstead (1986) made participants play a TEG presented as an "economic game" and debriefed them afterwards. Their initial results show that most subjects saw the experiment as a game, and that they would not have behaved in the same way in a real tax setting, so the authors ran another session in which the participants were told that they were participating in an "economic problem". In this session, the participants maximised their income more and underdeclared more. Wartick et al. (1999) also found that participants playing a TEG with framed instructions evaded less income, and that older subjects (25 and older) complied even more than younger subjects (under 25). This concurs with Mittone's (2006) comparison of a TEG and an equivalent gamble, where participants evaded less under tax framing.[5] Trivedi and Chung (2006) also reveal no difference between tax terminology and non-tax terminology in a TEG when income is low, although there is a contextual effect when incomes are medium or high: participants evade less under tax framing. Similarly, Choo et al. (2015) show that tax framing may be of some importance, especially for non-students, who evade less when the experiment is framed.

On the other hand, Alm et al. (1992) conclude that the use of neutral wording does not change behaviour in a TEG. Durham et al. (2014) also show that overall context does not matter in tax evasion; however, it may have a joint effect with income source and income level, or with income source and time.

Ways of asking for compliance

The framing of a TEG also matters in terms of how participants are required to pay their taxes. The way of asking for compliance may induce participants to over- or under-report, so the instructions must be carefully designed.

[5] Mittone's (2006) experiment differed slightly from the standard TEG. He asked participants to declare directly the amount of taxes that they wished to pay.

According to Cadsby et al. (2006, p. 944), many experiments communicate to participants that they "may report any amount of income from zero up to the amount they actually earned or received", which may be interpreted as a subtle invitation to gamble. To investigate this effect, Cadsby et al. (2006) ran a non-framed experiment in which they underlined the importance of declaring the full amount of income earned. In almost all of their treatments, a huge majority of subjects chose to report 100 per cent of their income.

The Origin and Nature of Income

Income may be given to the participants or earned by the participants themselves. Earned income is usually implemented through a real task or, less often, using hypothetical effort (i.e. making participants believe that there is a strong selection process and that they are the very best). It is supposed that effort invested in earning an income will make participants less willing to be taxed, thus decreasing tax compliance (through the sunk cost effect or simply a notion of property). However, the reverse effect may also be hypothesised: effort invested may also increase risk-averse decisions because participants will not wish to risk their hard-earned income (reverse sunk cost effect). See Durham et al. (2014) for more on these effects. The nature of income, whether derived from a third party or from self-employment, implies a difference in the probability of detection, since income from self-employed workers is self-declared. This informs taxpayers' intentions.

Origin of income: earned or windfall income

There are no clear results for the effect of the origin of income on tax compliance decisions. First, few experiments have investigated the origin of income through TEGs. Second, there may be interaction effects with audit probability, tax rate, context, income level or period, gender, and hypothetical versus real effort. More research is needed to understand how these parameters interact.

In the existing literature, some experiments compare earned and endowed amounts of money. One framed TEG (Boylan & Sprinkle, 2001) shows that people who earned money (through one hour of algebra exercises) evaded as much tax as those endowed with money. However, when the tax rate increased, participants with earned income increased their compliance, whereas participants with endowed income decreased their compliance. In Boylan's (2010) experiment, participants in a neutral TEG were either endowed with income or earned an income (through 30 minutes of algebra exercises). The results show that compliance was higher for participants earning an income in the first rounds before an audit. In successive rounds, the compliance of participants with earned money decreased, while the reverse was true for those with endowed money. After an audit, these behaviours became even more polarised. Durham et al. (2014) required some participants to participate in a double auction market at the beginning of each round to earn an income, while others were randomly given the same incomes. The results show that origin of income had no overall impact on tax evasion. However, it had a negative impact in interaction with the period, and with income level and context. Peliova (2015) set up a non-incentivised TEG with windfall and earned income, and observed less declared income in the former case (36.77%) than in the latter (31.93%). An interesting result was that participants' gender was an obvious factor. Men (women) declared 10.72% (47.50%) of their windfall income and 26.92% (37.25%) of their earned income.

Other studies feature different levels of difficulty in earning an income and compare it to endowed income. Kirchler et al.'s (2009) framed TEG used three hypothetical effort levels (no

effort, low effort and high effort). In their first and second experiments, participants in the low-effort condition evaded more income than the others on average. In Bühren and Kundt's (2013) study, participants earned money through high effort (difficult and lengthy counting of ones and zeros in matrices), moderate effort (easier and shorter task) or no effort (windfall endowment). The results prove that moderate-effort income is less likely to lead to evasion than high-effort or endowed income.

Nature of income: self-employed or salaried job

After deciding whether the subjects of a TEG earn or are endowed with an income, experimenters may also ask them to choose between an income where they have an opportunity to cheat (self-employed) and one where they cannot (salaried), so as to reveal participants' preferences. The results show that when income comes from a salaried job and there is a 100 per cent chance of being audited, participants declare their income more truthfully than when they have a self-employed income. Self-employed income is popular: participants often choose it when it is available. As this type of income is expected to be lower when fully taxed, it reveals some intentions to cheat; however, it does not lead automatically to more evasion. Thus, people like to keep their opportunities to cheat open, but do not automatically use them.

In Gërxhani and Schram's (2006) experiment, participants first chose between unregistered (self-employed) and registered (salaried) income. They then drew an income randomly within one of these sets. Registered income had a high average and low standard deviation, and unregistered income had a lower average and higher standard deviation. Registered income was guaranteed to be audited, and unregistered incomes were audited with probabilities of zero, 16.67 or 50 per cent. The results show that participants who chose a registered income declared their income truthfully. Participants more often chose an unregistered income when tax evasion was possible. However, none of the participants who chose an unregistered income cheated. In Alm et al. (2009), participants earned a mixture of "matched" and "non-matched" income. The probability of detecting matched income was 100 per cent, whereas the probability of detecting non-matched income varied across treatments between 25 and 75 per cent. Thus, non-matched income was derived from self-employment. Overall, the subjects did not declare all of their non-matched income. No connection could be made between the percentage of income received as non-matched income and compliance. There was a slight downward trend, but compliance was highest when participants received half of their income as non-matched income. Elaborating on Gërxhani and Schram's (2006) experiment, Lefebvre et al. (2015) decided to make participants choose between registered or unregistered income. A lottery determined the amount of gross income effectively perceived by the participant across a set of possible incomes. Unregistered income had the highest standard deviation, and registered income the lowest. Registered income was automatically taxed, whereas participants with unregistered income had first to choose whether or not to report it, and then to decide the amount to report. The results show that 60.64 per cent of participants chose unregistered income, of whom 40.65 per cent chose to evade a portion of that income.

The More Complex the Tax System, the More Evasion?

The complexity involved in declaring income affects participants' compliance. Compliance increases when it is easier, for example when the tax administration provides a liability information service. The impact of uncertainty about the true tax liability is negative.
The complexity of the tax system set in the laboratory matters. Beer et al. (2016) set up a TEG with two conditions: one in which computation of the true amount of money to deduct was

easy, and one in which it was difficult. The results show that when computations are complex, participants choose the right amount and report more income than necessary. In contrast, when the tax administration makes an effort to simplify the tax system, compliance is improved. In Alm et al.'s (2010) experiment, under one condition the tax system was complex (with a deduction and a tax credit on low income), and in a second condition the tax administration could automatically compute the true tax liability and furnish it to participants. The results show that when the tax system is complex, compliance decreases compared with a baseline, and when the tax administration provides an information service, compliance increases. The same result is replicated by Vossler and McKee (2017) and McKee et al. (2017).

Another way to implement a difficult tax reporting system is to introduce uncertainty into the TEG. For example, Beck et al. (1991) set up a TEG in which the level of net income was unknown to the participants. They completed various reports, one of which was randomly drawn. The results show that uncertainty interacts with the likelihood of being audited and the level of fines, but seems to increase compliance. This is contrary to Vossler and McKee's (2017) and McKee et al.'s (2017) findings, where making the tax liability uncertain increased evasion compared with a baseline where the tax liability was certain.

Tax Regime and Tax Rate

The tax rate determines the proportion of subjects' earnings that the experimenters demand back after the participants have earned or received their incomes. The impact of the tax rate has been theoretically discussed. In their original paper, Allingham and Sandmo (1972) demonstrate that the tax rate has an ambiguous impact on tax evasion. The first effect is that when the tax rate increases, the tax debt liability also increases, making taxpayers less willing to comply. The second effect is that when the tax rate increases, income decreases. When taxpayers become poorer, they are more risk averse overall, and will therefore declare less tax. This ambiguity is solved by Yitzhaki (1974), who shows that, counter-intuitively, when the imposed penalty is applied to evaded taxes (rather than evaded income), increasing the tax rate induces more tax compliance. However, Bernasconi et al. (2014) modelled taxpayers with reference-dependent preferences and ethical concerns to show that, contrary to previous models, an increase in tax rate may also decrease tax compliance. The papers reviewed here concern compliance behaviours under varying tax regimes and tax rates.

Progressive tax regimes tend to deter evasion

A tax regime in which taxes are progressive rather than flat seems to be beneficial to tax compliance. However, taxpayers should not feel that they are being treated unfairly by the tax system.

A few experimental papers study the effect of tax rate regimes on tax evasion, measuring the difference between progressive and flat tax rates (more articles study how the type of tax rate influences work supply, e.g. Masclet and Montmarquette, 2008). Heinemann and Kocher (2013) exposed participants to both types of tax regime. In the first 10 rounds, participants earned an income and were asked to declare it under the tax regime of their choice. In the following 10 rounds, the other tax regime was implemented. First, the results show that participants evaded more under a flat tax rate than under a progressive tax rate. Second, reforming from the progressive to the flat regime increased compliance, but the same pattern was not observed for the opposite reform. Third, participants' expressed preferences for one or other tax regime were driven mainly by monetary considerations. Fourth, reform losers tended

to evade more than reform winners. This last result may have been driven by a sense of unfairness: participants may have had an impression of being treated less fairly under the new tax regime than in the past. A quite similar effect was produced by Spicer and Becker (1980): when participants felt that they had been unfairly treated (the experimenters told them that the other participants had paid a lower tax rate), compliance decreased. On the other hand, when the perceived tax rate compared with others was to their advantage, participants increased their compliance.

Higher taxes, more evasion?

As in Allingham and Sandmo (1972), only TEGs using flat tax rates are mentioned here. Existing evidence is inconclusive, and the effect of tax rates on laboratory tax compliance is somewhat ambiguous. The papers can be separated between papers showing a negative effect of tax rates on compliance, and papers with reverse, mixed or no effects.
Friedland et al. (1978) considered two tax rates: 25 and 50 per cent. When the tax rate was 25 per cent, the proportion of income declared was 87 per cent, and when the tax rate was around 50 per cent, the proportion of income declared fell to 66 per cent. In Baldry's (1987) study, an increase in the marginal tax rate also increased participants' evasion. Collins and Plumlee (1991), who set tax rates at 30 or 60 per cent, also found that when the tax rate was high, evasion was higher. In Alm et al.'s (1992c) experiment, the tax rates were 10, 30 and 50 per cent, leading to average compliance rates of 37.6, 33.2 and 20.0 per cent. Park and Hyun (2003) varied the tax rates in their TEG from 10 to 40 per cent, and their results show that increasing the tax rate had a significant negative impact on tax compliance. Alm et al. (2009) also varied the tax rate from 35 to 50 per cent, showing that this decreased compliance by 11.6 points. A very comprehensive study of tax rates was conducted by Bernasconi et al. (2014), who compared two tax rates (27% versus 38%) across different treatments, showing that higher tax rates indeed reduced compliance. Using tax rates of 10, 20 and 30 per cent, Duch and Solaz's (2015) baseline results show that high taxes did indeed deter compliance. Peliova (2015) ran a TEG in which tax rates varied from 10 to 40 per cent with increments of 10 per cent. With a 20 per cent audit rate, compliance decreased linearly from 62.83 to 45.83 per cent at the 30 per cent tax rate level, but did not decrease any further thereafter. With a five per cent audit rate, there was a U-shaped relationship between tax rates and evasion: compliance decreased from 45.86 at the 10 per cent tax rate to 22 per cent for tax rates of 20 and 30 per cent, and then increased to 29 per cent at the 40 per cent tax rate.

With regard to papers showing mixed or no effects of tax rates on compliance, Becker et al. (1987) used three tax rates (33.33, 50.00 and 66.66%) on earned income and found that participants who considered their tax burden to be high were less prone to decide to evade. There was no correlation between the amount of income evaded and the perceived tax burden. Beck et al.'s (1991) TEG was set up with two different tax rates (25 and 50%), but increasing the tax rate in this experiment did not lead to increased compliance. In Alm et al. (1995), tax rates varied between 10, 30 and 50 per cent. The results show that increasing the tax rate increased compliance, with compliance rates of 14, 24 and 31 per cent respectively. The results of Alm et al.'s (1999) pre-vote rounds show that the effects of tax rates on compliance were negligible, with 28 per cent compliance at the 20 per cent tax rate and 29 per cent compliance at the 50 per cent tax rate. Using tax rates of either 20 or 40 per cent, Boylan and Sprinkle (2001) show that when incomes were endowed, doubling the tax rate decreased declarations from 61.50 to 55.30 per cent, whereas when incomes were earned, doubling the tax rate increased declarations from 48 to 68.70 per cent. These results reveals no effects arising solely from the tax rate, but indicate interaction effects between the nature of the income and tax rates.

In varying the tax rate from five to 70 per cent, Fortin et al.'s (2007) results show a U-shaped relationship with compliance: higher tax rates decreased compliance up to a 39 per cent tax rate, but raised compliance thereafter.

In summary, the impact of tax rates on tax evasion is unclear. In a meta-analysis of 20 experimental articles, Blackwell (2007) shows that increasing the tax rate has a positive but non-significant impact on compliance. Andreoni et al. (1998, p.839) conclude that "the effect of tax rates on evasion remains unclear" and "given the importance of this topic, it surely deserves further investigation". In this literature review, which focuses only on flat tax rates, tax rates seem to deter compliance when they increase. However, a relatively large proportion of studies has found no, reverse or mixed effects. This tends to validate Allingham and Sandmo's (1972) finding for the effect of tax rates that there may be a U-shaped relationship between taxation and compliance. Below 30 per cent, an increase in the tax rate may decrease compliance. Beyond a 30 to 40 per cent tax rate, a kind of psychological threshold may be reached, leading to an increase in compliance when the tax rate is raised further. The size of fines is always specified in terms of evaded taxes, and losses from being fined may loom larger than gains in participants' minds beyond this threshold.

Use of Collected Taxes

When a tax rate is applied to income, it results in an amount of collected tax. This may be kept by the experimenter to reduce the cost of the experiment, and is thus considered by the taxpayers as forfeited (as in Fortin et al., 2007). However, it is more usually redistributed to participants, with or without a social multiplier – as a public-good game with a marginal per capita return – or donated to finance a real-life public good.

Redistribution to participants

There are two ways of using collected taxes in a TEG. The first is to redistribute collected taxes to participants. As proved by Blackwell (2007), redistribution has a strong positive impact on compliance, which increases with the size of the social multiplier. Numerous papers demonstrate this result, as reviewed below in chronological order.

Becker et al. (1987) shared out different proportions of the taxes collected (0.60, 1.20 and 1.80% in one condition, and 1.70, 3.40 and 5.10% in another). Their results show that the amount of public money received by participants impacted negatively on their decisions to evade tax. However, this relationship was not significant with regard to the amount of tax evaded. In Alm et al. (1992a), the compliance rate rose from 26.20 to 55.70 per cent when money was placed in a group fund, with a social multiplier of 2 and shared equally among the taxpayers, and with a similar treatment, Alm et al. (1992c) observed a rise in compliance from 33.20 to 37.40 per cent. Alm et al. (1992d) show that the higher the social multiplier of the fund, the higher the compliance rate. Their compliance rates were 43.50, 53.70 and 59.20 per cent with social multipliers of 0, 2 and 6 respectively. Increasing the social multiplier increased compliance, but at a decreasing rate. Alm et al. (1995) investigated both the impact of redistributing the tax fund and the composition of the group. In the first condition, the tax fund was redistributed for a certain number of rounds to a fixed group; in the second, the fund was redistributed to a group with membership turning over. In both conditions, the social multiplier was equal to 2, and these conditions were compared with others that had no tax fund. No differences were observed between the fixed or variable status of members of the group receiving the tax fund (compliance with fixed members 27.80%; compliance with variable

members 26.60%). The results also show that taxpayers in experimental sessions with a tax fund exhibited only marginally increased compliance (average of 25% in the control condition). Bosco and Mittone (1997) implemented a TEG in which taxes were partially redistributed, showing that without redistribution, 80 per cent of participants evaded, whereas with redistribution, this rate decreased to 46.70 per cent. The presence of redistribution decreased both the likelihood of deciding to evade and the amount of money evaded. In Alm et al. (1999d), when the social multiplier was 0.5, compliance was 14 per cent, and when the social multiplier increased to 2, compliance also increased, to 44 per cent. Park and Hyun (2003) set up a TEG in which in one condition the tax fund was redistributed to participants and in another was not. The results show that the presence of a public good had a significant negative impact on tax compliance. Using a social multiplier of 2, Torgler (2003) compared real taxpayers under two conditions, one with redistribution of the taxes collected and the other without. The results show that with redistribution, taxpayers increased their declarations from 57.5 to 85.0 per cent of their income. Gërxhani and Schram (2006) ran sessions with and without redistribution of the taxes collected to participants, with a social multiplier of 1, and their results show that with a public good, participants more often chose a registered income, but this did not significantly decrease overall tax evasion.

Public good fund

The second way of using collected taxes in a TEG is to use them to fund a real-life public good. There are various types of public good in which participants' taxes may be invested, such as donating to an organisation or institution, or funding a scholarship. The impact on compliance is not definitive in the literature. Moreover, it is still unknown whether donation or redistribution of taxes performs better. What is more certain is the direct effect of democracy in a TEG: when participants are able to choose the destination of the donation, compliance increases.

Mittone (2006) compared compliance rates under three conditions: (1) in the baseline condition, the money was burned, (2) people received the amount of tax collected back through redistribution (without no mention of any social multiplier), or (3) taxes were invested in a real-world public good (a scholarship). The compliance rates were 47.17, 60.28 and 72.28 per cent respectively. In contrast, Masclet et al.'s (2013) results reveal no differences between cases in which participants' taxes were invested in purchasing carbon offset credits to counter the greenhouse effect, and when participants' taxes were burned.

The choice of the real-life public good is also important. The more participants support the organisation that will receive the tax collected, the more they comply (Alm et al., 1993). Indeed, when students had to comply in order to support two alternative organisations – their favourite one (relating to student support) and their least favourite one (university support) – the favourite received more tax funding than the other. The results of several studies also show that being able to vote (or signal preference) on the preferred tax recipient increases compliance (Alm et al, 1993; Wahl et al., 2010; Lamberton et al., 2017). Alm et al. (1999) also show that participants vote according to their own interests with respect to the tax fund parameter. When the social multiplier is high, they vote in favour of a tax rate increase, and vice versa.

Doerrenberg's (2015) study is the only one to have investigated the differing effects on tax compliance of redistributing to participants or donating. The tax fund was either equally distributed between participants, invested in a research fund, donated to the Red Cross or transferred to the German federal budget, resulting in compliance rates of 30.22, 42.52, 40.87

and 34.94 per cent respectively. Although tax compliance was higher when money was donated for research or charity purposes, these differences were not significant.

Type, Probability and Ambiguity of Audit

In real life, the probability of being audited differs according to different types of taxpayer. Some taxpayers are audited strategically, not randomly. With regard to random audits, as the probability of being audited rises, fewer taxpayers will be willing to evade (Allingham and Sandmo, 1972). However, it has also been hypothesised that the probability of being audited need not be high to deter tax evasion: as stated in prospect theory, taxpayers may over-evaluate their chances of being audited, even with very low probability. Kahneman and Tversky (1979) were the first to shed light on this effect, and their results have since been updated and adapted to the tax framework (e.g. Dhami and Al-Nowaihi, 2007). Ultimately, no one really knows the probability of being audited when cheating, so ambiguity may play an important role.

Endogenous audit is most effective

Audits may be either random or strategic. Strategic or endogenous audits mean that the tax administration targets a particular sub-sample of taxpayers. The endogenous audit mechanism may relate either to the relative behaviour of a taxpayer within a group, or solely to the compliance history of the particular taxpayer. The literature shows that endogenous audits always trigger more compliance than random audits.

The first mechanism studied here is when only taxpayers' compliance history influences their chances of being audited. Collins and Plumlee (1991) were the first to study endogenous audits. They compared a condition with a fixed probability of audit, a condition with a cut-off under which participants were audited with certainty, and a conditional audit where a preliminary earning task signalled which participants were supposedly the richest. The results show that the type of audit may have an impact on compliance. The type triggering the most evasion was random audits. Conditional audits produced a lower rate of evasion than the cut-off type, but this difference was not significant. Alm et al. (1992b) were the first to test a conditional audit probability reduction. When participants were audited and found to be fully compliant, the probability of being audited was reduced from 4.0 to 2.7 per cent, and then to 1.3 per cent. If participants were subsequently found to be non-compliant, the audit probability was again set to 4.0 per cent. Compared with random auditing, this audit reduction performed better in terms of compliance. Alm et al. (1993) also investigated these different types of audits: in one condition, they set random audits with fixed probabilities, and in the other conditions, audits were endogenous and dependent on taxpayers' actions. In one endogenous audit rule, people who were found to be non-compliant were certain to be audited within a specific period in the future (future audits). In another audit rule, people who were found to be non-compliant were certain to be audited for a specific period in the past (back audits). The last endogenous audit fixed a threshold under which taxpayers were certain to be audited. The results show first that endogenous audits always performed better than random audits in terms of compliance, even for a very high audit probability. The most effective endogenous audit rule was the threshold, probably because it involved a high number of audits. The least effective was the future audit rule. However, the endogenous audit rules did not take into account the cost of running the audits. Clark et al. (2004) sought to reach the best possible compliance outcome while also minimising the costs of auditing. In their framework, participants were first assigned to one of two pools of taxpayers, based on a first audit. The first was for somewhat compliant people, with a lower fine and probability of audit, and the second was for somewhat non-compliant

people, with a higher fine and probability of audit. Two mechanisms were thus studied: past-compliance targeting (PCT) and optimal targeting (OT). PCT depended on the audit results to move taxpayers from one pool to the other, whereas OT randomly transferred individuals between pools and used the audit results to allow compliant taxpayers to move from the second pool to the first. These treatments were compared with a classic random audit equivalent (RAE). The results show that, if a tax administration needs to minimise inspection rates, OT is the best strategy, whereas PCT is the best strategy to maximise compliance rates. Cason and Gangadharan (2006) ran a similar experiment with two pools of subjects: group 1 with a low fine and audit probability, and group 2 with a high fine and audit probability. Participants were first sorted randomly between groups, and then moved from one group to the other after the audit result. The results show that the evasion rate was higher in group 1 than in group 2, showing that evaders "behaved" in order to be moved to group 1.[6]

Another way of selecting which tax returns to audit is to target only returns that deviate too far from average reports. This means that an individual taxpayer's chances of being audited vary with the declarations of other taxpayers. The TEG is thus transformed into a coordination game, where participants must coordinate to reach the best outcome for them, i.e. declaring zero. Alm and McKee (2004) placed participants into groups of five, and a cut-off determined the deviation above which an audit was run (with cut-offs being varied across conditions). This was compared with a random audit condition, and a cut-off condition with "cheap talk", where subjects were allowed to discuss their strategies amongst themselves. The results show that participants had trouble coordinating to make the lowest declaration, so this kind of strategic audit was effective. The only exception was when cheap talk was possible between participants. Overall, the higher the cut-off, the more difficult it was to coordinate. A simpler coordination environment was employed by Dai (2016), who placed participants in groups of three, with an audit probability of 20 per cent as a baseline. However, when an audit occurred and two out of three participants were found to be non-compliant (i.e. declaring less than 100% of their income), the audit probability was raised to 90 per cent (known as a "crackdown" period). This crackdown lasted until all group members were found to be compliant. In this study, the timing of the announcement of the audit rate also varied (before or after filing, or with no announcement). The results show that participants reacted quickly when crackdowns were endogenous, and succeeded in coordinating on the 100 per cent declaration using strategic interdependence. Compliance rates rose from 40.54 to 83.14 per cent in the no announcement condition, from 58.61 to 84.90 per cent in the pre-announcement condition, and from 56.33 to 75.78 per cent in the post-announcement condition. The impact of pre- or post-announcements of audit probability increases did not differ significantly. Kamijo et al.'s (2017) experiment had one random audit treatment, two cut-off audit treatments (with two different levels of cut-off) and one lower-reported-income audit (LIRA) where the lowest income of a group of four subjects was audited. The results show that all the endogenous audits performed better than the random one, but all endogenous audit rules had the same effect.

Audits deter evasion

[6] In Clark et al. (2004) and Cason and Gangadharan (2006), subjects faced only two decisions: being compliant (declaring 100%), or not and incurring a cost *c*, thus differing from a standard TEG.

Most TEGs use random audits, as in Allingham and Sandmo's (1972) model. Audits have a strong positive impact on laboratory tax compliance.[7] As before, papers revealing a strong positive effect of audits are reviewed first.

In Friedland's (1982) study, audit probability varied from 23 to 54 per cent, leading to compliance rates of 71.11 and 94.67 respectively. In Spicer and Hero (1985), the number of random prior audits in the first nine rounds of a TEG significantly reduced taxes evaded in the 10th round. Webley (1987) set up a TEG in which participants faced two audit probabilities, 16.67 and 50.00 per cent, producing compliance rates of 78.52 per cent for the lower audit probability and 85.68 per cent for the higher. Beck et al. (1991) implemented an experiment dealing with uncertainty, in which participants faced a 40, 50 or 90 per cent chance of being audited. The results show that when the audit probability increased, participants declared more income. Alm et al. (1992d) increased the audit probability from zero to two per cent, and then to 10 per cent, producing compliance rates of 20.00, 50.30 and 67.50 per cent respectively (in a condition with neutral instructions similar to the condition with framed instructions). In Alm et al. (1995), audit probabilities varied between five, 30 and 60 per cent, with the fines varying between one, two and four per cent of unpaid taxes. Except when the fine was equal to one, the results show that raising audit rates significantly increased compliance. Alm et al. (1999) set up a TEG where, all else being equal, the audit probability increased from two to ten to 50 per cent, and the compliance rates varied from 23 to 39 to 73 per cent respectively. Park and Hyun's (2003) TEG had differing audit probabilities of six, 10 and 15 per cent. The results show that audit probability significantly increased tax compliance: when the former increased by one per cent, the latter increased by almost 1.6 per cent. Kirchler et al. (2003) introduced audit probabilities of either 15 or 30 per cent in each period, showing that increasing audit probability increased compliance. In Alm et al. (2009), where the audit probability could be either 10 or 30 per cent, the results reveal a significant negative impact of audit probability on tax evasion. When audit probability was raised by 20 points, compliance increased by 4.9 per cent, ceteris paribus. Cummings et al. (2009) ran two TEGs with varying audit probabilities in South Africa and Botswana. When the fine was equal to 1.5 times the amount evaded, a rise in audit probability from 10 to 30 per cent increased compliance in South Africa (49.40% to 56.90%) but decreased it in Botswana (61.70% to 41.80%). When the fine was equal to three times the amount evaded, a steady increase of 10 points from 10 to 40 per cent audit probability led to increasing compliance in both countries (from 48.50% to 69.74% in South Africa and from 62.20% to 74.99% in Bostwana). When Peliova (2015) increased the probability of audit from five to 20 per cent, compliance also increased for any level of tax rate.

Fewer studies have found mixed or no effects of audit probability on compliance. Friedland et al. (1978) studied the difference between more frequent audits coupled with lower fines, and fewer audits coupled with larger fines. When the probability of being audited was 6.67 per cent and the fine was 15 times the amount evaded, compliance amounted to 87.40 per cent of income. When the probability was 33 per cent and the fine three times the amount evaded, compliance was only 79.60 per cent. In this case, increasing the probability of being audited does not seem to have had a strong impact, probably because it was accompanied by a lower fine. Alm et al. (1992c) set up a TEG with different audit rates of two, four and six per cent, all else being equal, with compliance results of 32.10, 33.20 and 36.50 per cent respectively. Compliance did indeed increase with audit probability, but in a non-linear and non-significant

[7] Although the average effect of an audit is to increase compliance, some researchers observe that audits may also backfire: the audited taxpayers may wrongly believe that they cannot be audited again, leading to a decrease in compliance (see e.g. Mittone, 2006).

way. Choo et al. (2015) show that doubling the audit probability from 20 to 40 per cent had no significant impact on any of the three subject pools in their experiment.

In summary, audits are probably the least ambiguous variable available to encourage compliance. The existing literature shows that, all else being equal, increasing audit probability increases tax compliance. Few studies have found no or mixed results from increasing audit probability. Two meta-analyses support this result (Blackwell, 2007; Bloomquist, 2009).

Ambiguous impact of ambiguity

According to prospect theory, participants are supposed to over-evaluate their probability of being audited. So far, the results seem mixed. Indeed, the stronger the likelihood of being audited, the less participants evade. However, only one study in three provides evidence in line with the PT.

The effect of audit expectation plays a critical role. Becker et al. (1987) demonstrate that the more participants awaited a strong audit probability, the less they evaded. The only result in line with prospect theory was produced by Spicer and Thomas (1982), who implemented a TEG with three different rates of audit probability: five, 15 and 25 per cent. In the first condition, the experimenters communicated the precise rates to the subjects. In the second condition, they communicated the vague information that the audit probability was low, medium or high. In the third condition, participants were told nothing. The results show that when participants were certain of the audit probability, it impacted negatively and significantly on their likelihood of evading and the amounts evaded. When the information was vague, it impacted negatively on both components of evasion, but only the likelihood of evading was significant. When no information was given, no correlations were significant. In contrast, Friedland (1982) increased the audit probability from 23 to 54 per cent. When precise information was given, the compliance rates were 71.11 and 94.67 per cent respectively, and when the information was vague, compliance was higher for low audit probability (74.46%) but similar for high audit probability (94.73%). Thus, ambiguity seemed to be effective only for lower probability. Choo et al. (2015) also show that either telling participants directly that the audit probability was 20 per cent or making it ambiguous resulted in no difference, and hence no impact of ambiguity on compliance.

Fines and Amnesties

Fines are the second main deterrent policy variable. Theory logically predicts a positive correlation between fines and compliance (Allingham & Sandmo, 1972; Yitzhaki, 1974). Tax amnesties, where evasion is discovered but no fines are set, are also discussed below.

Fines deter evasion

As expected, when fines increase, laboratory tax compliance also increases. This is demonstrated in the literature reviewed chronologically in this section. Few studies have found mixed or no results for compliance. In Blackwell's (2007) study, the fine had a non-significant but positive impact on tax compliance.

In Friedland et al.'s (1978) experiment, frequent audits seemed to be less of a deterrent than significant fines. Friedland (1982) shows that when the fine was increased from three to seven times the tax evaded, compliance also increased, from 79.31 to 86.47 per cent when the audit probability was precisely described, and from 83.36 to 85.83 per cent when it was vague. In

Webley (1987), participants faced fines of both two and six times the tax evaded. The results show that in the lowest audit probability, compliance rates were about 77.47 per cent, with 86.72 per cent compliance for the highest probability. Beck et al. (1991) set up a TEG with two different fine levels: 1.2 times and twice the unpaid tax. Their results show that increasing the fine strongly decreased tax evasion. Collins and Plumlee (1991) chose the same two levels of fine, but although the lowest penalty triggered more evasion than the highest, the difference was not significant. Alm et al. (1992c) set up a TEG with fines of one, two and three times the unpaid tax, ceteris paribus. These fines led to compliance rates of 31.70, 33.20 and 37.60 per cent respectively, showing that increasing fines indeed increased compliance, but in a non-significant way. In Alm et al. (1999), when the penalty was equal to five times the evaded tax, compliance was 39 per cent, and when the penalty was 25 times the evaded tax, compliance jumped to 58 per cent. In Alm et al. (1995), fines varied between one, two and four times the unpaid tax, coupled with differing audit probability. There were no differences in the impact of fines when the audit probability was five per cent; however, at higher audit probability rates, when the fine size increased, compliance also rose. Park and Hyun's (2003) TEG had fines of one, three and five times the unpaid tax, and their results show that the size of the fine was significant in reducing tax evasion. In Kirchler et al. (2003), with fines of 0.5 and equal to the amount evaded, fine size tended to increase compliance, but in a non-significant way. The experiment featured in Cummings et al. (2009) also varied the fine size. When the audit probability was equal to 10 per cent and the fine was doubled from 1.5 to three times the evaded tax, compliance remained almost unchanged for South Africans (from 49.40% to 48.50%), but increased for Botswanans (from 61.70% to 62.20%). When the audit probability was 30 per cent, compliance in both countries increased (from 56.90% to 61.80% in South Africa and from 41.80% to 75.10% in Botswana). Choo et al. (2015) varied the fine rates between one and two times the unpaid tax. Doubling the fine had a positive and significant impact on the pool of students, but only a marginally significant one on workers.

A one-off amnesty tends to deter evasion

Two thirds of papers show that amnesties have a positive impact on post-amnesty compliance. However, it is important not to repeat an amnesty too often, nor to allow participants to anticipate one.

Alm et al. (1990) produced a complete experimental work on amnesties. In their experiment, participants who were caught cheating paid the evaded tax but did not pay any fine. However, after an amnesty, taxpayers evaded more. Believing that there would be an amnesty in one round of the TEG (whether or not it actually occurred) also reduced compliance. Even when the tax administration warned that it would be the only amnesty of the game, experiencing an amnesty still reduced compliance on average. The only way to ensure a higher level of compliance was to combine an amnesty with stronger deterrent variables (audit probability and fines). This combination outperformed increasing deterrent variables without an amnesty. Torgler and Schaltegger's (2005) two experiments, one in Costa Rica and the other in Switzerland, partly reproduced that of Alm et al. (1990). Some results were similar: it was indeed found that repeating a tax amnesty did not improve compliance, and that expectations of an amnesty were detrimental to compliance. However, contrary results were also found: a tax amnesty had a positive impact on tax compliance, especially for the Swiss groups, and the effect of an amnesty without the enforcement of deterrent variables was more powerful than the same effect with enforcement. Rechberger et al. (2010) also demonstrate that tax amnesties have a positive impact on tax compliance.

CONCLUSION

Table 1 summarises the expected impact of each variable on compliance. It shows that inviting professionals to play a TEG, a loaded frame, a directive way of asking for income declaration, a progressive tax regime, redistributing tax funds to participants, endogenous audits, increasing audit probability and fine sizes, and a single tax amnesty have a positive or somewhat positive impact on compliance. In contrast, granting participants self-employed income and complex tax systems have a negative impact. However, more research is needed to understand the impact of earned income, tax rates, public-good funds and audit ambiguity on compliance.

Some recommendations can be made for setting up a TEG. Experimenters should first ask what their main objectives are in terms of compliance and the extent to which a real-life setting is mirrored. There seems to be a trade-off between prompting enough evasion and mirroring real-life parameters. If a TEG sets a loaded frame, uses a directive way of asking for compliance and grants earned income, there is a risk of obtaining insufficient variability in evasion to correlate with a questionnaire or to observe the impact of a treatment aimed at improving compliance. Nonetheless, for the sake of replication and validity, Muehlbacher and Kirchler (2016) advise setting a loaded frame, redistributing tax funds, granting earned income and avoiding student pools as much as possible. However, they also advise against excessive standardisation of experimental research, as "heterogeneity [...] allows for replications in different settings" (p. 17).

Numerous topics have been left unaddressed in this review, such as social influence between taxpayers (Fortin et al., 2007), the impact of individual personality traits (Jacquemet et al., 2017b) and physiological measures (Coricelli et al., 2010; Dulleck et al., 2016), and the consequences of institutional changes (Jacquemet et al., 2017a). Each study has used its own set of variables, and this review has focused more on how to build a TEG. The issue of a TEG's external validity has also not been addressed here, but Torgler (2002), Bloomquist (2009), Alm et al. (2015) and Muehlbacher and Kirchler (2016) have done so. When compared with the right data, Bloomquist (2009) and Alm et al. (2015) conclude that TEGs have rather good validity, although Muehlbacher and Kirchler (2016) warn about not "whispering in the ear of princes" before verifying "experimental findings by replication through other methods" (p. 17). Finally, although this review offers some clues as to the expected impact of some variables on compliance in the laboratory, it is not guaranteed that this effect will be confirmed (of the 15 variables reviewed, six are labelled as ambiguous or "somewhat" positive or negative). Confounding variables can always be suspected to have played a role, especially where few studies have been carried out. The only way to overcome this difficulty would be to run a meta-analysis on the existing set of databases used by all TEGs. This work is next on the author's agenda.

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BOOK REVIEW: IOTA (2017). DISRUPTIVE BUSINESS MODELS: CHALLENGES AND OPPORTUNITIES FOR TAX ADMINISTRATION[1]

Edidiong Bassey[2]

This book takes a holistic approach towards an understanding of the complex realities that faces tax administrations in the age of disruptive business technologies. Through a collection of fifteen reports comprising of ten tax administrations, two supranational institutions and three multinational tax consultancies, comprising work from Europe, china and the Americas, the reader can gain a thorough insight into the opportunities and risks that exist from a multi-stakeholder perspective.

As indicated in the foreword, the book is divided into four sections; the first section highlights the work of tax administrations in adapting to the world of information technology through the provision of better services and to tackle disruptive business models, the second section focuses on the sharing economy and the approaches taken to ensure that they are properly taxed, the third section discusses the importance of block chain technology in the improvement of public services and transforming tax administration activities, the final section discusses the necessity for an appropriately skilled workforce in responding to this new digital transformations and the need for human development programs suited to such endeavours.

In the first section, the tax administrations of Finland, Georgia and Ireland discusses some of the work they have done in IT development such as pre-populated tax returns, some disruptive technologies they are working on including block chains and electronic fiscal devices, the challenges of an ageing and less-skilled workforce, dealing with the sharing economy and the need for more international co-operation. This section can be seen to be a precursor giving a little discussion to a wide range of issues discussed in more depth further along in the book.

Digging into the sharing economy in the second section, the tax administrations of Italy, Belgium, the United Kingdom and Vertex Consulting gives a comprehensive overview of what the sharing economy is, the alternative names and the different types. They highlight some of the work that has been done to rein in the sharing economy into the tax net such as legislations, Co-operation between tax authorities and platform owners and scraping. Other issues noted were the need for tax administrations to have appropriate business architecture for technological adaption and the need for more inter-country co-operation.

The European Commission, Accenture, Netherlands and PWC, in the third section provide a detailed discussion of a particularly notable and much talked about disruptive technology, Block chain. On average, there seems to be much appreciation of what the technology can do for tax administration but its actual use seems to be quite low. Only, the Netherlands has a pilot program ongoing, the rest are far more cautious about championing the cause of block chains.

[1] Available online from https://www.iota-tax.org/news/iotas-latest-publication-disruptive-business-models-challenges-and-opportunities-tax

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They highlight the need for better understanding and more collaboration with external partners which includes countries and organisations.

In this new age of disruptive technology, the final section highlights a key resource that tax administrations need to meet these opportunities and challenges, a skilful workforce. Austria, China, the Inter-American Centre for Tax Administration and Estonia highlights the work they are doing to provide a skilful workforce to match these new digital transformations. All except Estonia have launched several programs to provide a new generation of tax experts skilful in the digital economy. Perhaps not surprising, given the status of Estonia as a 'D5' country and the world first provider of e-services, the author gives an impressive rendition of the digital eco-system that has made the country a world leader, it's no wonder that they have pay packages to match those of the market, a challenge for other tax administrations.

Throughout this book, two identifiable patterns can be found. First, the emphasis on voluntary compliance; where possible, tax administrations would like to avoid a combative approach to tax compliance and this can be noticed in this book. There is a lot of focus on trying to make tax compliance easier and to ensure ease of collecting taxes in the sharing economy, there is little talk of penalties or developing disruptive technologies to catch tax evaders. Second, the need for international co-operation which is perhaps not too surprising given that the book is a result of a conference of the Intra-European Organisation of Tax Administrations. Nevertheless, it does show that tax administrations recognise that this is a complex challenge that cannot be solved on their own but require multi-lateral cooperation.

Upon review of this book, two issues do come to light. The first is the lack of perspective on developing countries, Vertex and the Inter-American Centre for Tax Administration do make little side notes to acknowledge the lack of technological competency of the developing world but there is no concrete input from any developing country on how they intend to address their technological deficit. Second and perhaps most stark is the difference between the perceptions of country tax administration and non-country tax administration (the European commission is included in the latter category) on disruptive technologies. While the former sees disruptive technology in a very positive light, the latter takes an almost pessimistic approach to it. It is therefore imperative that country tax administrations manage their expectations of disruptive technologies because as the author from the European commission puts it, there is little room for 'trial and error' where tax payers' funds and a country's economy are involved.

REVIEW OF RECENT LITERATURE

John D'Attoma[1], *Duccio Gamannossi degl'Innocenti*[2], *Shaun Grimshaw*[3] *& Antoine Malézieux*[4]

A selection of recently published papers is reviewed below. The aim is to bring together tax administration-related papers from the diverse range of outlets in which they are published. The review is necessarily selective, and the Journal welcomes suggestions for inclusion of papers in subsequent reviews.

TRANSPARENCY AND INFORMATION EXCHANGE

Byrnes, W. (2017) 'How May the United States Leverage Its FATCA IGA Bilateral Process to Incentivize Good Tax Administrations among the World of Black Hat and Grey Hat Governments? A Carrot & Stick Policy Proposal'.

This essay challenges the idea that all tax jurisdictions should have complete information on taxpayers. Given that most countries are hardly without corruption, who then is to be trusted with taxpayer information? The author suggests that the United States uses a "carrot" and "stick" approach by utilizing FACTA, coupled with the Tax Administration Certification administered under the President's Annual Narcotics Certification. Under this framework, the U.S. will provide financial information about other country's citizens using the CAA (Competent Authority Agreement), while foreign governments will provide information under FACTA. This is the cooperative "carrot". The "stick" would be administered when financial transparency is not reciprocated or under cases of abuse of power. Sanctions would then be placed on secretive jurisdictions who do not provide information to the U.S. government and those that misuse the tax information that the U.S. provides.

Kim, Y.R. (2017), 'Considering Citizenship Taxation: In Defense of FATCA'.

This article addresses the issue of citizen taxation, by examining whether citizenship taxation (as opposed to residency taxation) fulfils the efficiency and administrative principles of taxation. The author uses citizenship renunciation rates in mainly OECD countries to suggest that citizenship taxation isn't the main motivating factor in citizenship renunciation. Furthermore, the author argues that citizenship taxation has only a marginal effect on inbound migration from high-skilled and wealthy migrants. Finally, the author makes the case for why citizenship taxation is actually more easily administered than residence based taxation. On balance, the author concludes that citizenship taxation is good policy.

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Cockfield, A. J. (2017) How Countries Should Share Tax Information

Exchange of tax and financial information is the main policy response to capital flight, offshore tax evasion and multinational firm tax avoidance. This article discusses optimal exchange of information (EOI) laws and policies in the light of the different interests of taxpayers and tax authorities, implementation challenges and opportunities provided by big data and analytics. The author shows how taxpayers and tax authorities may have contrasting interests with respect to global financial transparency and how this results in an opaque global financial system where high transaction costs prevent the achievement of optimal outcomes. The importance of high quality tax information is deemed crucial to improve enforceability via taxpayer segmentation. A broad multilateral agreement on privacy protections is identified as a prerequisite to address privacy concerns stemming from the risk of misuse of taxpayers' information and varied levels of domestic legal protection of privacy rights. The article argues that data analytics may significantly improve tax law's enforceability and future EOI reforms should be designed so to allow for its full exploitation. To this end, the author notes the potential usefulness of the institution of a global financial registry and the use of private sector firms in the identification of untaxed income from publicly available data.

TAX PROFESSION

Lankhorst, P. and van Dam, H. (2017) 'Post-BEPS Tax Advisory and Tax Structuring from a Tax Practitioner's View'.

This article discusses the expected impact of BEPS on tax advisory and tax planning. To answer the research question, the authors discuss BEPS Actions 7, 8-10, and 13 and their possible implications. Finally, they discuss three issues that the BEPS Actions do not address. The authors suggest that governments should focus a tax on sales and employees factors rather than on which activity creates profits. They argue that BEPS fails to consider the effects corporate taxes may have on wages. Finally, they suggest that advisors shift from advising MNEs on the lowest possible effective tax rate to broader advice including risks, risk appetite and public expectations.

Field, H. M. (2017). Aggressive Tax Planning & the Ethical Tax Lawyer.

This article contemplates the choices facing a lawyer considering giving advice on aggressive tax planning; i.e. advice on actions that may be contestable. At the core of the discussion is the question as to whether a tax lawyer can be both aggressive and ethical with particular regard to the key activity of giving advice on the likelihood of success if a particular measure is challenged. The article considers a number of known strategies for aggressive tax planning by multinational corporations that are discouraged, such as inversion, earnings striping and transfer pricing. The author then sets out a number of different philosophies of lawyering and their outcomes when applied to the example of interest. The article argues that a lawyer seeking to pursue a career as an ethical tax planner should identify and implement her philosophy of lawyering to help make difficult discretionary tax advising decisions in a principled way,

Gammie, M. (2017) Shooting the messenger: the proposed enabler penalty.

This article is a plea against the UK "enabler" penalty, i.e. the idea that tax advisors should be held responsible if their client is found guilty of tax avoidance (as stated in the General Anti Abuse Rule guidance). The author underlines the difficulty in judging if avoidance has occured

and if it was abusive, the threat to the whole tax community and the conflict of interest that may arise between advisors and clients. He concludes with the hope that professionals will continue advising clients without being influenced by, or fearing, a possible penalty.

West, A. (2017) Multinational Tax Avoidance: Virtue Ethics and the Role of Accountants

The author draws on MacIntyre's virtue ethics in this paper which is concerned with the role of accountants in the tax avoidance activities of large multinational companies. He provides a concise overview of modern philosophical approaches to ethics and links MacIntyre's virtue ethics to Cressey's fraud triangle in his analysis, concluding that more work is needed regarding the accounting practices in a global tax setting.

TAX EXPENDITURES

Zu, Y. (2017) 'Reforming VAT Concessions: A Tax Expenditure Analysis'

In this article, the author examines the implications of VAT concessions. The author argues that although there is wide consensus that these concessions are market distorting and inefficient, VAT concessions are a widely used administrative tool. To analyze the effectiveness of these concessions the author uses relies on three-staged inquiry: Does the concession serve a valid government objective? Is a tax expenditure or a direct spending program better at achieving this objective? How should the tax expenditure be designed as to achieve its primary objective? The author relies on the latter two for her analysis. She concludes that VAT expenditures are often unfair and inefficient subsidy programs that can lead to high costs and administrative burdens. She suggests that the VTER – and approach to measure the direct cost of each concession – should be employed to examine the implications for VAT expenditures.

CONFIDENTIALITY

Yin, G. K. (2017) 'Congressional Authority to Obtain and Release Tax Returns'.

This article describes the authority of US Congress under 6103(f)(1) to obtain the tax information of any taxpayer, including the President, without consent. The author suggests that President Trump's current situation justifies a committee effort to obtain the President's tax information. Whether that information is disclosed to the public is a separate issue, but that is up to the committee to investigate.

Debelva, F & Mosquera, I. (2017). Privacy and Confidentiality in Exchange of Information Procedures: Some Uncertainties, Many Issues, but Few Solutions.

In this paper the authors argue that the protection of taxpayer's rights with regard to privacy and confidentiality have received insufficient attention in discussions of the exchange of information between national tax authorities. The article notes that there has been a significant increase in the amount and the types of information being exchanged in respect of several concurrent international initiatives of instruments to exchange information in order to prevent tax evasion and tackle aggressive tax planning. The paper identifies a number of instances where the level of protection offered by current measures is insufficient. The authors conclude that existing safeguards in with regards to taxpayer's right to privacy and confidentiality are

not sufficient to tackle the existing issues and recommend a specific multilateral instrument to address them.

Hambre, A-M. (2017). Tax Confidentiality: A Legislative Proposal at National Level.

In this article the author examines the competing desires for transparency and confidentiality in relation to the information held about taxpayers by national tax authorities. The paper proposes legislation for "a requirement of damage," constructed such that confidentially only applies in the case where there is a likelihood of damage occurring to a taxpayer upon disclosure, thereby adhering to a principle of maximum disclosure on behalf of government, while affording taxpayer privacy when necessary. The paper presents an evaluation of the proposed measure against three key benchmark factors of interest to the related agents, tax compliance, administrative costs and taxpayer privacy and concludes that the proposed measure will facilitate public access to information and thus should provide benefits in terms of the level of taxpayer compliance, while recognising that full disclosure in every situation may not be appropriate.

TAX COMPLIANCE: INDIVIDUALS

Malik, S., Mihm, B. and Timme, F. 'An Experimental Analysis of Tax Avoidance Policies'.

For this study, the authors conduct a laboratory experiment to examine the effects of Anti-avoidance rules (AARs) on tax compliance. They reveal that AARs can actually lead to the unintended consequence of increasing evasion as subjects substitute avoidance for evasion when feasible or evasion for avoidance (a substitution effect). In the end, the substitution effect mitigates the effect of the AARs on the tax gap.

Hallsworth, M., List, J. A., Metcalfe, R. D. & Vlaev, I. (2017). The behavioralist as tax collector: Using natural field experiments to enhance tax compliance.

This article presents results from two large scale natural field experiments in which the UK tax authority sent reminder letters to taxpayers who were late in paying their taxes. The authors report that the inclusion of a social norm message in standard reminder letters led to accelerated payment rates of overdue tax relative to a control condition. The results further reveal that the use of a message detailing a descriptive norm (detailing the behaviour of others) were significantly more effective than those using injunctive norm (detailing the behaviour expected by others). Messages referring to public services or financial information also significantly increased payment rates. The authors note that the interventions significantly accelerated the collection of tax revenue due at little cost.

Bruner D. M., D'Attoma, J. & Steinmo, S. (2017). The role of gender in the provision of public goods through tax compliance.

This paper details the results of an experimental investigation conducted in multiple countries, in which subjects faced a series of decisions on reporting their income from a real effort task. The tax paid was used to form a group fund, which was potentially enhanced by a multiplier, and distributed equally among the subjects, thereby forming a public good. The authors investigate the effect of the level of the multiplier and of the gender of the subject in the compliance decision. The results show that women are more compliant than men, and

interestingly that the gender difference does not correlate to differences in risk aversion. Furthermore, the results also show that increasing the value of the multiplier increases compliance and gives some evidence that men are more sensitive to the price of provision.

D'Attoma, J. (2018) What explains the North–South divide in Italian tax compliance? An experimental analysis

Northern Italy is known to be tax compliant whereas southern Italy is not. This paper studies the cultural differences across populations from northern and southern Italy, using an experimental method. Using a Tax Evasion Game, compliance behaviour is recorded in Capua, Rome, Bologna, and Milan. There were no differences of compliance behaviour between northern and southern Italians, showing that there is no intrinsic cultural motivation to evade taxes in southern Italy. The author concludes that institutions probably drive this real life difference.

Mendoza, J.P., Wielhouwer, J.L., & Kirchler, E (2017) The backfiring effect of auditing on tax compliance.

Authors expect a curvilinear (U-shaped) relationship between the number of audits and tax evasion. This means that increasing audit level has a positive impact on tax compliance until a certain level is reached, after which it has a negative impact on tax compliance. An increasing level of audits could lead to a perception of distrust from taxpayers, a feeling of unfairness or of widespread noncompliance. The authors compare the number of verification actions taken by tax authorities to the perception of tax evasion from business executives in different countries and indeed show that audit level can backfire when it is set too high.

Alm, J. Bloomquist, K & Mckee, M (2017) When You Know Your Neighbour Pays Taxes: Information, Peer Effects and Tax Compliance.

In this paper, the authors use a Tax Evasion Game where the participants have to file and report their taxes to study the impact of peer information. They compare treatments where different information is provided: no information (baseline), one with information about the percentage of group members who filed their taxes, one with the results of the audits for the current round and one with both types of information. The results show that providing information always has an impact compared to the baseline. However, this impact is not always positive on compliance. Managing peer effects information is thus complicated and subtle.

Goerke, L. (2016) Tax evasion in a Cournot oligopoly with endogenous entry.

This contribution investigates how excessive entry is affected by tax evasion when a tax on operating profits is imposed on a homogenous-good Cournot oligopoly. The scientific literature shows that in a Cournot oligopoly, if the number of competitors and output per firm are negatively related, there will be excessive entry compared to the welfare maximizing one. While it has been proven that this issue may be ameliorated - or even solved - by taxing firms, an analysis of the impact of tax evasion on this result was still lacking. The author identifies two simultaneous effects for tax evasion on excessive entry: the first one increases the incentives to entrance by raising profits and the second one affects the welfare maximizing number of firms. While the former effect exacerbates excessive entry, the second may have a positive impact on the issue. In particular, when the welfare cost of evasion declines with the number of competitors, evasion activity also decreases in a number of firms. In this case, tax

evasion is found to be positively related to the welfare maximizing number of firms and this effect may outweighs the higher incentives to entry. A numerical illustration of the inherent ambiguity of the effect of evasion on excessive entry is provided to support the result.

TAX COMPLIANCE: LARGE BUSINESS

De Widt, D. & Oats, L. (2017) Risk Assessment in a Co-operative Compliance Context: A Dutch-UK Comparison, British Tax Review, 230 –

Both the UK and the Netherlands deploy risk assessment techniques in the context of co-operative compliance arrangements with large business taxpayers. Both countries have mature models of co-operative compliance with important operational differences and this paper probes these differences drawing on interview based research conducted in both countries. The authors highlight the difficulties faced by tax authorities in defining and quantifying the ongoing benefits of risk based compliance programmes.

Szudoczky, R & Majdanska, A. (2017) Designing Co-operative Compliance Programmes: Lessons from the EU State Aid Rules for Tax Administrations

In this paper the authors explain the rationale for co-operative compliance initiatives by reference to the OECD recommendations in this area, and focus on the EU context, in particular the state aid rules. Co-operative compliance arrangements are then evaluated against the state aid rules and the authors conclude that if the programmes are limited to procedural benefits and eligibility defined in a non-arbitrary way, then the scope for challenge under the state aid rules is low.

DISPUTE RESOLUTION

De Carolis, D. (2017) A New Approach to International Dispute Resolution Processes.

The substantial growth in tax disputes between tax authorities and multinational enterprises has exposed the substantial inadequacy of International Taxation Dispute Resolution Process (ITDRP). This manuscript proposes to analyse the ITDRP using an institutional approach i.e., under the assumption that the states behave as rational actors guided by cost/benefit considerations. The author argues that re-framing ITDRP as a compromise between the sovereignty costs imposed on states and the benefits generated for tax authorities and taxpayers is both more insightful and reliable than legal analysis alone. The paper identifies the main interests underlying the ITRDP and illustrates how such an interdisciplinary comparative paradigm may be fruitful to the current debate about the use of Non-Binding Dispute Resolution Mechanisms and to increase the taxpayers' involvement and rights during the Mutual Agreement and Arbitration Procedures.

BEPS

Ginevra, G. (2017) The EU Anti-Tax Avoidance Directive and the Base Erosion and Profit Shifting (BEPS) Action Plan: Necessity and Adequacy of the Measures at EU level.

This article analyses the Anti-Tax Avoidance Directive from the Council of European Union and compares it to the original OECD BEPS Action Plan. The author concludes that this

agreement is impressive, as the matter is particularly sensitive. It will indeed provide for common implementation and reduce compatibility issues between countries. However, the author points out that the anti-avoidance measures will probably not be enough to meet the objectives of the Directive.

Christians, A. (2017) BEPS and the New International Tax Order.

In this paper, the author takes a helicopter view of recent co-ordination efforts in the battle against multinational tax avoidance. She reflects on the Inclusive Framework which provides a potential avenue for the participation of non-OECD countries in the norm building process and concludes by speculating about the potential for expansion of inclusivity to encompass NGOs as well as country representation in the evolution of the new global tax order.

Büttner T. and Thiemann, M. (2017)., 'Breaking Regime Stability? The Politicization of Expertise in the OECD/G20 Process on BEPS and the Potential Transformation of International Taxation'

In this article, the authors examine how and why the OECD has utilised the Transfer Pricing Guidelines in order to reign in Base Erosion and Profit Shifting (BEPS). They argue that this incremental approach, rather than a more radical shift in policy, allows the OECD to retain authority while limiting political risk. Utilizing an historical institutionalist/constructivist framework, the authors rely on expert interviews and qualitative content analysis of OECD reports, suggesting that that this approach has had the unintended consequence of rendering BEPS policies increasingly incoherent. Thus, the end goal of institutionalising a Transfer Pricing regime as to set certain boundaries, could actually undetermined the entire regime.

Avi Yonah, R. & Xu, H. (2017) Evaluating BEPS.

The authors provide an evaluation of the BEPS project's achievements and critically appraise its limits, observing the new direction of international tax law reform towards economic value and calling for a re-evaluation of the benefits principle. They advocate source taxation of passive income and residence taxation of active income to enable more effective combat against both tax evasion and tax avoidance.

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