



REPUBLIC OF LITHUANIA

SELECTED ISSUES

June 2017

This Selected Issues paper on Republic of Lithuania was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed on June 15, 2017.

Copies of this report are available to the public from

International Monetary Fund • Publication Services

PO Box 92780 • Washington, D.C. 20090

Telephone: (202) 623-7430 • Fax: (202) 623-7201

E-mail: publications@imf.org Web: <http://www.imf.org>

Price: \$18.00 per printed copy

International Monetary Fund
Washington, D.C.



REPUBLIC OF LITHUANIA

SELECTED ISSUES

June 15, 2017

Approved By
European Department

Prepared by Iacovos Ioannou and Peichu Xie.

CONTENTS

| | |
|--|-----------|
| WHAT EXPLAINS LITHUANIA'S LOW TAX-GDP RATIO? | 3 |
| A. Tax Revenue Performance Relative to the EU | 4 |
| B. Underlying Reasons for Tax Revenue Underperformance | 7 |
| C. Quantification of Contributions to Tax Revenue Underperformance | 14 |
| D. Conclusions and Recommendations | 18 |
| REFERENCES | 20 |
| BOX | |
| 1. Estimating the Effective Statutory Tax Rate | 15 |
| FIGURES | |
| 1. Tax Revenues in EU countries, 2015 | 3 |
| 2. Tax Revenues, 2000–15 | 4 |
| 3. Tax Structure in Lithuania and the EU, 2015 | 5 |
| 4. Labor Share of Income, 2012–15 | 11 |
| TABLES | |
| 1. Current Taxes on Income and Wealth, 2015 | 5 |
| 2. Production and Import Taxes in Europe, 2015 | 6 |
| 3. Social Security Contributions in Europe, 2015 | 6 |
| 4. Lithuania's Tax Revenue Underperformance, 2015 | 7 |
| 5. Tax Rates in Europe, 2015 | 8 |
| 6. Tax Exemptions in Europe, 2015 | 10 |
| 7. VAT Exemptions in Europe, 2016 | 10 |
| 8. VAT Compliance Gap, 2015 | 12 |
| 9. Tax Administration Indicators in Europe, 2013 | 13 |
| 10. Effective Statutory Tax Rates, 2015 | 16 |
| 11. Contributions to Lithuania's Tax Underperformance Relative to the EU, 2015 | 17 |

LITHUANIA'S INNOVATION SYSTEM AND PROPOSALS FOR REFORM—LEARNING FROM THE EXPERIENCE OF ISRAEL _____ **23**

A. Innovation Performance _____ 23

B. Innovation Policies _____ 27

C. Conclusions and Recommendations _____ 36

REFERENCES _____ **38****FIGURES**

1. Summary Innovation Index _____ 24

2. Aggregate and Public R&D Expenditure, 1996–2014 _____ 25

3. R&D Expenditure and Financing _____ 26

4. Indicators of Scientific Innovation, 2013 _____ 26

5. Non-Scientific Innovation, 2015 _____ 27

6. Overview of Lithuania's Research and Innovation System, 2016 _____ 31

7. Overview of Israel's Research and Innovation System _____ 32

8. Innovation Promotion Programs and Their Funding under the 2014–20 MFF _____ 33

TABLE

1. Innovation Index Comparison _____ 24

ANNEXES

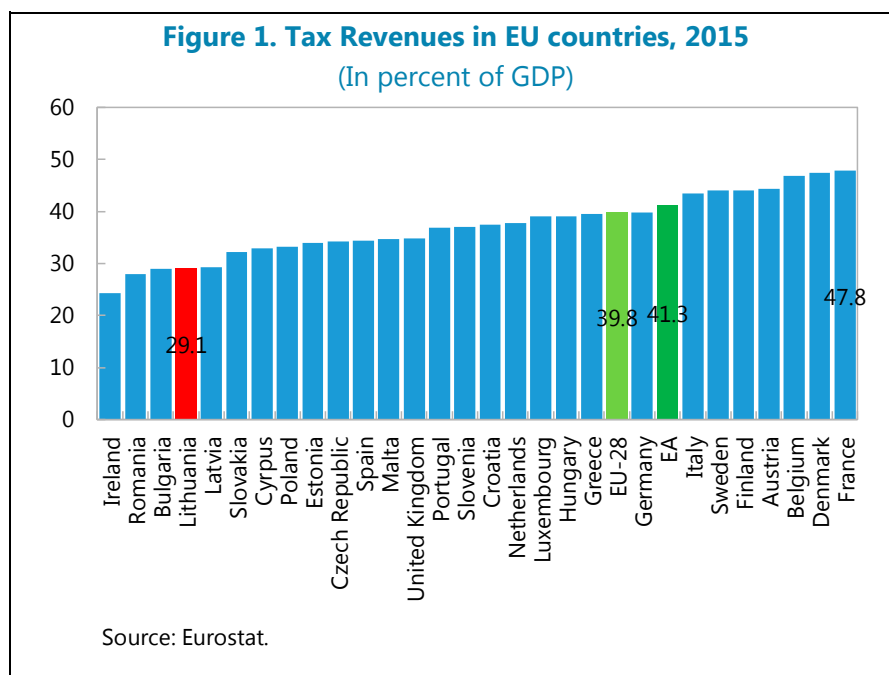
I. Objectives and Targets of the Lithuania Innovation Promotion Program 2014–20 __ 40

II. Institutional Setup of Lithuania's Innovation System _____ 44

WHAT EXPLAINS LITHUANIA'S LOW TAX-GDP RATIO?¹

This paper examines the reasons behind Lithuania's low tax-GDP ratio relative to the EU. It finds that weak tax administration is the primary cause, while tax policy plays an important role. Differences in the economic structure, however, do not make much difference.

1. **At end-2015, Lithuania had nearly the lowest tax-GDP ratio in the EU**, along with Bulgaria and Romania (Figure 1). Lithuania's tax-GDP ratio was about 10 percentage points below the EU average. While a low tax-GDP ratio may be a country's deliberate choice reflecting its social preferences, low tax revenues may also be indicative of an outdated tax system, an inefficiently small public sector that lacks resources to promote growth and provide adequate social protection, or weaknesses in tax administration.



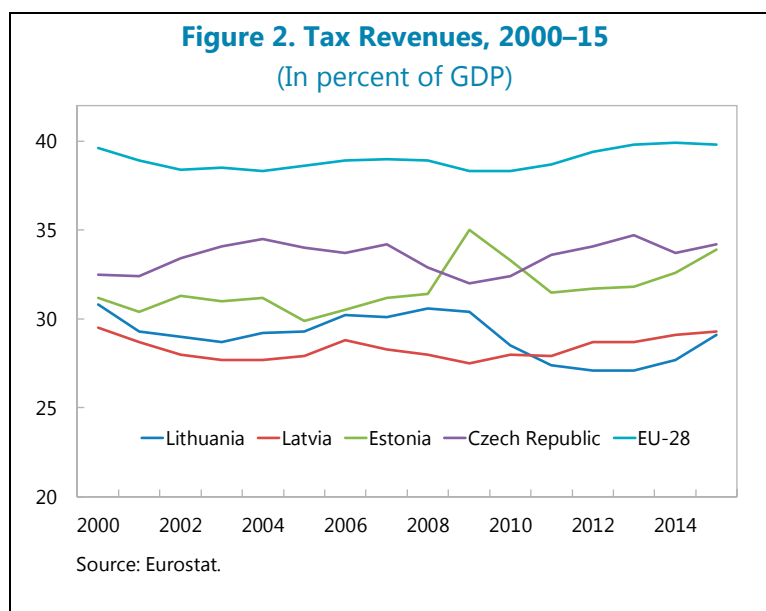
2. **Lithuania's tax underperformance relative to the EU has worsened over time (Figure 2).** The tax ratio differential with the EU has widened since 2000, pointing to potential structural weaknesses. Lithuania's tax-GDP path is in stark contrast with that of nearby Estonia. While both countries had the same tax-GDP ratio in 2000, Estonia's revenues in 2015 were well above Lithuania's. Similarly, Latvia which was tailing Lithuania in 2000, slightly surpassed it in 2015.

3. **The purpose of this paper is to identify the reasons behind Lithuania's low tax-GDP ratio relative to the EU.²** The paper investigates the role of tax policy (tax rates and exemptions),

¹ Prepared by Iacovos Ioannou.

² Using the tax-GDP ratio in the EU as a benchmark is meant to illustrate the level of taxes that other EU countries think is needed to achieve development and social objectives.

the structure of the economy, and tax administration (including informality). It finds that weak tax administration is the main reason for Lithuania's tax revenue shortfall relative to the EU, while differences in tax policy play an important role. Differences in the economic structure, however, do not make much difference.



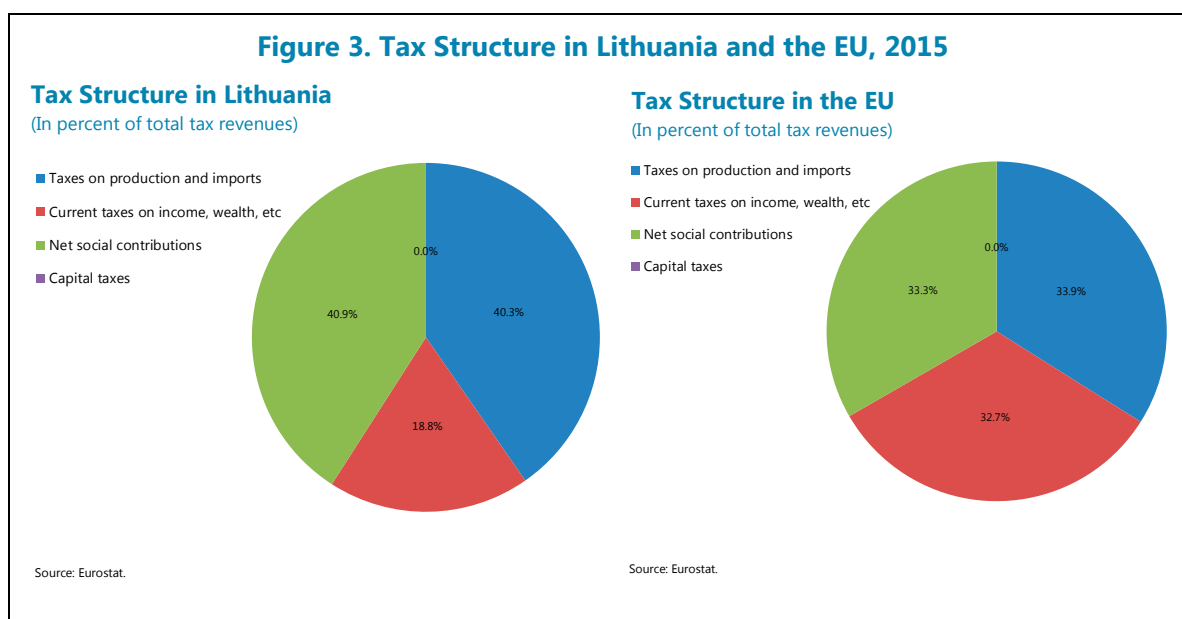
4. **The rest of the paper is organized in four parts.** Part I reviews Lithuania's tax structure relative to the EU and identifies the main taxes responsible for the underperformance. Part II examines the underlying reasons for the tax underperformance by comparing Lithuania's tax rates, exemptions, the structure of the economy, and tax administration to other EU countries. Part III seeks to quantify the relative contribution of each of these factors to the tax shortfall relative to the EU. Part IV concludes and highlights key recommendations.

A. Tax Revenue Performance Relative to the EU

5. **A cursory look at Lithuania's tax structure relative to the EU suggests that Lithuania relies relatively more on indirect, rather than direct, taxes and social security contributions (Figure 3).**

- Current taxes on income, wealth, and other (direct taxes) account for 18.2 percent of total tax revenues, compared with 32.1 percent in the EU.
- Taxes on production and imports (indirect taxes) account for 40.7 percent of total tax revenues, compared with 33.6 percent in the EU.
- Social security contributions account for 41.2 percent of total tax revenues, compared with 33.6 percent in the EU.

It is therefore important to delve deeper into the reasons behind the different tax structures by examining the composition of these broad tax categories.



6. **Low income and wealth taxation is for the most part attributable to low personal income tax (PIT).** Lithuania's PIT yields less than half of the EU average and well below regional peers (Table 1).³ Low corporate income tax (CIT) and recurrent capital taxes further contribute to Lithuania's shortfall relative to the EU.

| | Lithuania | Estonia | Latvia | Germany | Sweden | United Kingdom | CE-5 1/ | EU-28 | EA-19 |
|--|-----------|---------|--------|---------|--------|----------------|---------|-------|-------|
| Current taxes on income, wealth, etc. | 5.5 | 7.9 | 7.9 | 12.3 | 18.4 | 13.9 | 7.2 | 13.0 | 12.6 |
| Personal income tax | 3.9 | 5.8 | 5.9 | 9.1 | 15.1 | 9.2 | 4.3 | 9.4 | 9.3 |
| Corporate income tax | 1.5 | 2.1 | 1.6 | 2.4 | 3.0 | 2.5 | 2.4 | 2.5 | 2.5 |
| Current taxes on capital 2/ | 0.0 | : | 0.1 | 0 | : | 1.7 | 0.1 | 0.5 | 0.3 |
| Payments by households for licences 2/ | 0.0 | : | 0.2 | 0.2 | 0.3 | 0.4 | 0.2 | 0.2 | 0.2 |
| Other | 0.0 | 0.0 | 0.1 | 0.6 | 0.0 | 0.1 | 0.0 | 0.4 | 0.3 |

Source: Eurostat.
 1/ CE-5 includes Czech Republic, Hungary, Poland, Slovakia, and Slovenia.
 2/ The numbers refer to EU-25 and EA-16.

7. **Despite having a tax structure that is tilted toward indirect taxes, Lithuania's production and import tax revenues are lower than the EU average, primarily because of lower taxes on land, buildings, and other structures (Table 2).** Other smaller taxes (e.g., insurance premiums, lotteries and gambling, car registration, and pollution taxes) also account for the underperformance. On the other hand, Lithuania's revenues from VAT and excise duties exceed the EU average.

³ Lithuania's low PIT reflects in part its reliance on high social security contributions to fund the social security system. Other EU countries keep labor taxation low and also use several revenues to fund the social security system.

Table 2. Production and Import Taxes in Europe, 2015
(Percent of GDP)

| | Lithuania | Estonia | Latvia | Germany | Sweden | United Kingdom | CE-5 1/ | EU-28 | EA-19 |
|---|-----------|---------|--------|---------|--------|----------------|---------|-------|-------|
| Production and import taxes | 11.8 | 14.5 | 12.8 | 10.8 | 21.9 | 12.8 | 13.9 | 13.4 | 13.1 |
| Value added type taxes (VAT) | 7.7 | 9.2 | 7.7 | 7.0 | 9.1 | 6.9 | 7.8 | 7.0 | 6.8 |
| Taxes on imports excluding VAT and import duties 2/ | 0.0 | 4.3 | 0.0 | 0.6 | 0.0 | 0.0 | 0.5 | 0.3 | 0.3 |
| Excise duties and consumption taxes 2/ | 3.1 | : | 3.3 | 1.5 | 2.3 | 3.1 | 3.2 | 2.3 | 2.1 |
| Stamp taxes 2/ | 0.2 | : | : | 0.4 | : | 0.0 | 0.0 | 0.3 | 0.4 |
| Taxes on financial and capital transactions 2/ | : | : | 0.2 | 0.0 | 0.3 | 0.7 | 0.2 | 0.4 | 0.3 |
| Car registration taxes 2/ | : | 0.0 | 0.0 | 0.0 | : | 0.0 | 0.1 | 0.1 | 0.1 |
| Taxes on lotteries, gambling and betting | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.2 | 0.2 | 0.2 | 0.2 |
| Taxes on insurance premiums 2/ | : | : | : | 0.4 | 0.1 | 0.2 | 0.1 | 0.3 | 0.3 |
| Taxes on land, buildings and other structures | 0.3 | 0.3 | 0.7 | 0.4 | 0.8 | 1.4 | 0.5 | 1.2 | 1.2 |
| Taxes on the use of fixed assets | 0.0 | 0.0 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Total wage bill and payroll taxes 2/ | 0.0 | : | 0.0 | 0.0 | 9.0 | 0.0 | 0.2 | 0.6 | 0.4 |
| Taxes on international transactions 2/ | : | : | : | 0.0 | : | 0.0 | 0.0 | 0.0 | 0.0 |
| Business and professional licences 3/ | 0.5 | 0.0 | 0.2 | 0.0 | 0.0 | 0.1 | 0.3 | 0.1 | 0.0 |
| Taxes on pollution | 0.0 | 0.3 | 0.2 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 |
| Other | 0.0 | 0.3 | 0.2 | 0.2 | 0.2 | 0.0 | 0.6 | 0.4 | 0.8 |

Source: Eurostat.

1/ CE-5 includes Czech Republic, Hungary, Poland, Slovakia, and Slovenia.

2/ The numbers refer to EU-25 and EA-16.

3/ The numbers refer to EU-25.

8. **Similarly, social security contributions are lower than in the EU and go hand in hand with less generous pension benefits (Table 3).** Employers bear by far the biggest burden.

Table 3. Social Security Contributions in Europe, 2015
(Percent of GDP)

| | Lithuania | Estonia | Latvia | Germany | Sweden | United Kingdom | CE-5 1/ | EU-28 | EA-19 |
|-------------------------------|-----------|---------|--------|---------|--------|----------------|---------|-------|-------|
| Social security contributions | 11.9 | 11.6 | 8.7 | 16.5 | 3.7 | 7.8 | 14.0 | 13.2 | 15.3 |
| Paid by employers | 7.8 | 10.7 | 5.9 | 6.6 | 3.5 | 4.1 | 7.1 | 6.9 | 8.0 |
| Pension contributions | 5.8 | 5.8 | 4.1 | : | 3.5 | 3.9 | 4.4 | : | : |
| Non-pension contributions | 2.0 | 5.0 | 1.8 | : | 0.0 | 0.2 | 3.4 | : | : |
| Paid by employees | 3.8 | 0.6 | 2.5 | 8.8 | 0.1 | 3.0 | 6.6 | 5.4 | 6.3 |
| of which: by self employed | : | 0.1 | 0.1 | : | 0.1 | 0.2 | 0.9 | : | : |
| Pension contributions | 1.0 | 0.1 | 1.7 | : | 0.1 | 2.9 | 4.5 | : | : |
| Non-pension contributions | 2.8 | 0.5 | 0.7 | : | : | 0.2 | 3.2 | : | : |
| Imputed contributions 2/ | 0.3 | 0.2 | 0.3 | 1.1 | 0.0 | 0.6 | 0.3 | 0.9 | 1.1 |
| Other | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |

Source: Eurostat.

1/ CE-5 includes Czech Republic, Hungary, Poland, Slovakia, and Slovenia.

2/ The numbers refer to EU-25 and EA-16.

9. **In summary, Lithuania's revenue shortfall relative to the EU originates from the following taxes (Table 4):**

- About half of the difference between Lithuania's tax revenues relative to the EU is due to low PIT revenue.
- About a quarter of the difference in tax revenues is accounted for by a few select taxes, notably social security contributions, corporate income tax, and taxes on land, buildings, and other structures.

- The remainder reflects shortfalls in several smaller taxes, including current taxes on capital, payments for licenses, taxes on insurance premiums, and capital (non-recurrent) taxes (e.g., taxes on capital transfers).
- Some of Lithuania's taxes, notably the VAT and excise taxes, overperform relative to the EU.

Table 4. Lithuania's Tax Revenue Underperformance, 2015
(Percent of GDP)

| | Lithuania | EU-28 | Change |
|---|-----------|-------|--------|
| Total tax revenues | 29.1 | 39.8 | -10.7 |
| Personal income tax | 3.9 | 9.4 | -5.5 |
| Corporate income tax | 1.5 | 2.5 | -1.0 |
| VAT | 7.7 | 7.0 | 0.7 |
| Excises and consumption taxes 1/ | 3.1 | 2.3 | 0.8 |
| Taxes on land, buildings and other structures | 0.3 | 1.2 | -0.9 |
| Social security contributions | 11.9 | 13.2 | -1.3 |
| Other | 0.7 | 4.2 | -3.5 |

Source: Eurostat.

1/ The numbers refer to EU-25.

B. Underlying Reasons for Tax Revenue Underperformance

10. **This section discusses the reasons behind Lithuania's tax underperformance relative to the EU.** More specifically, it examines how Lithuania's tax policy (tax rates, exemptions), the structure of the economy, and tax administration compare to the EU and other peers.

Tax Policy

11. **Most tax rates in Lithuania are lower than the EU average (Table 5).**

- *PIT.* Lithuania has one of the lowest income tax rates in the EU, in part because it relies on a flat-rate structure and social security contributions account for the bulk of labor taxation.
- *CIT.* Lithuania has one of the lowest CIT rates in the EU, intended to provide a business-friendly environment, including for foreign investors.
- *VAT.* The VAT standard rate seems broadly comparable to other countries, although some EU countries have recently hiked their rates. The reduced rates, however, seem low relative to regional peers.⁴ This is because Lithuania has not increased the reduced rate since 2001,

⁴ The framework for VAT rates in the EU is set in the VAT Directive. Member countries are free to choose the number and level of rates on the condition that: (i) a standard rate of at least 15 percent applies to all goods and services except as mandated in the Directive and (ii) reduced rates of at least 5 percent are limited to one or two and apply to goods and services listed in Annex III of the Directive. The VAT system in the EU is currently under review to make it simpler, more fraud-proof, and business-friendly.

whereas most other countries have increased it in tandem with changes in the standard rate or to raise revenues (e.g., Latvia or the Czech Republic).

- *Excises.* Overall, the excise rate on gasoline and, to some extent, the ad-valorem tax on cigarettes seem rather low, perhaps to contain incentives for smuggling from Belarus and Russia.⁵ Excise rates on alcoholic beverages are substantially higher than the minimum rates required by the EU, driven by efforts to curb alcohol consumption, which is amongst the highest in the world.⁶
- *Social security contributions.* Total social security contribution rates are somewhat lower than in other countries and matched by less generous pension benefits. Employer contribution rates are higher though, while employee social security contribution rates are well below peers.
- *Wealth taxes.* Although cross country data are not readily available, the property tax rate in Lithuania is considered low.⁷

Table 5. Tax Rates in Europe, 2015
(Euros unless otherwise indicated)

| | Lithuania | Estonia | Latvia | Germany | Sweden | United Kingdom | CE-5 | EU-28 | EA |
|--|-----------|---------|--------|---------|--------|----------------|--------|-------|------|
| PIT (highest marginal rate) | 15 | 20 | 23 | 45 | 25 | 45 | 27.6 | 33.4 | 37.5 |
| Corporate income tax (highest marginal rate) | 15 | 20 | 15 | 30 | 22 | 20 | 19.2 | 22.6 | 24.5 |
| Social security contributions-total (percent) | 31.0 | 35.4 | 34.1 | 39.6 | 38.4 | 25.8 | 35.7 | 34.5 | 34.1 |
| Social security contribution rates-employees (percent) | 3.0 | 1.6 | 10.5 | 20.2 | 7.0 | 12.0 | 12.8 | 12.1 | 11.8 |
| Social security contribution rates-employers (percent) | 28.0 | 33.8 | 23.6 | 19.3 | 31.4 | 13.8 | 22.9 | 22.4 | 22.3 |
| VAT standard rate | 21 | 20 | 21 | 19 | 25 | 20 | 22.6 | 21.6 | 20.8 |
| VAT reduced rate | 0/5/9 | 0/9 | 0/12 | 7 | 0/6/12 | 0/5 | ... | ... | ... |
| Excise tax on ethyl alcohol (per hectoliter) | 1321 | 2,172 | 1,360 | 1,303 | 5,469 | 3,812 | 1176.8 | ... | ... |
| Excise tax on cigarettes (specific per 1000) | 48 | 47 | 54 | 98 | 160 | 261 | 55.1 | ... | ... |
| Excise tax on cigarettes (ad valorem, percent of retail selling price) | 25 | 34 | 25 | 22 | 1 | 17 | 25.5 | ... | ... |
| Excise tax on premium unleaded gasoline (per liter) | 0.43 | 0.42 | 0.41 | 0.66 | 0.60 | 0.80 | 0.46 | ... | ... |

Sources: OECD, KPMG, and European Commission.

⁵ Following the creation of the Single Market and the abolition of internal border tax controls, EU member countries are required to apply excise duties on the same products (those which are harmful or pollute): alcohol, tobacco, and energy (including mineral oils). The EU directive indicates that energy products are taxed when used as motor fuel or fuel for heating. EU legislation requires countries to apply only the harmonized minimum rates. Countries are free to apply excise duty rates above these minimum rates.

⁶ Excise rates on all alcoholic beverages have been increased considerably as of March 1, 2017. Smaller increases have also taken place for cigarettes.

⁷ The tax rate for immovable property ranges from 0.3 to 3 percent of the taxable value of the property, depending on the purpose, use, legal status, location, condition, and technical features of the property. The exact rate is set by local municipality councils. Natural persons pay 0.5 percent of the taxable value of the property exceeding EUR 220,000.

12. Tax exemptions in Lithuania appear to be broadly comparable to other countries (Tables 6 and 7).

- *PIT.* The tax-exempt amount (TEA)—which depends on the basic salary, number of children, and degree of disability (where applicable) and gradually decreases as income rises⁸—appears rather high compared to some regional peers because it has been used to impart a degree of progressivity into the otherwise flat-rate tax system. Besides the TEA, other leakages include income tax exemptions (e.g., interest, capital gains including from sale of real estate, and insurance payouts) and various deductions (e.g., life insurance premiums, pension contributions into the third pillar, fees for higher education/vocational training).⁹
- *CIT.* The current threshold of EUR 300,000 for taxable income is relatively high, implying that many companies do not have to pay CIT. Moreover, Lithuania is one of a handful of EU countries that apply a reduced rate to smaller companies and agricultural enterprises (as defined by law). Among comparators, only Latvia and the UK do so. Hungary abolished the small company tax rate in 2017.
- *VAT.* Exemptions are generally modest. The reduced VAT rate applies to a limited number of products compared to many other EU countries, which have more widespread exemptions.
- *Excises.* Excise taxes are subject to the harmonized EU minimums and apply to the same products as elsewhere. Exemptions are therefore unlikely to play an important role in explaining Lithuania's relative performance.¹⁰
- *Social security contributions.* Lithuania applies social security contributions to broad categories of income and earners (including farmers and self-employed) based on the entire income from labor with no cap.¹¹ In other countries, social security contributions may apply to narrower categories of income and earners and sometimes may be subject to a minimum threshold and/or a cap.
- *Wealth taxes.* Lithuania exempts immovable property used in agricultural activities, education, social welfare, artistic studios, as well as property owned by state and municipal governments, charitable organizations, and free economic zones. The EUR 220,000 threshold

⁸ The decrease in the TEA with income applies only to the basic TEA, not the TEA for children. The TEA in Lithuania has been increased further in 2016 and 2017.

⁹ In addition, income from individual activities is taxed at 5 percent.

¹⁰ Differences, however, may arise to the extent that some countries in 2015 (including Lithuania) had a derogation in meeting the minimum excise rates. Moreover, countries apply reduced rates for alcoholic beverages, and/or differentiated rates for some energy products (e.g., gas oil, kerosene, electricity), depending on use (e.g., heating, industrial use), which may vary from country to country. As of March 1, 2017, Lithuania has reached all the minimum excise rates required by EU law.

¹¹ The tax base is employment income, income from business and self-employed activities, income from sports/entertainment, benefits in kind and royalties. Individuals other than employees are subject to different contribution rates. For example, the self-employed and farmers contribute 50 and 20 percent of the basic pension, respectively. Performers or sportsmen contribute 2.5 percent of the income received but income subject to contributions is capped at 50 percent.

for immovable property tax is relatively high. The threshold applies to all property (residential premises, greenhouses, recreational buildings, garages, and homesteads) owned by family members (spouses and children living with parents). Data on exemptions and property thresholds for other countries are not readily available.

Table 6. Tax Exemptions in Europe, 2015
(Percent of per capita GDP, unless otherwise indicated)

| | Lithuania | Estonia | Latvia | Germany | Sweden | United Kingdom | CE-5 | EU-28 | EA |
|---|-----------|---------|--------|---------|--------|----------------|-------|-------|----|
| PIT personal allowance | 19.2 | 16.5 | 9.3 | .. | 4.2 | 42.0 | 29.5 | .. | .. |
| PIT tax credit | .. | .. | .. | .. | .. | .. | 5.1 | .. | .. |
| Social security contributions-upper threshold for employers | - | - | 501.0 | 266.9 | - | - | 136.4 | .. | .. |
| VAT registration threshold | 432.7 | 142.9 | 515.5 | 64.3 | 0.0 | 320.7 | 579.8 | .. | .. |

Sources: OECD and European Commission.

Structure of Economy

13. **Even if Lithuania applied the same tax rates and exemptions as the EU, tax revenues would deviate from the EU average because of differences in the structure of the economy.**

The analysis focuses on the labor share of income, the share of consumption in GDP, the share of excisable goods consumption in GDP, and the stock of wealth. These features of the economy influence the tax base of specific taxes and therefore tax revenues.

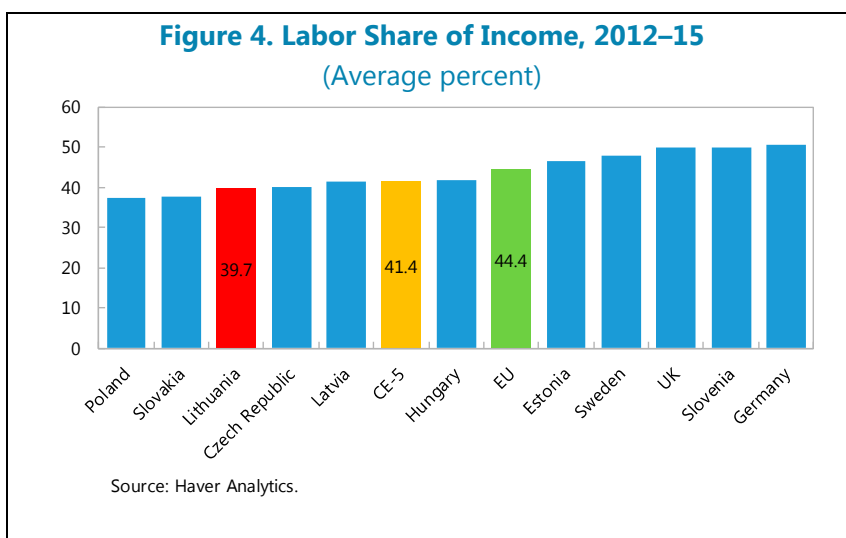
Table 7. VAT Exemptions in Europe, 2016
(Percent, unless otherwise indicated)

| | Lithuania | Estonia | Latvia | Germany | Sweden | United Kingdom | CE-5 |
|---------------------------------------|-----------|---------|--------|---------|--------|----------------|------|
| Admission to cultural events | ex/21 | 20 | ex/5 | ex/7 | 6 | 20 | 15.6 |
| Admission to sports events | 21 | 20 | 21 | 7/19 | ex/6 | 20 | 15.9 |
| Books | 9 | 9 | 12 | 7 | 6 | 0 | 9.2 |
| Foodstuffs | 21 | 20 | 21/12 | 7/19 | 12/25 | 0/20 | 12.1 |
| Hotel accommodation | 9 | 9 | 12 | 7 | 12 | 20 | 14.1 |
| Medical equipment for disabled | 5 | 9 | 12 | 7 | 25/ex | 0 | 11.7 |
| Medical and dental care | 21/ex | ex | ex | 7/ex | ex | ex | .. |
| Newspapers and periodicals | 9 | 9 | 12 | 7 | 6/ex | 0 | 10.3 |
| Pharmaceutical products | 5 | 9 | 12 | 19 | 25/0 | 0/20 | 11.2 |
| Public transport | 9/21 | 20/0 | 12/ex | 7/19 | 6/0 | 0 | 12.4 |
| Memorandum item: VAT standard rate | 21 | 20 | 21 | 19 | 25 | 20 | 22.6 |

Source: European Commission.

14. **Lithuania has one of the lowest labor shares of income in Europe (Figure 4),** partly driven by high levels of self-employment, undeclared wage income, and wage income disguised as profits/mixed income. As a result, Lithuania forgoes revenues that it would otherwise collect

from PIT and social security contributions. The flipside of Lithuania's relatively low labor share is a relatively high share of profits/mixed income, which is subject to income tax, meaning that everything else equal, Lithuania should make up some of the revenue forgone on wage income.



15. **The Lithuanian economy is relatively consumption-oriented.** The share of final consumption expenditure in 2015 was 80.8 percent, compared with 76.8 percent in the EU. Relying on consumption is a boon for tax revenues, because household consumption is generally subject to VAT whereas other types of expenditure (i.e., investment, exports) are not. Consequently, Lithuania collects more revenues than it would if it had the same share of household consumption in GDP as the EU.

16. **Lithuanians consume relatively more products that are subject to excise taxes.** Lithuania's excisable consumption in 2015 amounted to 7.5 percent of GDP, compared with 4.1 percent of GDP in the EU. The excess consumption is largely attributable to alcohol consumption (two percentage points) and energy (one percentage point). Lithuania therefore collects more tax revenues than it would if it had the same share of excisable consumption as the EU.

17. **Low wealth also adversely impacts Lithuania's tax revenues.** Lithuania's stock of household wealth is estimated at approximately one third of the wealth in the EU (Credit Suisse, 2016 and ECB, 2017).¹² A lower stock of wealth implies lower tax revenues from land, buildings, and other structures. Lower (financial) wealth also means a lower share of nonwage income (e.g., interest, dividends, capital gains) and therefore less PIT revenues than if Lithuania had the same stock of wealth as the EU.

¹² Average of estimates of wealth relative to GDP and wealth per adult.

Tax administration

18. **Various indicators suggest that tax administration in Lithuania is lagging relative to other EU countries.** For example, the *2016 Study and Reports on the VAT Gap in the EU-28 Member States* found that Lithuania had the second highest VAT gap in the EU (36.84 of potential revenues, or 1.6 percent of 2014 GDP) in 2014 after Romania.¹³ Moreover, Lithuania's VAT C-efficiency is considerably lower than in the EU (Table 8).¹⁴ Decomposing the C-efficiency into a compliance and policy gap¹⁵ confirms that for the most part Lithuania's weak efficiency is the result of weak compliance. In contrast, Lithuania's policy gap is the lowest among peers, implying that tax exemptions and reduced VAT rates are not an issue, consistent with the analysis in the previous section.¹⁶

Table 8. VAT Compliance Gap, 2015
(Percent change)

| | Lithuania | Estonia | Latvia | Germany | Sweden | UK | CE-5 | EU | EA |
|---------------------------|-----------|---------|--------|---------|--------|------|------|------|------|
| VAT effective tax rate 1/ | 9.6 | 12.7 | 9.7 | 9.5 | 12.8 | 8.2 | 11.1 | 9.1 | 9.0 |
| C-efficiency 2/ | 45.6 | 63.6 | 46.4 | 50.2 | 51.1 | 40.9 | 48.9 | 42.3 | 43.4 |
| Compliance gap 3/ | 36.8 | 9.6 | 23.4 | 10.4 | 1.2 | 10.1 | 19.3 | 14.0 | 17.4 |
| Policy gap 4/ | 27.8 | 29.6 | 39.4 | 44.0 | 48.3 | 54.5 | 39.5 | 50.8 | 47.5 |

Sources: IMF staff calculations, Eurostat, Haver.

1/ The implicit VAT rate corresponding to actual VAT collections. It is less than the standard VAT rate which is assumed to apply to the entire potential base (final consumer expenditure) with no exemptions and no compliance gaps.

2/ The VAT effective rate as a percent of the standard VAT rate.

3/ Defined as the difference between the amount of VAT collected and the VAT Total Tax Liability (VTTL). The VTTL is the theoretical tax liability according to tax law. The estimates come from the 2016 VAT compliance gaps study for the DG Taxation and Customs Union based on 2014 data.

4/ Calculated as multiplicative residual.

19. **Other indicators of tax administration point to specific shortcomings relative to good principles of tax administration (OECD, 2015, and Table 9).**¹⁷

- *Qualified staff, but high attrition.* While Lithuania's State Tax Inspectorate (STI) has a relatively young and well-educated staff, attrition rates are high, pointing to possible weaknesses in human resource management. In recruitment, for example, the STI cannot

¹³ The VAT gap, also referred to as compliance gap, is defined as the difference between the amount of VAT collected and the VAT Total Tax Liability (VTTL), the theoretical tax liability according to tax law. The VAT gap is an estimate of revenue loss from fraud and evasion, tax avoidance, bankruptcies, financial insolvencies, and miscalculations.

¹⁴ The C-efficiency ratio is an indicator of the departure of the VAT from a perfectly enforced tax levied at a uniform rate (no reduced rates) on all consumption (no exemptions). The C-efficiency measures the VAT effective rate as a ratio of the statutory rate.

¹⁵ The policy gap captures the effects of reduced VAT rates and exemptions on the theoretical revenues, assuming perfect tax compliance.

¹⁶ The 2016 Study and Reports on the VAT Gap in the EU-28 Member States found that Lithuania had the second lowest policy gap in the EU, after Malta.

¹⁷ The analysis below is based on the OECD's findings. OECD data refer to 2013. The current situation may be somewhat different. Drawing conclusions based on data comparisons may not always be appropriate.

autonomously decide on the duration of contracts, in contrast to Estonia and Latvia for example. Staff remuneration is based on the public-sector salary scale. STI has no leeway to reward good performance, unlike Estonia and over two thirds of the OECD countries. STI also falls short in staff development where there are no formal partnerships with education bodies, contrary to arrangements in Latvia for example.

- *Inefficient use of resources.* Administrative costs are twice as high as in the EU, with the share of salaries to expenditures among the highest. STI uses its resources primarily for account management and other tax operations, rather than on verification (including audit) and tax debt collection.
- *Fragmented structure.* STI's institutional set up is more fragmented and decentralized than elsewhere. Only 37 percent of staff are located at headquarters, compared to 100 percent in Estonia and 80 percent in Latvia.¹⁸ While the STI is responsible for the administration of direct and indirect taxes (including immovable property), unlike Estonia it is not in charge of social security contributions.¹⁹
- *Insufficient powers.* To some extent legal constraints tie STI's hands in enforcing tax debt collection. STI, for example, cannot collect due amounts from third parties, restrict overseas travel, arrange seizure of assets, withhold government payments, or deny access to government services. Unlike Estonia, STI cannot autonomously request or serve a search warrant without the help of other government agencies.

Table 9. Tax Administration Indicators in Europe, 2013

| | Lithuania | Estonia | Latvia | Germany | Sweden | United Kingdom | CE-5 1/ | EU | EA |
|--|-----------|---------|--------|---------|--------|----------------|---------|------|------|
| Staff attrition rate (percent) | 8.8 | 8.0 | 6.6 | 1.0 | 7.9 | 6.5 | 4.5 | 5.2 | 4.5 |
| Staff with a degree (percent) | 81.0 | 62.0 | 94.0 | 52.0 | 62.0 | 26.0 | 63.4 | 53.2 | 50.9 |
| Administrative costs (percent of net revenues collected) | 0.8 | 0.4 | 1.1 | 0.3 | 0.2 | 0.2 | 0.3 | 0.4 | 0.4 |
| Staff usage (percent of total) 2/ | | | | | | | | | |
| Account management | 38.8 | 1.0 | 46.5 | 39.5 | 0.0 | 33.4 | 29.9 | 30.2 | 32.1 |
| Verification (incl. audit) | 28.7 | 67.0 | 25.9 | 39.6 | 32.5 | 42.7 | 32.1 | 33.6 | 32.8 |
| Tax debt collection | 6.7 | 10.1 | 8.1 | 6.8 | 0.0 | 12.0 | 11.2 | 11.0 | 10.5 |
| Other tax operations | 14.3 | 10.1 | 2.0 | 9.5 | 36.1 | 3.6 | 9.3 | 10.7 | 9.6 |
| Support: Human resources | 0.9 | 0.6 | 1.3 | 3.6 | 0.0 | 1.8 | 1.1 | 2.5 | 3.2 |
| Support: Other functions | 10.5 | 11.2 | 16.1 | 0.9 | 31.5 | 6.5 | 16.5 | 11.4 | 10.9 |

Sources: OECD.

1/ CE-5 includes Czech Republic, Hungary, Poland, Slovakia, and Slovenia.

2/ The data should be treated with caution owing to differences in interpretation between countries on the functional split used and organisational arrangements in place.

¹⁸ More recent data by the authorities suggest that 45 percent of staff are currently located at headquarters.

¹⁹ Tax and customs operations are not integrated in STI, although import VAT is partially administered by STI. Moreover, while STI is not in charge of social security contributions, it assists with verification of taxpayers' liabilities, providing details on evasion, and debt collection.

C. Quantification of Contributions to Tax Revenue Underperformance

20. **This section seeks to quantify the respective contributions of tax policy, the structure of the economy, and tax administration to Lithuania's tax underperformance, building on the above qualitative assessment.** Given the complexity of the undertaking, the analysis requires at times making strong assumptions and simplifications. While this may impinge on the accuracy of some of the estimations, it should not affect the overall thrust of the findings.

21. **Assessing the impact of tax policy on Lithuania's tax underperformance requires comparing tax systems across countries.** This is not straightforward because tax systems differ in many different dimensions, not just in standard tax rates. Tax systems can be progressive with multiple rates and have different allowances, exemptions, and deductibles. To make comparisons possible, one needs to estimate and compare effective statutory tax rates. Effective statutory tax rate is the average legally imposed tax rate that an individual or enterprise is obliged to pay taking into consideration different features of the tax system (e.g., multiple rates, exemptions). This is done for seven main taxes: PIT, CIT, VAT, excise tax, social security contributions, property tax, and car registration taxes. Details of the estimation methodology are provided in Box 1.

22. **The quantification of the contributions of tax policy, structure of economy, and tax administration on Lithuania's tax shortfall relative to the EU is based on the following steps:**

- Estimation of effective statutory tax rates in Lithuania and the EU;
- Comparison of tax bases (structure of economy) in Lithuania and the EU;
- Estimation of the loss/gain in Lithuania's tax revenues from applying the EU effective statutory tax rates (tax policy contribution) and the EU tax bases (contribution of the structure of the economy); and
- Calculation of the contribution of tax administration (including shadow economy) as residual.

Box 1. Estimating the Effective Statutory Tax Rate

PIT. The statutory effective tax rate is calculated as the income tax due on a typical worker's gross salary (including social security contributions by the employer). The data come from a study on the tax burden of individual employees earning typical salaries in EU member states in 2015 (Rogers and Philippe, 2015). The EU effective statutory tax rate is calculated using as weights the share of each country's PIT in the EU-28 total.

CIT. The effective statutory tax rate for Lithuania is estimated by adjusting the standard statutory rate for the fact that companies with fewer than 10 employees are subject to a reduced rate of 5 percent. The EU effective tax rates are taken from Oxford University's Center for Business Taxation (2017).

VAT. Effective statutory tax rates are taken from the Study and Reports of the VAT Gap in the EU-28 Member states (European Commission, 2016). The EU effective statutory tax rate is calculated as the average across countries using as weights the share of each country's VAT in the EU-28 total.

Excise taxes. The effective statutory tax rate is calculated separately for the following: alcoholic beverages (beer, wine, intermediate products, and ethyl alcohol), cigarettes, energy products (petrol, gas oil, heavy fuel oil, liquefied petroleum gas (LPG), natural gas, coal and coke), and electricity. The EU effective statutory tax rate for each product is calculated using as weights the excise revenues reported for each product. Data for the statutory rates and revenues for each product come from the European Commission (2016), based on information provided by member countries. To make the calculation more tractable, we proxy the EU by a group of ten countries from Central and Eastern, and Western Europe. The Czech Republic, Hungary, Poland, and Romania represent Central and Eastern Europe. France, Germany, Italy, Spain, Sweden, and the UK represent Western Europe.

Social security contributions. The effective statutory rate is proxied by the social security contributions (employer and employee) due for an individual employee earning typical salaries in each of the member states of the EU in 2015. The data are again taken from Rogers and Philippe (2015). The EU effective statutory rate is calculated using as weights the share of each country's social security contributions in the EU-28 total. These results are adjusted for social security contributions caps. Drawing on the experience in France, the cap on contributions is assumed to become binding at the 70th salary percentile and the income of those above the cap is assumed to correspond to twice the average wage. Data for the prevailing cap on contributions come from the U.S. Social Security Administration (2017).

Property tax. Statutory effective tax rates are calculated as the ratio of property tax revenues per dwelling divided by the average unit price (average price per square meter of a 120 m² apartment in the most important city of a country). Data for apartment prices come from the Global Property Guide (2017). For the EU, we use data from a group of ten countries from Central and Eastern and Western Europe, as described above. Implicit in the calculation is the assumption that tax administration does not impact revenue collection.

Car registration tax. Lithuania does not have a car registration tax. For the EU, the effective statutory tax rate is calculated as the tax per registered car in percent of the average price of new cars (European Commission, 2017 and Statista, 2017). This rate is applied to Lithuania's number of car registrations to estimate the revenue loss from not having a car registration tax.

23. Lithuania's effective statutory tax rates are generally lower than in the EU (Table 10).

The effective statutory tax rate for both the PIT and CIT are lower mainly because of the low flat tax rate and the reduced rates for individual activities and small companies, respectively. Lithuania's effective statutory tax rates for most excise taxes are also lower.²⁰ This is the case for most alcohol, cigarettes, and petroleum products, except ethyl alcohol, gas oil, and liquefied petroleum gas, which are more heavily taxed in Lithuania than in the EU. The effective statutory property tax rate is very low in Lithuania, about one half of the prevailing rate in the EU (which is already quite low). On the other hand, the effective statutory VAT rate is higher than in the EU—despite a relatively low reduced rate—thanks to limited exemptions. Similarly, the effective statutory social security contributions rate is higher than in the EU because contributions are levied from the first euro earned with no cap, unlike many Western European countries, which apply caps or floors.

Table 10. Effective Statutory Tax Rates, 2015
(Percent)

| | Lithuania | EU-28 |
|-------------------------|-----------|-------|
| PIT | 8.9 | 14.5 |
| CIT | 14.5 | 24.3 |
| VAT | 15.5 | 10.6 |
| SSF | 30.9 | 27.9 |
| Property tax 1/ | 0.03 | 0.06 |
| Car registration tax 2/ | ... | 0.2 |

Sources: IMF staff estimates.

1/ Tax paid per dwelling/average unit price.

2/ Average tax paid/average price of car.

24. Lithuania's tax policy results in a 3.8 percent of GDP revenue loss relative to the EU.

Not surprisingly, PIT and CIT tax policies account for the bulk of the tax policy revenue loss given the significantly lower effective statutory tax rates relative to the EU. Beyond the PIT and CIT, a large part of the tax policy revenue loss comes from taxes which are present in (some) EU countries but not in Lithuania (including the car registration tax). Excise tax policy and tax policy on land, buildings and other structures contribute relatively little to the tax policy revenue shortfall relative to the EU (despite having low statutory tax rates in most cases) mainly because many of the individual taxes have small contributions in total revenues. The tax policy gap associated with these taxes is partly mitigated by strong policies for select other taxes. For example, VAT policy helps reduce the tax policy revenue shortfall relative to the EU by 2.5 percent of GDP while social security contributions by 1.2 percent of GDP.

25. Lithuania's economic structure is responsible for a 1.2 percent of GDP revenue loss relative to the EU.

This net effect, however, masks important and often opposing effects in individual taxes. More specifically, the low labor share of income leads to a significant revenue loss of 2.1 percent of GDP relative to the EU in the form of lower PIT and social security contributions. Similarly, if Lithuania had the same stock of wealth (relative to GDP or per capita) as the EU, tax revenues in the form of higher taxes on land, buildings and other structures, and the PIT (nonwage income) would be higher by 0.9 percent of GDP. On the other hand, strong

²⁰ The effective statutory tax rate for excise taxes is not presented in the table because it is calculated individually for each excisable good.

consumption in Lithuania results in a boost of 1.4 percent of GDP to excise revenues and 0.4 percent of GDP to VAT revenues.

26. **Tax administration accounts for a 5.7 percent of GDP revenue loss relative to the EU.**²¹ This number is the unexplained component of the tax revenue shortfall relative to the EU (after accounting for the effects of tax policy and the structure of the economy). The bulk of the tax administration-related losses comes from the PIT, reflecting the widespread shadow economy.²² In fact, if Lithuania had closed the tax administration gap relative to the EU, its PIT revenues would have increased by 2.3 percent of GDP, bringing this ratio slightly above the levels reported by neighboring Estonia and Latvia. Weaknesses in tax administration also have an equally significant negative impact on VAT revenues, a result which is broadly consistent with the analysis on the VAT gap (European Commission, 2016). Finally, social security contributions suffer considerably from informality and a culture of undeclared work and cash wage payments (“envelope payments”).

Table 11. Contributions to Lithuania’s Tax Underperformance Relative to the EU, 2015
(Percent of GDP)

| | Tax Revenues | Tax policy | Economic structure | Tax administration |
|---|--------------|------------|--------------------|--------------------|
| Total tax revenues shortfall | 10.7 | 3.8 | 1.2 | 5.7 |
| PIT | 5.5 | 2.5 | 0.8 | 2.3 |
| CIT | 1.0 | 1.0 | -0.2 | 0.2 |
| VAT | -0.7 | -2.5 | -0.4 | 2.1 |
| Excise taxes | -0.8 | 0.5 | -1.4 | 0.1 |
| Taxes on land, buildings and other structures | 0.9 | 0.2 | 0.7 | 0.0 |
| Social security contributions | 1.3 | -1.2 | 1.7 | 0.7 |
| Other taxes | 3.5 | 3.2 | 0.0 | 0.3 |
| Car registration tax | 0.1 | 0.2 | -0.1 | 0.0 |
| Other taxes not in existence in Lithuania 1/ | 2.8 | 2.8 | 0.0 | 0.0 |
| Other 2/ | 0.6 | 0.2 | 0.1 | 0.3 |

Sources: Eurostat and other sources; and IMF staff estimates.

1/ Including taxes on financial and capital transactions; taxes on insurance premiums; wage bill and payroll taxes; taxes on pollution; and taxes on capital.

2/ Contributions based on the total contribution of taxes analyzed.

²¹ In addition to weak tax administration and informality, the unexplained component may also capture measurement errors.

²² Estimates of the size of the shadow economy vary. The most comprehensive study puts it at 26 percent in Lithuania, compared to 14 to 16 percent in OECD countries. Some of the impact of the shadow economy is captured by the low labor share of income.

27. **In summary, the tax revenue shortfall relative to the EU is for the most part attributable to weak tax administration and tax policy, with the structure of the economy playing a secondary role (Table 11).** More specifically, weak tax administration contributes 53.6 percent of the tax revenue shortfall, tax policy 35.3 percent, and the structure of the economy 11.1 percent. Looking at individual taxes, the PIT has the biggest contribution (5.5 percent of GDP) to the tax revenue shortfall relative to the EU. About 45 percent of the PIT shortfall relative to the EU is the result of tax policy and 40.9 percent the result of tax administration. The second largest contribution to the tax revenue shortfall relative to the EU comes from social security contributions (1.3 percent of GDP). The shortfall is driven primarily by the structure of the economy (i.e., low labor share of income), and to a smaller extent by tax administration. Most of the negative contribution of the structure of the economy and tax administration, however, is offset by strong tax policy. The CIT and taxes on land, buildings, and other structures each have a contribution of about 1.0 percent of GDP to the tax revenue shortfall. While in the case of the CIT, the shortfall relative to the EU is driven in its entirety by tax policy, in the case of taxes on land, buildings, and other structures the shortfall originates almost entirely from the structure of the economy (wealth), with tax rates playing only a minor role. Finally, the VAT and excises are the only taxes which overperform relative to the EU. The VAT overperformance is the result of strong policy, although the benefits of strong policy are almost wiped out by weak tax administration. In the case of excise taxes, the overperformance stems entirely from the structure of the economy (excess consumption of excisable goods), while weak policy partially offsets the overperformance. It should be noted that to the extent ongoing efforts to reduce alcohol consumption and improve energy efficiency yield results, the overperformance in excise taxes will likely decrease in the future.

D. Conclusions and Recommendations

28. **Lithuania has significant scope to increase its tax-GDP ratio.** This does not necessarily mean that Lithuania should implement sweeping tax policy reforms to increase revenues. Doing so is a matter of social preferences for the appropriate role of the government in the economy (though clearly the government should have sufficient resources to meet its economic and social objectives). Nevertheless, the analysis suggests that if Lithuania had the same tax policy as the EU, its revenues would be higher by 3.8 percent of GDP. Even if Lithuania does not implement ambitious tax reforms, merely narrowing the tax administration gap and tackling informality could add up to 5.7 percent of GDP in additional revenues. Achieving concrete results in this area, however, will likely take time. Similarly, if Lithuania had the same economic structure as the EU, its tax revenues would be higher by 1.2 percent of GDP. Changes in economic structure may be more difficult to bring about as these require changes in behavior, which can materialize only over time.

29. **Tax administration has a key role to play in closing Lithuania's tax revenue shortfall relative to the EU.** Among other things, the authorities should allocate more resources to verification (including audit) and tax debt collection and fewer to account management. In this regard, the authorities may consider increasing the use of third-party delivery of tax administration activities (e.g., collection of tax payments and tax debts) and widen the range and

scope of online services (e.g., pre-filing). The authorities should also proceed with the creation of a dedicated unit for administering high net worth individuals and the development of an in-house tax fraud investigation function. Finally, Lithuania should work toward unifying its institutional setup by merging tax and social security collection into one agency, and reducing fragmentation by shifting more staff to headquarters.

30. **Tackling informality requires a coordinated approach that goes beyond tax administration.** Scaling back the shadow economy requires a comprehensive and coordinated effort across different government institutions. Possible measures to tackle informality include lighter labor regulation, lower taxes for low incomes (including social security contributions), stronger institutions, graduated enforcement measures, and awareness campaigns.

31. **Selected tax policy measures could also contribute to narrowing Lithuania's tax revenue shortfall relative to the EU, as well as making the tax system more efficient and equitable.** In the longer run, public finances will come under pressure as adverse demographics push up pension and health care spending, and EU-funds decline. Revenue gains from better tax administration may not be enough to meet the challenge and recourse to tax policy might become necessary. Even in the shorter run, Lithuania may choose to raise selected taxes either to finance higher spending or to compensate for cuts in other taxes. This could be motivated by income equality considerations—e.g., raising wealth taxes and adding a higher PIT bracket to fund higher social protection spending or a cut in social security contributions for low-wage earners. It would also be motivated by efficiency considerations—e.g., boosting public investment and raising ALMP spending to promote economic growth financed by higher wealth and income taxes.

References

Belinga, Vincent, Benedek, Dora, de Mooij, Ruud and John Norregaard, 2014, "Tax Buoyancy in OECD Countries," IMF Working Paper 14/110 (Washington: International Monetary Fund).

Credit Suisse Research Institute, 2016, *Global Wealth Databook, 2016*. <http://publications.credit-suisse.com/tasks/render/file/index.cfm?fileid=AD6F2B43-B17B-345E-E20A1A254A3E24A5>

Enste and Schneider, 2002, "Hiding in the Shadows: The Growth of the Underground Economy," *Economic Issues*, No. 30, (Washington: International Monetary Fund).

European Central Bank, 2017, *Household Sector Report 2016 Q3*" (Frankfurt).
<https://sdw.ecb.europa.eu/servlet/desis?node=1000004962>

European Commission, Directorate General for Taxation and Customs Union, 2016, "Excise Duty Tables Part I—Alcoholic Beverages" (Brussels: European Commission).
http://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/excise_duties/alcoholic_beverages/rates/excise_duties-part_i_alcohol_en.pdf

European Commission, Directorate General for Taxation and Customs Union, 2016, "Excise Duty Tables Part II—Energy Products and Electricity" (Brussels: European Commission).
http://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/excise_duties/energy_products/rates/excise_duties-part_ii_energy_products_en.pdf

European Commission, Directorate General for Taxation and Customs Union, 2016, "Excise Duty Tables Part III—Manufactured Tobacco" (Brussels: European Commission).
http://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/excise_duties/tobacco_products/rates/excise_duties-part_iii_tobacco_en.pdf

European Commission, Directorate General for Taxation and Customs Union, 2016, "Excise Duty Tables (Tax Receipts - Alcoholic Beverages)" (Brussels: European Commission).
http://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/excise_duties/alcoholic_beverages/rates/excise_duties_alcohol_en.pdf

European Commission, Directorate General for Taxation and Customs Union, 2016, "Excise Duty Tables (Tax Receipts - Energy Products and Electricity)" (Brussels: European Commission).
http://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/excise_duties/energy_products/rates/excise_duties_energy_products_en.pdf

European Commission, Directorate General for Taxation and Customs Union, 2016, "Excise Duty Tables (Tax Receipts – Manufactured Tobacco)" (Brussels: European Commission).
http://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/excise_duties/tobacco_products/rates/excise_duties_tobacco_en.pdf

European Commission, 2016, *Study and Reports on the VAT Gap in the EU-28 Member States: 2016 Final Report*, TAXUD/2015/CC/131 (Brussels).

http://ec.europa.eu/taxation_customs/sites/taxation/files/2016-09_vat-gap-report_final.pdf

European Commission, Directorate General for Taxation and Customs Union, 2016, *Taxation trends in the European Union* (Brussels). https://ec.europa.eu/taxation_customs/business/economic-analysis-taxation/taxation-trends-eu-union_en

European Commission, Directorate General for Taxation and Customs Union, 2016, "VAT Rates applied in the Member States of the European Union," (Brussels: European Commission). http://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/vat/how_vat_works/rates/vat_rates_en.pdf

European Commission, Directorate General for Internal market, Industry, Entrepreneurship, and SMEs, 2015, "2015 SBA Fact Sheet, Lithuania" (Brussels, European Commission).

Eurostat, Statistics Explained, "Passenger Cars in the EU in 2015," April 2017 (Frankfurt: Eurostat). http://ec.europa.eu/eurostat/statistics-explained/index.php/Passenger_cars_in_the_EU#Database:

Geng, Nan, 2013, "Toward a Sustainable and Inclusive Consolidation in Lithuania: Past Experience and What is Needed Going Forward," IMF Working Paper 13/157 (Washington: International Monetary Fund).

Global Property Guide, "Europe Square Metre Prices," (Bristol: Global Property Guide). <http://www.globalpropertyguide.com/Europe/square-meter-prices#footnotes>

Housing Europe, 2015, *The State of Housing in the EU 2015 (Country Profiles)* (Brussels: Housing Europe). <https://drive.google.com/file/d/0B3Yb8SWGtmE7Sl8yZWc5M0Y2TjA/view>

International Monetary Fund, 2015, "Republic of Lithuania: 2015 Article IV Consultation— Staff Report," IMF Country Report No 15/138 (Washington).

Kangur, Alvar, 2010, "Lithuania: Options for Revenue-Supported Fiscal Adjustment— Selected Issues," IMF Country Report No 10/202 (Washington).

Keen, Michael, 2013, "The Anatomy of the VAT," IMF Working Paper 13/111 (Washington: International Monetary Fund).

Keen, Michael, Kim, Yitae, and Ricardo Varsano, 2006, "The "Flat Tax(es)": Principles and Evidence," IMF Working Paper 06/218 (Washington: International Monetary Fund).

Leontjeva, Kaetana, 2015, "Taxation in Lithuania," Impresa Lavoro Working Paper (Rome: Impresa Lavoro).

Mircheva, Borislava, and Jason Koralai, 2017 (forthcoming), "The Shadow Economy—Impact and Policy Agenda, A Cross-Country Perspective"—Selected Issues," IMF Country Report No 17/xx (Washington: International Monetary Fund).

Norregaard, John, 2013, "Taxing Immovable Property: Revenue Potential and Implementation Challenges," IMF Working Paper 13/129 (Washington: International Monetary Fund).

Organization for Economic Cooperation and Development, 2015, *Tax Administration 2015: Comparative Information on OECD and Other Advanced and Emerging Economies* (Paris).

Organization for Economic Cooperation and Development, 2016, OECD Tax Database (Paris). <http://www.oecd.org/tax/tax-policy/tax-database.htm>.

Oxford University Centre for Business Taxation, 2017, CBT Tax Database (Oxford). <http://www.sbs.ox.ac.uk/faculty-research/tax/publications/data>

Rogers, James and Cecile Philippe, 2015, "The Tax Burden of Typical Workers in the EU-28—2015," (Paris-Bruxelles: Institut Economique Molinari). <http://www.institutmolinari.org/IMG/pdf/tax-burden-eu-2015.pdf>

Schneider, 2015, "Size and Development of the Shadow Economy of 31 European and 5 other OECD Countries from 2003 to 2015: Different Developments," (Linz: Johannes Kepler University). <http://www.econ.jku.at/members/Schneider/files/publications/2015/ShadEcEurope31.pdf>

Social Security Administration, Research, Statistics and Policy Analysis, "Social Security Programs Throughout the World: Europe 2016" (Washington). <https://www.ssa.gov/policy/docs/progdesc/ssptw/2016-2017/europe/index.html>

Statista, "Average Price of Passenger Cars in the EU from 2013 to 2015" (Hamburg). <https://www.statista.com/statistics/425095/eu-car-sales-average-prices-in-by-country/>

Stepanyan, Vahram, 2003, "Reforming Tax Systems: The Experience of the Baltics, Russia, and Other Countries of the Former Soviet Union," IMF Working Paper 03/173 (Washington: International Monetary Fund).

Tax Inspectorate of Lithuania, 2016. <http://www.vmi.lt/cms/en/mokesciai>.

LITHUANIA'S INNOVATION SYSTEM AND PROPOSALS FOR REFORM—LEARNING FROM THE EXPERIENCE OF ISRAEL¹

Innovation outcomes in Lithuania have been disappointing. Comparison with Israel's highly successful innovation promotion model suggests that an overly fragmented innovation support structure, narrow and inflexible innovation promotion instruments, and excessive emphasis on public sector infrastructure and services are likely responsible. Consideration should therefore be given to gradually merging existing institutions, broadening existing instruments and making them more flexible, and allocating more funds directly to private businesses.

1. **Innovation is key for raising productivity and advancing to a more sophisticated economic structure.** Over the last fifteen years, Lithuania has made large strides in narrowing the gap in living standards with Western Europe. With all the basic ingredients for a functioning market economy already firmly in place, advancing income convergence further will increasingly require innovation. In this context, innovation should be understood broadly, going beyond scientific discovery. The OECD (2010) defines it as: "... implementation of a new or significantly improved product (good or service), or process, marketing method, or organizational method in business practices, workplace organization or external relations."
2. **This paper seeks to identify reforms that will make innovation promotion in Lithuania more effective, drawing on the successful example of Israel.** Like Lithuania, Israel is a relatively small economy without significant natural resource endowments. It is also geographically far removed from major markets, but is nonetheless considered one of the prime innovation leaders in the world. Lithuania is fortunate in receiving sizable grants from the EU to promote innovation—some €770 million, or 2.1 percent of 2014 GDP, are earmarked for that purpose under the EU's Multiannual Financial Framework (MFF) for 2014-20. But innovation outcomes have disappointed so far. This paper attributes the poor outcomes mainly to an overly fragmented innovation support structure; narrow and inflexible innovation promotion instruments; and, most importantly, excessive focus on the supply of infrastructure and services by the public sector, rather than direct funding of businesses innovation.
3. **The rest of the paper is divided into three parts.** Part A compares innovation performance in Lithuania and Israel. Part B reviews innovation promotion policy in Lithuania, with the objective of determining how good practices in Israel could be applied in Lithuania. It covers innovation strategy, innovation institutions, and innovations programs and instruments. Part C concludes with reform recommendations for Lithuania.

A. Innovation Performance

4. **Lithuania is a moderate innovator trailing Israel by a large margin, especially in the area of private-sector innovation.** The European Innovation Scoreboard (EIS) provides a

¹ Prepared by Iacovos Ioannou and Peichu Xie.

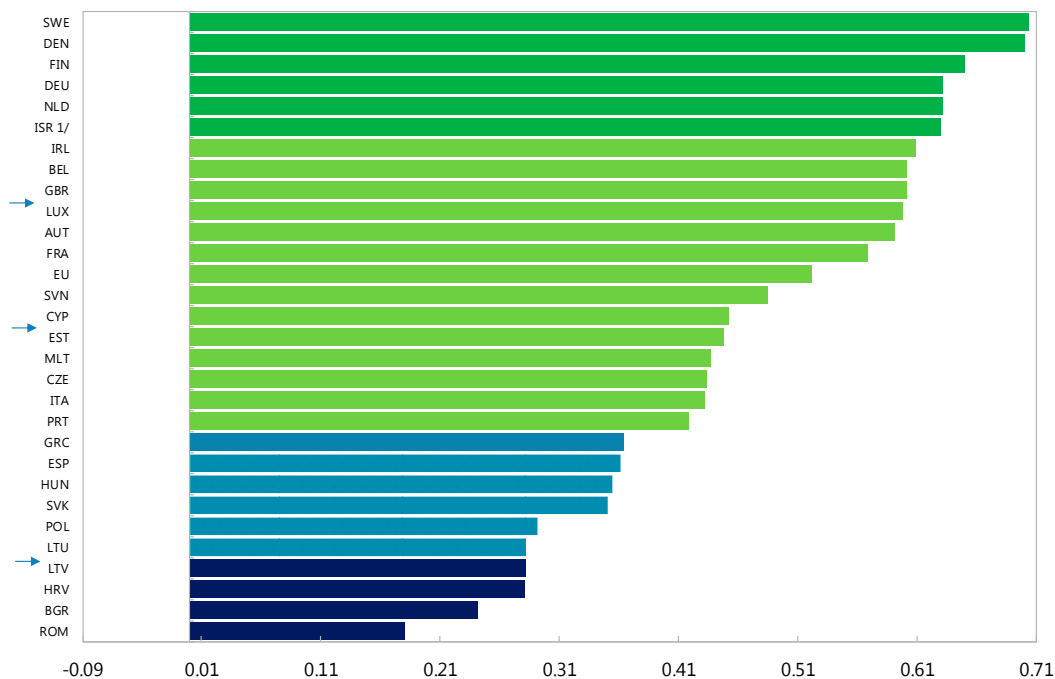
comprehensive and comparative assessment of innovation performance of 29 countries using 25 different indicators grouped into 8 categories. According to the latest EIS assessment, Lithuania ranks fourth from the bottom overall, while Israel is classified as innovation leader. Lithuania does worse than Israel in all categories, but the gap is especially large for the categories “firm investments” and “innovators” (Table 1 and Figure 1). The “firm investments” category looks at business R&D expenditure and the “innovators” category captures non-scientific innovation activity by SMEs.² This suggests that, in broad terms, Lithuania’s biggest challenge lies in spurring innovation in private businesses.

Table 1. Innovation Index Comparison

| | LTU | ISR | Δ |
|--------------------------------|-------------|-------------|--------------|
| Ranking: | 26 in 29 | 6 in 29 | |
| Normalized Score: [0,1] | | | |
| Summary Innovation Index | 0.28 | 0.63 | -0.35 |
| Human Resources | 0.73 | 0.72 | 0.01 |
| Research Systems | 0.13 | 0.55 | -0.42 |
| Finance and Support | 0.54 | 0.28 | 0.25 |
| Firm Investments | 0.35 | 1.00 | -0.65 |
| Linkages & Entrepreneurship | 0.17 | 0.57 | -0.40 |
| Intellectual Assets | 0.26 | 0.60 | -0.35 |
| Innovators | 0.11 | 0.81 | -0.70 |
| Economic Effects | 0.17 | 0.62 | -0.45 |

Source: European Innovation Scoreboard, 2016.

1/ Data for Israel are for 2013.

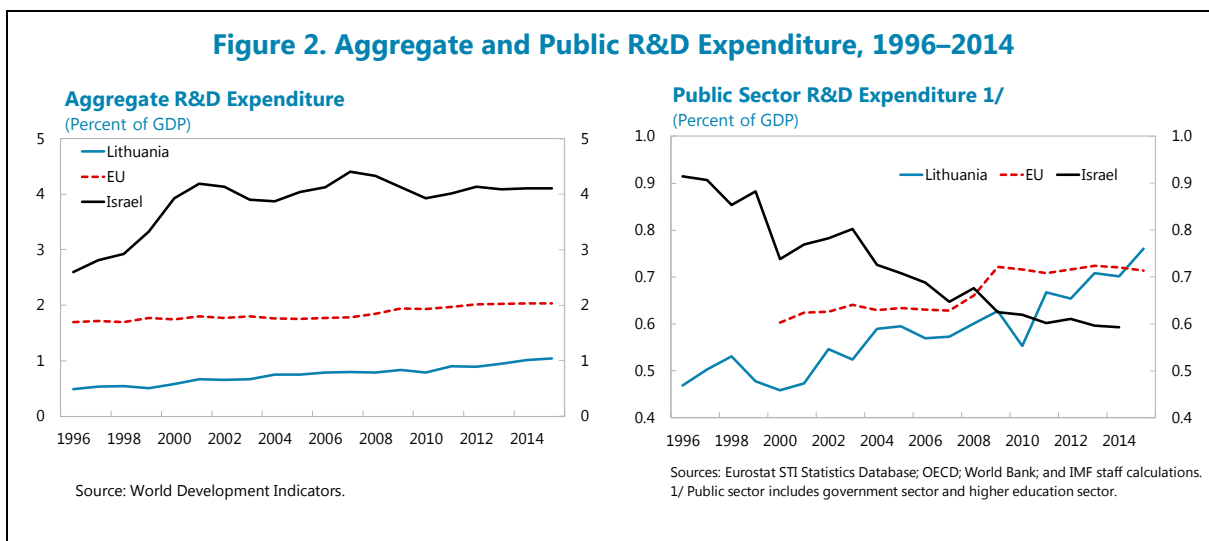
Figure 1. Summary Innovation Index, 2015
(Normalized Score [0.1])

Sources: European Innovation Scoreboard, 2016.

1/ Data for Israel are for 2013.

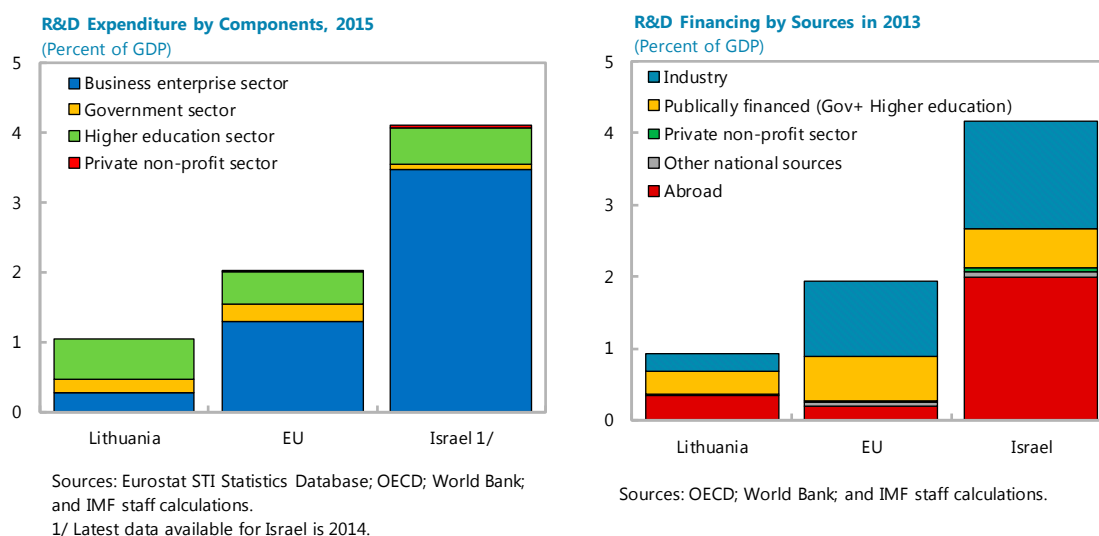
² The “firm investments” category relies on two indicators: (i) business R&D expenditure; and (ii) non-R&D innovation expenditure. The “innovators” category uses three indicators: (i) introduction of product or process innovation by SMEs; (ii) introduction of marketing or organizational innovations by SMEs; and (iii) employment in fast-growing firms. Further detail is available at http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en.

5. **Lithuania's public sector spends more on R&D than Israel and the EU, but this has so far not effectively catalyzed private R&D spending (Figure 2).** Total R&D spending is often used as summary indicator of innovation performance, not least because data are readily available. By this yardstick, Lithuania fares poorly, with R&D spending only half the EU's and a quarter of Israel's. Interestingly, public-sector R&D expenditure in Lithuania has been surpassing that of Israel since 2011 and that of the EU since 2015. This suggests that high public-sector R&D expenditure is not necessary to achieve an overall good outcome. The key is that the public sector catalyzes business R&D, which remains Lithuania's main challenge.



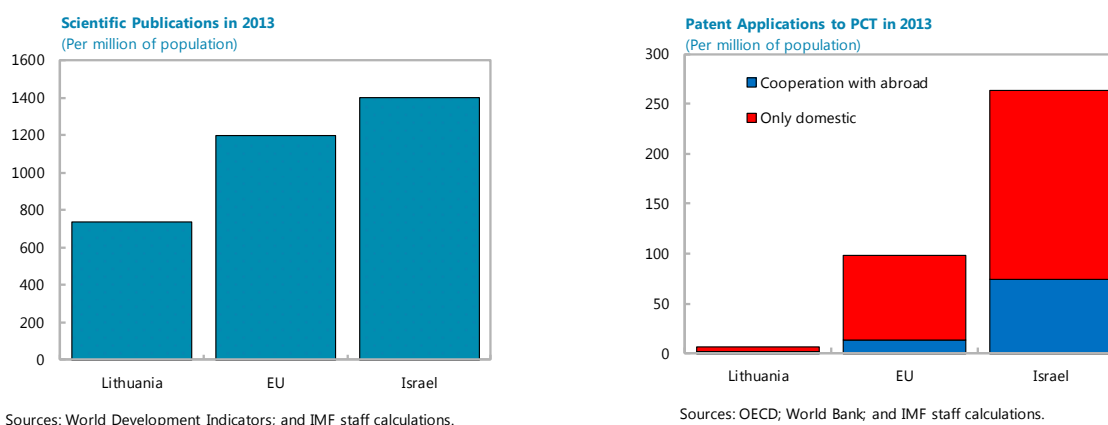
6. **The financing of R&D in Lithuania is equally skewed toward the public sector (Figure 3).** Dissecting R&D spending by sector that finances it rather than by sector that carries it out, confirms the overwhelming role of the public sector in Lithuania. About one third is directly financed by the public sector and more than a third is foreign-financed, capturing mainly EU grants, which are either spent by the public sector itself or passed through the public sector to the private sector. Israel in contrast sources a much larger part of financing for R&D from its domestic industry. It also receives very large R&D financing from abroad, but these are foreign private-sector companies, including large multinationals like Apple, Google, or Microsoft, that have established R&D facilities in Israel.

Figure 3. R&D Expenditure and Financing



7. **Indicators of mainly scientific innovation show deficits in quantity and quality of output and international cooperation (Figure 4).** The number of scientific publications in Lithuania has increased sharply during the last two decades, but still falls significantly short of achievements in the EU and Israel. Taking into account scientific quality, Lithuania's performance, as measured by the number of worldwide citations per thousand people, was one tenth of Israel's during the last two decades. Patent counts are a good indicator for the performance of advanced innovation systems. Patent applications relative to population out of Lithuania are only a tiny fraction of those filed by entities in the EU and Israel. This may partly reflect the fact that a large share of Lithuania's R&D personnel is employed by universities rather than the business sector—some 50 percent in Lithuania compared to 30 percent for the average of countries with advanced innovation systems. International linkages are especially important for small countries to maximize knowledge sharing, leverage their own capacities, and achieve

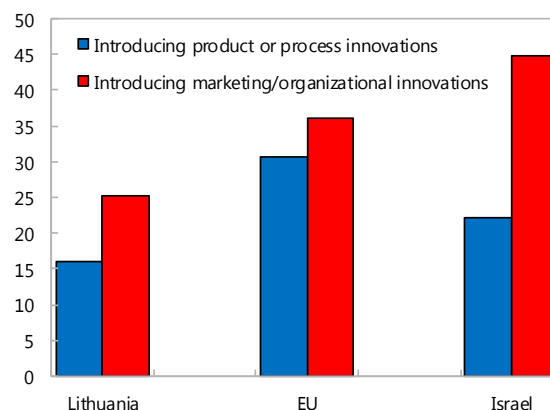
Figure 4. Indicators of Scientific Innovation, 2013



excellence in research. But Lithuania's international collaboration remains modest, with patents in cooperation with abroad filed under the Patent Cooperation Treaty (PCT) remaining far fewer than in Israel.

8. **Indicators of non-scientific innovation by businesses also show deficits (Figure 5).** In catching-up economies, one would expect to see a particularly high degree of more basic innovation activity, such as the introduction of products that the firm has not produced before, more up-to-date processes and organizational arrangements, and upgrading of marketing activity. Indeed, the gap in such activities by SMEs between Lithuania and the EU or Israel is not as large as for scientific innovation, but Lithuania's deficit is also still substantial in these areas.

Figure 5. Non-Scientific Innovation, 2015
(Percent of total SMEs)



Sources: European Commission Innovation Union Scoreboard 2016; and IMF staff calculations.

9. **Innovation policies comprise strategic, institutional, and implementation aspects.** In all three areas, there are insightful differences between policies in Lithuania and Israel.

Innovation Strategies and Policy Guidelines

10. **The strategic orientation of Lithuania's innovation policy has shifted over time.** During the first phase (2002–07), the focus was on the development of high-tech technology to achieve better cohesion with the rest of Europe. The second phase (2007–13) saw large investments in research infrastructure, accompanied by efforts to attract FDI, promote exports, and develop financial engineering instruments. In the current third phase (2014–20), the emphasis is more on mobilizing state resources to improve innovativeness and develop a competitive economy based on high-level knowledge, high technologies, qualified human resources, and smart specialization.

11. **The growing number of strategic documents on innovation risks obstructing the overall policy thrust.** Lithuania's innovation policy is laid out in numerous documents and programs, making it difficult to absorb. There is also a risk of duplication, muddled priorities, and possibly competing policies to the extent that these are prepared by different ministries with dissimilar agendas. At least, three strategic documents at the national level focus on innovation promotion:

- *Lithuania Innovation Development Program 2014–20.* This document is prepared by the Ministry of Economy and lays out an overarching innovation strategy. Its four main objectives are to: develop an innovative society through new knowledge and applications;

enhance the innovative potential of business; promote cooperation through the creation, development, and internationalization of value networks; improve the efficiency and implementation of innovation policies; and promote innovation in the public sector. The objectives and targets are accompanied by specific assessment criteria and quantitative values (Annex 1).

- *The National Program for the Development of Studies, Scientific Research and Experimental (Social and Cultural) Development for 2013–20.* This document, prepared by the Ministry of Education and Science, defines the main directions of studies and scientific research, which would help sustain development and create supportive conditions for innovation.
- *Program on the Implementation of the R&I Priority Areas.* This document, prepared by the Ministry of Education and Science and the Ministry of Economy, sets out Lithuania's smart specialization priority areas—a requirement for accessing European Structural and Investment Funds (ESIF) under the 2014–20 MFF—and discusses elements of the implementation and monitoring instruments. It aims to increase the impact of high value-added, highly skilled labor and knowledge-intensive economic activities on output and structural change.

In addition, there are other strategic documents and programs at the national level that deal with innovation in a broader context:

- *Lithuania 2030.* This national strategy document, prepared by the government together with social partners and approved by Parliament, outlines the national vision and priorities for development. It aims at making Lithuania one of the ten most advanced EU countries by 2030. In the parts related to innovation policy, the strategy highlights the need for regulatory simplification for businesses, protection of intellectual property, international integration, FDI, and market-relevant innovations based on research.
- *The National Progress Program 2014–20.* This document, approved by the government in 2012, outlines how the government plans to implement its long-term priorities and provides the basis for the EU Structural Funds support. One of the main priorities is to create a favorable environment for economic growth, by enhancing research-business collaboration with joint projects and providing joint use of R&D infrastructure. This includes promoting innovation networks, joining global networks and global markets, as well as fostering innovation in business through a set of demand-side innovation policy measures, such as innovative public and pre-commercial procurement or incentives for innovation consumers.

Finally, there are numerous strategic initiatives and programs at the EU level that focus on innovation promotion, including in the context of Lithuania:

- *Europe 2020: Flagship Initiative "Innovation Union."* The Innovation Union is an EU initiative with a strategic approach to innovation. To realize an Innovation Union, the initiative seeks to better link EU and national research and innovation systems, modernize education

systems at all levels, and facilitate cooperation by researchers and innovators across the EU. Toward this end, the initiative aims at simplifying access to EU programs.

- *Horizon 2020—the Framework Program for Research and Innovation.* Horizon 2020 is the financial instrument implementing the Innovation Union. Horizon 2020 is the biggest EU research and innovation program with a financial volume of nearly €80 billion over 2014–20. Its main objective is to ensure Europe produces top-notch science and innovation results faster. To ensure new projects get off the ground quickly, the program focuses on removing barriers to innovation, such as red tape, and facilitating public-private sector collaboration.
- *Europe 2020: A Strategy for Smart, Sustainable, and Inclusive Growth.* This is a 10-year strategy prepared by the European Commission as a follow-up to the Lisbon Strategy for 2000–10. Innovation plays a central role in the strategy. For Lithuania, the aim is to create a knowledge and innovation-based economy with a high employment rate. The strategy also includes EU development objectives, which member states are encouraged to transpose into national objectives.

12. **Unlike Lithuania, Israel’s innovation policy has one clear vision.** As articulated in the annual report of the Israel Innovation Authority (IIA), the overriding objective is to create economic prosperity for the Israeli economy and society through technological innovation, while empowering Israel as a global innovation center. To this end, Israel seeks to maintain its position as a global innovation leader and lift the entire economy through technological innovation.

13. **Israel’s clear innovation vision is supported by a single law.** The Law for the Encouragement of Industrial R&D was passed in 1985 and has defined the parameters of government policy toward industrial R&D ever since. At the heart of the law is the objective to promote commercial industrial R&D through financial incentives.

Innovation-Promotion Institutions

14. **The institutional setup of innovation promotion in Lithuania is highly fragmented.** A large number of bodies is involved in each of the four broad categories: (i) policy making institutions; (ii) advisory bodies; (iii) implementing institutions; and (iv) coordinating bodies. Figure 6 provides an overview and Annex II elaborates on their respective functions. Overall, this setup presents significant coordination challenges, ranging from unclear mandates, overlapping responsibilities, and administrative inefficiency. Without a clear lead institution, diverging views on innovation promotion might remain unresolved, hampering efficient and consistent policy implementation.

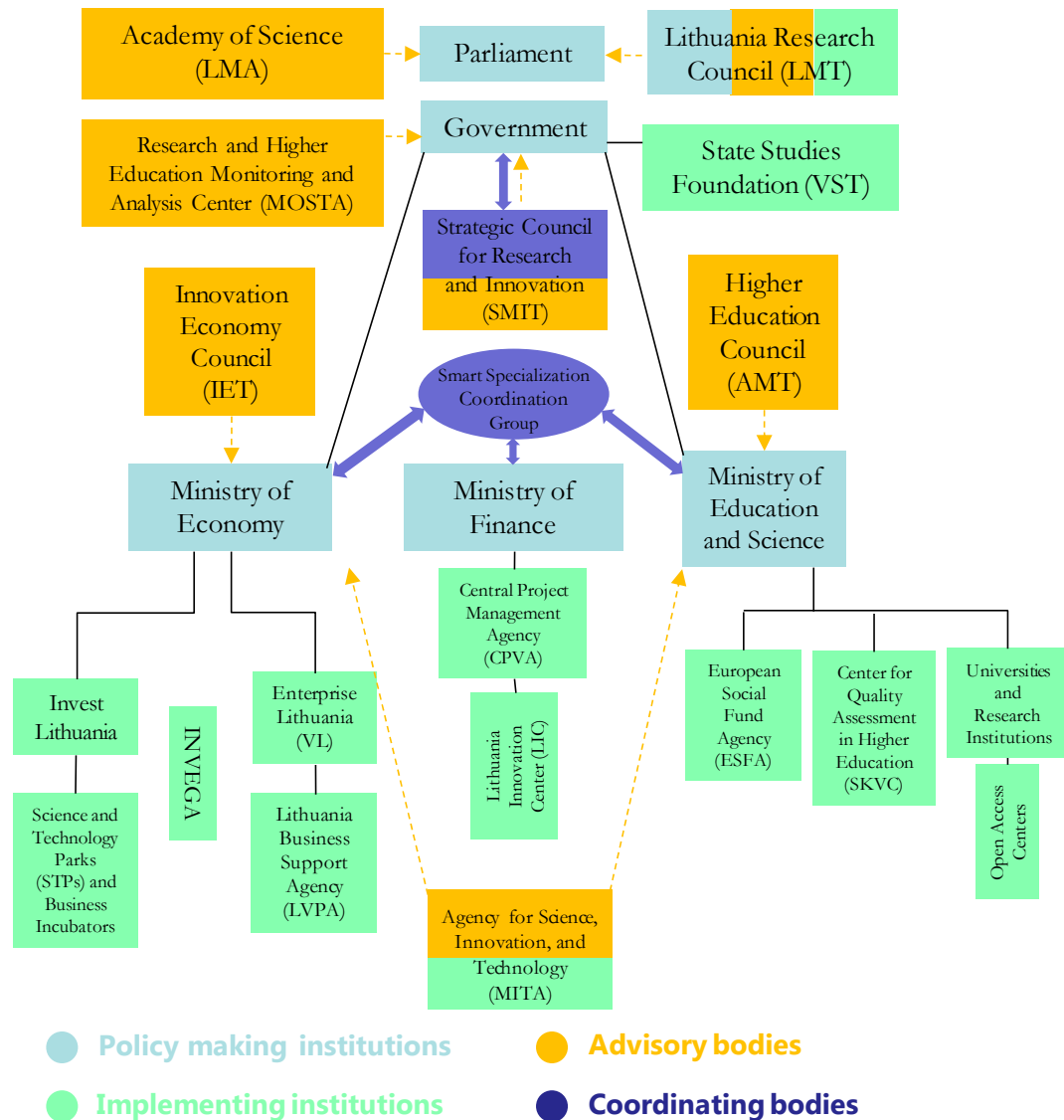
15. **Israel’s institutional setup for innovation promotion is much simpler and mandates are clearly delineated (Figure 7).** At the policy making level, there are three players and each of them has a very clear focus: the IIA is the most important player responsible for industrial R&D, its main function being to subsidize commercial R&D projects; the Ministry of Education covers academic R&D; and the Ministry of Science, Technology and Space is a less important

player. The Ministry of Finance helps with cooperation and coordination. Under each policy making entity, there are several implementing institutions with clearly defined responsibilities.

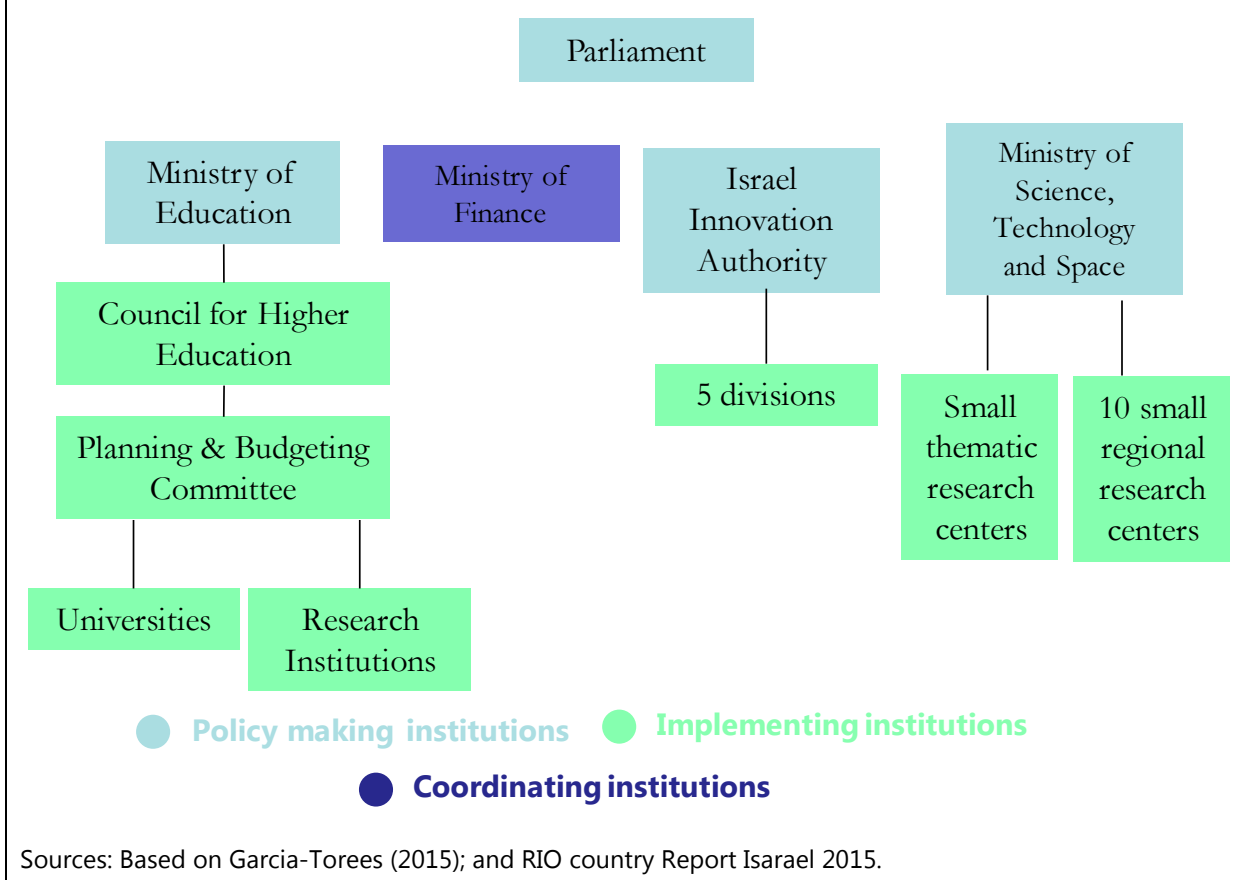
16. **The partnership between government and industry is an important basic principle of Israel's innovation promotion policy.** This is reflected in the structure of the Authority Council, which operates like a supervisory body of the IIA. It comprises not only government officials, but also industry representatives. The structure helps ensure formulation of effective policies, which reflect both government priorities and industry needs.

17. **The IIA has a track record of success.** The IIA became independent in 2016 and replaced its predecessor, the Office of Chief Scientist (OCS), housed in the Ministry of Economy. The creation of the IIA was in response to new challenges in the changing innovation ecosystem and the high-tech industry's needs. Following the establishment of the OCS in 1968, industrial R&D rose rapidly. Between 1969 and 1988, industrial R&D expenditures grew by 14 percent annually (Trajtenberg, 2000). The OCS was highly regarded both by industry and the public sector around the world, because it had:

- *A clear mandate:* the main objective of the OCS was to subsidize commercial R&D projects undertaken by private firms;
- *A strong governance structure:* approval of funds is reviewed by a Research Committee, chaired by the Chief Scientist and staffed by qualified government officials and public representatives. Its decisions rely heavily on external professional referees and advisers and can be appealed to the Appeals Committee, which serves as a control mechanism to ensure that the Research Committee's decisions meet quality standards; and
- *A targeted approach:* it administers and supervises five divisions that focus on the specific needs of businesses at different stages of the innovation process.

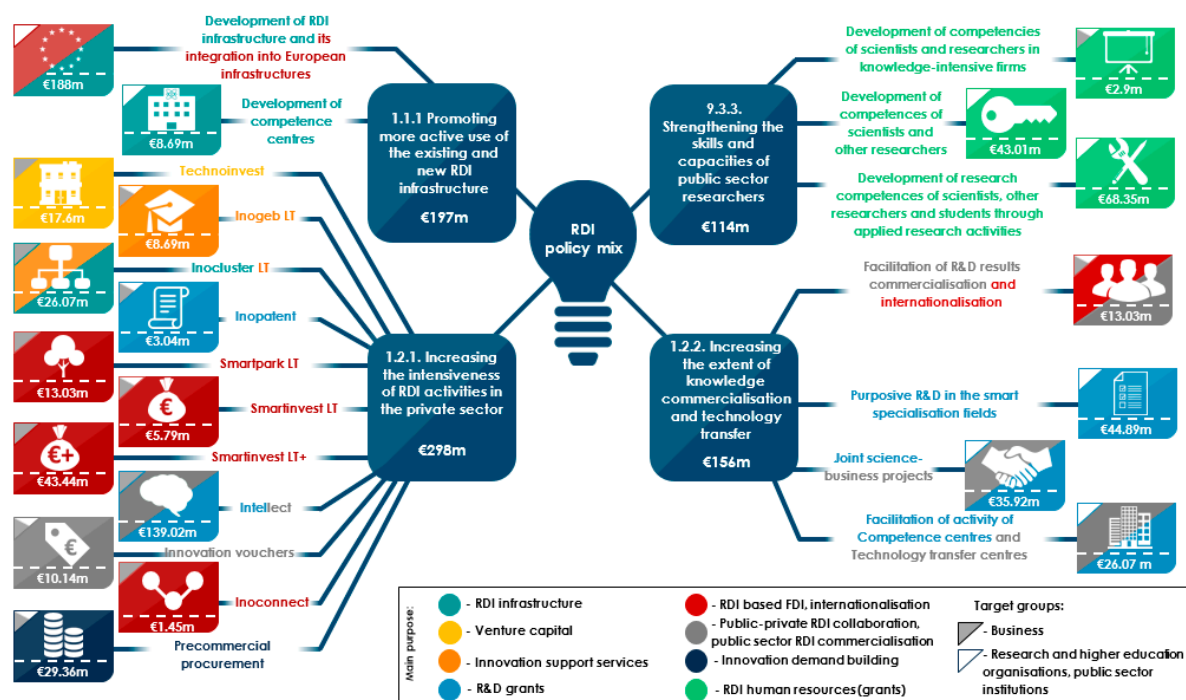
Figure 6. Overview of Lithuania's Research and Innovation System, 2016

Sources: Based on Paliokaite (2015a); and RIO Country Report Lithuania 2015.

Figure 7. Overview of Israel's Research and Innovation System

Innovation Promotion Programs and Instruments

18. **Innovation promotion in Lithuania is predominantly financed by ESIFs that are distributed through a large number of programs by the Ministry of Education and Science and the Ministry of Economy.** Under the 2007–13 MFF, ESIFs of some €825 million, or 2.9 percent of 2007 GDP, were made available. About €770 million, or 2.1 percent of 2014 GDP, in ESIFs are earmarked for innovation promotion in the 2014–20 MFF (Figure 8). Under both MFFs, programs administered by the Ministry of Education and Science account for roughly 60 percent of the total, with the Ministry of Economy responsible for most of the rest.

Figure 8. Innovation Promotion Programs and Their Funding under the 2014–20 MFF

Source: Paliokaitė and González Verdesoto (2017, p. 13).

19. **Heavy emphasis on innovation infrastructure has left Lithuania with underused capacities.** According to the Lithuanian authorities, in the 2007–13 programming period some 70 percent of ESIF funds for innovation went toward infrastructure investment. Lithuania now has 9 Science and Technology Parks, 52 Clusters, 7 Business Incubators, and 25 so-called Open Access Centers, where businesses can use public laboratories and research institutions for a fee. Most of these entities—either already existing or newly established—were grouped into five so-called “Integrated Science, Studies, and Business Centers” organized around universities under the so-called valley program. Almost €300 million was spent under the program, much of it going toward upgrading universities’ research facilities. The vast new infrastructure is currently not fully used and expensive to keep up-to-date. Lithuania’s State Audit Office (2017) found for example that open access centers use only 44 percent of their capacity and users are predominantly internal. Ernest and Young (2014) estimate that the cost of updating equipment will total €118 million, or 0.3 percent of 2016 GDP, by 2020. In the 2014–20 programming period, the authorities put less emphasis on infrastructure and more on soft measures, which is a welcome development. It will be important that new initiatives such as establishing Competence Centers or Innovation and Technology Centers be implemented so as not to exacerbate existing overcapacities or duplicate activities already in place.

20. **The supply of infrastructure and services, rather than direct support, to businesses, risks creating a mismatch between available innovation support instruments and business needs.** For the 2007–13 programming period, the OECD reports that “... the largest part of funds ... has been allocated to strengthen the knowledge base of the public sector, especially in infrastructure ... Incentives for business R&D and innovation received only 26 percent, while the remaining funds ... were dedicated to direct cooperation between companies and research organizations.” (OECD, 2016, p. 140). The share of direct business support is set to be only moderately higher in the 2014–20 programming period, and moreover a sizable part of direct business support is earmarked for foreign investors. The heavy emphasis on indirect business support, risks supplying infrastructure and services that do not efficiently meet businesses’ needs. The limited uptake of the services offered in the Open Access Centers underscores this reality.

21. **Innovation promotion in Lithuania is predominately public-sector driven.** The lion’s share of funding goes directly to public research institutions. Science and Technology Parks or Business Incubators are coordinated by the Ministry of Economy. The Integrated Science, Studies, and Business Centers began as a joint initiative of the Ministry of Education and Science and the Ministry of Economy and are now run by valley management associations, although a clear management, coordination, and evaluation system seems not to be in place (State Audit Office, 2017). Public entities are often heavily involved in programs that directly support business. For example, the largest program currently run by the Ministry of Economy called Intellect, which provides grants to businesses, finances only projects jointly carried out by businesses and research establishments.

22. **Innovation promotion instruments are often narrow in scope and inflexible.** Lithuania tends to offer separate instruments for particular steps in the innovation process rather than for a project as a whole. They are frequently offered independently by different agencies, each with its own requirements. This creates uncertainty about how much overall support a project will secure. It also places a high administrative burden on enterprises, compared to the financial support provided, sometimes prompting enterprises not to apply in the first place. For example, there are dedicated instruments for getting new products certified (Innocertification), for developing designs of products and services (Design LT), protecting intellectual property (Inopatentas), etc. Innovation vouchers support the purchase of innovation-related services, but support is capped at €5,000 and only preapproved services offered by public research institutions are eligible.

23. **R&D tax incentives are relatively generous, but take-up is modest.** Under the CIT, Lithuania allows the deduction of 300 percent of eligible R&D outlays from taxable income, the deduction of 50 percent of R&D investment from taxable income, and accelerated depreciation of R&D capital assets over 2 years or less. According to the State Audit Office (2017), in 2015 only 150 firms availed themselves of the triple deductibility of R&D outlays at a total cost of €7.8 million to the budget. Uncertainty about what constitutes eligible R&D expenditure and the fact that young innovative firms often do not make profits are the likely reasons.

24. **In Israel, there are fewer innovation programs and instruments, but they are well targeted and administered by dedicated divisions of the IIA.** Israel's innovation programs strive to fully cover each stage of a firm's development, while promoting applied and non-scientific innovation. Five dedicated IIA divisions share the task of supporting industrial innovation for specific client groups:

- The Startup Division supports the early development of technological initiatives;
- The Growth Companies Division promotes technological innovation for mature and growth companies in new products or manufacturing processes;
- The Technological Infrastructure Division focuses on the collaboration between academia and industry to produce advanced technologies and generic groundbreaking knowledge;
- The International Collaboration Division fosters cooperation with foreign companies active in the target market; and
- The Advanced Manufacturing Division promotes the application of R&D and innovation processes in the manufacturing sector.

25. **Direct financial incentives for companies to leverage industrial R&D are at the heart of Israel's innovation promotion.** The Incubator Program, the R&D Fund, and the MAGNET Incentive Program are the most prominent programs with a long track record of success:

- *The Incubator Incentive Program.* There are currently 18 technological incubators, which are privately owned by venture capital funds, multinational corporations, private investors, and others. Experienced equity investment firms license the incubators from the government, significantly invest in the startup projects, and provide management support for the portfolio companies. Each incubator is structured to handle 10–15 projects simultaneously and R&D teams consist of 3 to 5 researchers. Approved projects qualify for a conditional grant of 85 percent of the approved budget up to NIS 3.5 million (around USD 1 million) to help entrepreneurs establish a startup based on an innovative technology concept, with a view to subsequently develop a commercial product. Companies undertake to repay the received funding to the IIA via royalty payments from sales, but only if the project succeeds in reaching the commercialization stage. The incubator can provide supplementary investment to finance the other 15 percent of the approved budget, in which case the entrepreneur does not have to commit any resources. The incubator program is supervised by the Startup Division.
- *The R&D Fund.* This is by far the largest incentive program for industrial R&D with a budget of about 10–15 times that of the incubator program. The R&D Fund offers financial incentives to enterprises for the development of new products or for the upgrading of existing technology. Once a proposal is approved, the applicants receive a conditional grant of 20–50 percent of the project's approved R&D budget. Again, if the project is successful,

the IIA support is repaid via royalty payments. The R&D Fund is supervised by the Growth Companies Division.

- *The MAGNET Incentive Program.* This program assists the development of generic technologies in important fields. It focuses on consortiums of industrial companies and research institutions that collaborate to develop innovative technologies. The program has been designed to help internalize the externality of doing generic research. The consortiums receive multi-year grant support of up to 66 percent of the approved budget for industrial companies and up to 100 percent for research institutions. There is no repayment obligation. The MAGNET Incentive Program is supervised by the Technological Infrastructure Division.

26. **A well-designed governance structure underpins the successful implementation of Israel's innovation promotion programs.** Under the incubator program, the incubators perform a preliminary screening of applications and, if satisfactory, they submit them to the IIA for support. For R&D fund applications, eligible firms submit grant applications for specific R&D projects that are reviewed by a Research Committee, chaired by the Chief Scientist and staffed both by qualified government officials and advisors. The Committee relies on external professional referees and advisors for its decisions, which can be appealed to an Appeals Committee.

27. **In addition to financial support, comprehensive assistance is another hallmark of Israel's innovation promotion.** The incubator program comes with a support framework for startups to develop a concept into a commercial product. The program dates back to the early 1990s when immigration from the former Soviet Union reached its peak. Many immigrants were scientists and skilled professionals, but lacked other skills required for commercial success, such as language, managerial experience, and access to capital. To address these shortcomings, incubators started providing comprehensive non-financial assistance ranging from physical space and infrastructure, to administrative services, technological and business guidance, legal advice, and access to partners (e.g., identification of new investors and customers).

C. Conclusions and Recommendations

28. **Lithuania's system of innovation promotion has yet to generate the intended results.** Lithuania has substantial resources in the form of EU grants for the promotion of innovation at its disposal. This has helped finance a large and modern physical innovation infrastructure, but it also spawned a confusing array of institutions, instruments, and strategic documents. Innovation results have so far disappointed, especially regarding private-sector innovation, which holds the key to sustained income convergence with Western Europe. Lithuania devotes similar amounts of public resources to innovation as Israel, but it achieves much less. R&D outlays by businesses remain low, patent applications are far fewer, international innovation cooperation is modest, and non-scientific innovation performance, such as the introduction of new processes or products, trails.

29. **Lithuania can learn valuable lessons from Israel’s successful innovation promotion model.** While important success factors, such as the strong links with the U.S. high-tech industry will be impossible to fully replicate elsewhere, Israel’s model has many other important elements that are worth considering. The promotion of innovation other than basic research is mostly implemented by a single entity, the IIA, providing a one-stop shop for businesses. Its governance structure gives the private sector a strong voice in the oversight of the authority as well as in project selection. The IIA operates mainly by providing grants to the private sector, coupled with non-financial support from experienced authority personnel and privately-run incubators.

30. **Lithuania’s innovation promotion should put businesses in the driver’s seat and consolidate the highly fragmented system of institutions and instruments.** There are many institutions with advisory and implementation functions under the Ministry of Economy, the Ministry of Education and Science, the Ministry of Finance, government, and parliament. Each has a narrow mandate and there is no effective coordination between them, making it difficult to navigate the system and driving up administrative costs. Institutions should be gradually merged into two, one primarily in charge of business innovation and one primarily in charge of academic research and education, although clearly delineating gray areas may not always be easy. Consideration should be given to streamlining the many narrow, often small-scale instruments, into broader and more flexible ones that cover innovation projects from start to finish. Most importantly, funds should be made available directly to private businesses to a much larger extent, instead of creating ever more programs, which offer infrastructure and services for which there is limited private-sector demand.

References

- Atkinson, D. Robert, 2009, *Competitiveness, Innovation and Productivity: Clearing up the Confusion* (Washington DC: The Information Technology and Productivity Foundation). <http://www2.itif.org/2013-competitiveness-innovation-productivity-clearing-up-confusion.pdf>
- European Commission, 2016, "European Innovation Scoreboard 2016," http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en
- European Commission, 2014, "Research and Innovation Performance in the EU: Innovation Union Progress at Country Level." http://ec.europa.eu/research/innovation-union/pdf/state-of-the-union/2014/iuc_progress_report_2014.pdf
- European Commission, 2010, "Europe 2020 Flagship Initiative Innovation Union." https://ec.europa.eu/research/innovation-union/pdf/innovation-union-communication_en.pdf
- European Commission, 2010, "Europe 2020: A European Strategy for Smart, Sustainable and Inclusive Growth." <http://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf>
- European Parliament, 2017, "Horizon 2020 EU Framework Programme for Research and Innovation." [http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_STU\(2017\)598599](http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_STU(2017)598599)
- Eurostat, Statistics on Innovation. <http://ec.europa.eu/eurostat/web/science-technology-innovation/data/database>
- Garcia-Torres, Abraham, 2015, "RIO Country Report 2015: Israel." <https://ec.europa.eu/jrc/en/publication/rio-country-report-2015-israel>
- Government of Lithuania, 2014, "Programme on the Implementation of R&I Priority Areas and their Priorities." <http://ukmin.lrv.lt/en/sector-activities/innovation/smart-specialisation>
- Government of Lithuania, Agency for Science, Innovation and Technology (MITA), 2013, "Lithuanian Innovation Development Programme 2014–2020." <http://www.mita.lt/en/general-information/national-rampd-programmes/innovation-policy-in-lithuania/>
- Government of Lithuania, 2012, "National Progress Programme for Lithuania for the period 2014–2020." <https://rio.jrc.ec.europa.eu/en/library/national-progress-programme-lithuania-period-2014-2020>
- Israel Innovation Authority, 2016, "2016 Annual Report." <http://innovationisrael-en.mag.calltext.co.il/?article=0>
- Lithuania 2030, "Lithuania 2030." <https://www.lietuva2030.lt/en/contacts>
- Organization for Economic Cooperation and Development, 2010, "Ministerial Report on the OECD Innovation Strategy." <http://www.oecd.org/sti/45326349.pdf>

Organization for Economic Cooperation and Development, 2016, *OECD Reviews of Innovation Policy, Lithuania 2016*" (Paris)

Paliokaitė, Agnė, and González Verdesoto, Elena, 2017, "RIO Country Report 2016: Lithuania." <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/rio-country-report-2016-lithuania>

Paliokaitė, Agnė, Krūminas, Pijus, and Stamenov, Blagoy, 2016, "RIO Country Report 2015: Lithuania." <https://rio.jrc.ec.europa.eu/en/library/rio-country-report-lithuania-2015>

Senor, Dan and Saul Singer, 2009, *Start-Up Nation: The Story of Israel's Economic Miracle* (New York: Hachette Book Group).

State Audit Office of the Republic of Lithuania, 2017, "Public Investment in Research and Development for Innovation Growth," No. VA-P-50-1-7. https://www.vkontrole.lt/default_en.aspx

Statistics Lithuania, 2016. "Development of Innovation Activity, 2012-14." Vilnius. <http://osp.stat.gov.lt/en/home>

Trajtenberg, M., 2000, "R&D Policy in Israel: An Overview and Reassessment," NBER Working Paper 7930, (Cambridge: National Bureau of Economic Research).

Annex I. Objectives and Targets of the Lithuania Innovation Promotion Program 2014–20

| | Description of the objective and target | Description of the assessment criterion | Value of the assessment criterion | | | Institution in charge of data submission (data source) |
|------|--|--|-----------------------------------|--------|--------|---|
| | | | Status (year) | 2017 | 2020 | |
| 1. | Strategic goal of the Lithuanian Innovation Promotion Program 2014–20—to enhance the competitiveness of the Lithuanian economy by creating an efficient system of innovation stimulating the innovativeness of economy | Summary innovation index | 0.28 (2012) | 0.4 | 0.54 | Ministry of Economy (Innovation Union Scoreboard) |
| 2. | The first objective of the Program—to develop innovative society by developing new knowledge and its application | Percentage population aged 30–34 having completed higher education or | 48.7 (2012) | min 40 | min 40 | Ministry of Education and Science (Eurostat) |
| | | Employment in knowledge-intensive sectors (percentage) | 9 (2010) | 11 | 13.6 | Ministry of Social Security and Labor (Innovation Union Scoreboard) |
| | | Percentage population employed in high technology and medium-high technology | 2.9 (2011) | 3 | 3.2 | Ministry of Economy Statistics Lithuania) |
| 2.1. | Target 1 of the first objective of the Program—to develop high-level knowledge, and research and development activities | Percentage ratio of higher education sector and government sector spending | 0,66 (2012) | 0,7 | 1,0 | Ministry of Education and Science (Statistics Lithuania) |
| | | R&D level (position) | 39 (2013) | 32 | 25 | Ministry of Education and Science (Global Innovation Index) |

| | | | | | | |
|------|---|---|-----------------|------|-----|---|
| 2.2. | Target 2 of the first objective of the Program—to develop creativeness, entrepreneurship, innovativeness and practical skills and qualification corresponding to market needs within the system of higher education and science | Students of physical and engineering sciences as percentage of all | 22,1 (2010) | 24 | 27 | Ministry of Education and Science (Eurostat) |
| | | Percentage of educational institutions implementing Programs promoting creativity and innovative | 30 | 70 | 90 | Ministry of Education and Science |
| | | Private spending on education as percentage of | 0,69 | 0,8 | 0,9 | Ministry of Education and Science (Eurostat) |
| 2.3. | Target 3 of the first objective of the Program—to promote the development of innovative business, creating favorable conditions and providing knowledge about the start of the innovative business | Number of active small and medium-sized enterprises (hereinafter – SMEs), number of natural persons engaged in individual activity per 1,000 population | 65 (2010) | 75 | 80 | Ministry of Economy |
| 3. | The second objective of the Program—to enhance innovation potential of business | Value added delivered by high technology and medium-high technology manufacturing industries as percentage of total value added in manufacturing | 23,1 (2011) | 25 | 27 | Ministry of Economy (Statistics Lithuania) |
| | | SMEs implementing innovations as percentage of all SMEs | 15,67 (2010) | 20,5 | 35 | Ministry of Economy (Innovation Union Scoreboard) |
| 3.1. | Target 1 of the second objective of the Program—to promote investments in activities delivering high added-value | Business sector spending on R&D as percentage of GDP | 0,24 (2012) | 0,5 | 0,9 | Ministry of Economy (Statistics Lithuania) |
| | | Spending of enterprises on innovations not related to R&D as percentage of total turnover of enterprises | 1,27 (2010) | 1,5 | 1,7 | Ministry of Economy (Innovation Union Scoreboard) |

| | | | | | | |
|------|--|---|-----------------|-----|-----|---|
| 3.2. | Target 2 of the second objective of the Program—to promote the introduction of new products to the market | SMEs implementing new products or | 21,39 (2010) | 35 | 40 | Ministry of Economy (Innovation Union Scoreboard) |
| | | Sales of products new to the market and enterprise as percentage of total turnover of | 6,64 (2010) | 10 | 14 | Ministry of Economy (Innovation Union Scoreboard) |
| | | Number of patent applications according to the Patent Cooperation Treaty (PCT) per billion GDP as purchasing power parity | 0,31 (2010) | 0,5 | 0,9 | Ministry of Economy (Innovation Union Scoreboard) |
| 3.3. | Target 3 of the second objective of the Program—to promote the cooperation between different sectors by creating innovations and developing innovations of high impact | High-technology manufacturing industry's value added | 0,2 (2011) | 0,5 | 0,6 | Ministry of Economy (Statistics Lithuania) |
| | | ICT sector's value added as percentage of total value added | 2,5 (2012) | 2,2 | 3 | Ministry of Transport and Communications (Statistics Lithuania) |
| | | Lithuanian eco-innovation indicator (position in the EU) | 27 (2012) | 24 | 20 | Ministry of Economy (Eco-Innovation Scoreboard) |
| | | Enterprises implementing non-technological innovation as percentage | 26,3 (2012) | 30 | 35 | Ministry of Economy (Innovation Union Scoreboard) |
| 4. | The third objective of the Program—to promote the cooperation creation of value networking, development and internationalization | Collaboration of universities and business (position) | 28 (2013) | 25 | 19 | Ministry of Economy (Global Competitiveness Index) |
| | | Innovative SMEs engaged in collaboration activities with other enterprises or institutions as percentage of all SMEs | 8,76 (2010) | 10 | 12 | Ministry of Economy (Innovation Union Scoreboard) |

| | | | | | | |
|---|---|--|----------------|-----|----|---|
| 4.1. | Target 1 of the third objective of the Program—to promote cooperation between business and science and transfer of knowledge and technology | Cooperation between enterprises implementing technological innovation with national research bodies | 9,3 (2010) | 12 | 15 | Ministry of Economy (Statistics Lithuania) |
| | | Cooperation between enterprises implementing technological innovation with universities (percentage) | 14,9 (2010) | 17 | 20 | Ministry of Economy (Statistics Lithuania) |
| 4.2. | Target 2 of the third objective of the Program—to promote the development of clusters and integration in the global value | Cluster development level (position) | 102 (2013) | 100 | 70 | Ministry of Economy (Global Innovation Index) |
| 5. | The fourth objective of the Program—to increase efficiency of innovation policy making and implementation and promote innovation in the public sector | Innovation efficiency rating (position) | 105 (2013) | 90 | 70 | Ministry of Economy (Global Innovation Index) |
| 5.1. | Target 1 of the fourth objective of the Program—to create regulatory environment promoting innovations and to improve the institutional framework for the formation and implementation of the innovation policy | Business entities positively assessing services provided by R&D and innovation promotion institutions (percentage) | – | 70 | 80 | Agency for Science, Innovation and Technology |
| 5.2. | Target 2 of the fourth objective of the Program—to create measures stimulating the demand for innovations that help to address social, economic and environmental challenges | Innovative public procurement as percentage of total public procurement | 1,17 (2012) | 2 | 5 | Ministry of Economy (Public Procurement Office) |
| Source: http://www.mita.lt/uploads/documents/lithuanian_innovation_Program.pdf | | | | | | |

Annex II. Institutional Setup of Lithuania's Innovation System

1. **Policy Making Level.** The Parliament and government set STI policy at the highest level. The ministries responsible for the policy making of STI policy are the Ministry of Education and Science, the Ministry of Economy, and the Ministry of Finance. Other ministries are active in sector-specific STI policies in their respective policy domains.

- The Ministry of Education and Science (MoES) is mainly responsible for policy development in the areas of research in the public science system and highly skilled human resources, including R&D. At the same time, it proposes the establishment, reorganization, and closure of research institutions. The ministry is also in charge of a major part of financial and other resources for the implementation of national research policy.
- The Ministry of Economy (MoE) is responsible for the design of policy related to the promotion of innovation and business development, including the establishment and operation of innovation support organizations such as science and technology parks (STPs) and business incubators. However, the Ministry of Economy has a limited mandate to participate in the process of R&D policy development, which is led by the Ministry of Education and Science (including government funding of R&D).¹

2. **Advisory bodies.** The Strategic Council for Research, Development, and Innovation (SMIT), chaired by the Prime Minister and consisting of representatives of the ministries engaging in R&D and innovation development, provides advice to the government. The Academy of Science (LMA) and Lithuania Research Council (LMT) act as counsellor of Parliament and the Government of Lithuania. The Research and Higher Education Monitoring and Analysis Center (MOSTA) also gives advice to government. The Agency for Science, Innovation, and Technology (MITA) gives advice to both MoE and MoEs. The Innovation Economy Council (IET) and Higher Education Council (AMT) serve as consultants to MoE and MoES, respectively.

- LMA is an association of scientists and provides independent advice on a broad range of issues ranging from research and higher education, to culture, social development, economy, environmental protection, health care, and technology. The mission is to bring Lithuanian and international scientists together for meaningful collaboration, to encourage the integration of Lithuania into the European Research Area and developing a knowledge society, and to provide the best scientists needed for R&D.
- LMT is a counsellor of Parliament and the Lithuanian government on issues of research and researcher training. LMT's main areas of engagement are in research policy and legislation, research funding, and scientific advice. LMT experts are involved at all three levels of STI policy (decision making, advisory bodies, and implementation). One example of its activity is the role in

¹ The recent establishment of the Innovation Department within the Ministry of Economy highlights the increased importance attached to research and innovation policy.

the preparation of the Smart Specialization Strategy. Another example is LMT taking charge of the evaluation of Lithuanian education and science institutions and doctoral studies.

- MOSTA, established by the MoES, but now reporting to government, provides recommendations on the development of the national research and higher education systems, monitors developments, analyses the state of the Lithuanian research and higher education systems, and participates in the development and implementation of research and higher education policies.

3. **Implementing Institutions.** Responsibility for innovation policy implementation is scattered across the system. Each innovation policy making ministry administrates several different implementing institutions. However, some policy advisory bodies also have responsibility in implementation. The main institutions responsible for implementing innovation policy are:

- The Lithuanian Business Support Agency (LVPA), operating under the supervision of the MoE, administrates EU funds allocated to business support programs.
- Enterprise Lithuania (VL), supervised by the MoE, provides support to SMEs and encourages Lithuanian exports. It organizes events to help entrepreneurs build connections with and attract funding from Silicon Valley and European investors.
- Invest Lithuania, supervised by the MoE, is an agency with the objective to attract foreign investment, which serves as a point of contact for foreign companies and guides international businesses through the process of setting up operations in Lithuania.
- The Investment and Business Guarantee Institutions (INVEGA), supervised by the MoE, implements and administers financial and other support measures for SMEs.
- The Central Project Management Agency (CPVA), under the MoF, administers large-scale investments in the development of research infrastructure as well as international cooperation programs. It also provides methodological and advisory assistance on issues of public-private partnerships.
- The Center for Quality Assessment in Higher Education (SKVC), founded by the MoES, implements the external quality assurance policy in higher education in Lithuania and contributes to the development of human resources by assessing the quality of higher education, assessing qualifications, and disseminating information on higher education systems and qualifications recognition.
- The European Social Fund Agency (ESFA) administers EU Social Fund aid and implements measures assigned to the MoES in the development of human resources for science, technology and industry.
- The Agency for Science, Innovation and Technology (MITA) was established in 2010 following an agreement between the MoE and the MoES with activities supported and funded jointly by the two ministries. The key objective is to foster business and science cooperation and to create a

business-friendly environment conducive to innovation. This institution administers several measures and programs, especially R&D collaboration, and it also administers the innovation voucher program.²

4. **Coordination institutions.** In general, there is lack of coordination between different innovation institutions in Lithuania. The establishment of the Smart Specialization Coordination Group can be regarded as an effort to address this issue. It is responsible for managing the implementation of the Research and Innovation Smart Specialization Strategy (RIS3). The Group was formed by a joint order of the MoES and the MoE, consisting of representatives from the Office of the Government, ministries, other state institutions, business representatives, and other socio-economic partners.

² For example, the Industrial Biotechnologies Development Program and the High-technology Development Program, which were transferred to MITA from the LMT.