The Race Between Tax Enforcement and Tax Planning: Evidence From a Natural Experiment in Chile

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Motivation

Tax avoidance by multinational firms is an increasing concern for governments around the world

- Multinationals shift profits to subsidiaries in lower-tax jurisdictions
- E.g., revenue of Google in Bermuda: 75 billion USD in 2019

Estimates show sizeable share of multinational profits are booked in tax havens

- E.g., Clausing, 2016; Blouin & Robinson, 2020; Torslov et al. 2020

OECD has promoted policy reforms to curb profit shifting

- Thus far difficult to study their impact

Measuring Impacts of the OECD-led Enforcement Regulation

Challenges:

- Reforms in international taxation are often gradual
- Hard to construct comparison group for multinational firms
- Limited data access

This paper:

- Study Chile's large transfer pricing reform which transformed the country in one year from a laggard to a leader in OECD transfer pricing standard
- Comprehensive analysis including
  - Intra-group transfers: royalties, interests, services, goods
  - Tax payments
  - Tax advisory industry
- Using transaction-level micro data from tax filings and customs, and in-depth qualitative interviews

Literature

1. Taxation of multinational firms

- Extensive evidence of the importance of profit shifting for tax avoidance (e.g., Tørsløv et al. 2020)
- Channels: intra-group (intra-multinational) transactions of
  - Intangible assets such as patents and trademarks (e.g., Dischinger & Riedel 2011; Karkinsky & Riedel 2012; Griffith, Miller & O'Connell 2014; Alstadsæter et al. 2015)
  - Debt and interests (e.g., Desai, Foley & Hines 2007; Mintz & Weichenrieder 2010)
  - Services such as marketing and administration (e.g., Hebous & Johannesen 2016)
  - Trade in goods (e.g., Cristea & Nguyen 2016; Davies et al. 2016; Liu et al. 2019)
- This paper: First to provide a comprehensive evaluation of a transfer pricing reform by measuring its impacts on each channel as well as on tax payments

Literature

2. Tax advisory services

- Surprisingly small literature on tax advisors (Slemrod, 2019)
- Previous research has highlighted that tax advisors help shape compliance and avoidance behavior (e.g., Slemrod et al. 2001; Battaglini et al. 2020; Mayo 2021; Zwick 2021; Barrios & Gallemore 2023)
- What is the role of the industry in shaping the effectiveness of tax monitoring reforms?

Literature

3. Tax enforcement and information reporting

- Paper trails are of vital importance for tax monitoring (e.g., Kleven et al., 2011; Pomeranz, 2015; Naritomi, 2019)
- Credible enforcement is needed for the paper trail to be effective in reducing evasion
- This paper: Also effective for large corporations that can afford sophisticated tax planning?
  - Race between tax enforcement and tax planning might lead to wasteful expenditure
  - By tax authorities to enforce taxes, and taxpayers to avoid them

Literature

4. Tax capacity

- Significant attention has been devoted to the taxation of small and medium-sized firms (e.g., Best et al. 2015; Jensen 2022) and property taxes (e.g., Bergeron et al. 2020; Brockmeyer et al. 2022)
- Few papers so far have been able to analyze large corporations (Holz et al. 2023; Carrillo et al. *forthcoming*)

Preview of Results

1. Background: evidence of profit shifting
   - Intra-group payments respond to destination tax rates
2. Reform did not reduce propensity to shift profits to low-tax countries via
   - Copyright
   - Interests
   - Services
   - Goods prices
3. Reform had no effect on tax payments
4. Sharp increase in tax advisory services (based on interviews)
   - Jump start of transfer pricing industry with twelve-fold increase in expert consultants after the reform
   - Firms come for compliance support and stay for tax planning
   - Find quantitative evidence for tax-minimizing strategy in administrative data

Despite high expectations, OECD-based reform did not increase tax payments, but created a boon for tax advisory services

Overview

1. Background
   - **International profit shifting**
   - Chilean context and reform
   - Data
   - Evidence on tax-motivated intra-group payments
2. Impacts of the reform
   - Intra-group transactions
   - Tax payments
   - Transfer pricing advisory industry
3. Conclusion

Background: International Profit Shifting

Tax avoidance through profit shifting

- Company A located in relatively high-tax country
- Affiliated company B located in low-tax jurisdiction
- A can sell goods or services to B at a low price, or buy from B at a high price
  - Profits of A $\searrow$, profits of B $\nearrow$
  - $\Rightarrow$ tax liabilities of the group $\searrow$

Arm's-length principle from early 20th century

- Subsidiaries in each country treated as independent firms
  - Taxed separately on profits in each country
- Intra-group transactions must be priced as if with non-affiliates
- At the time this was a small phenomenon, grew in importance in recent decades

Background: Arm's-Length Principle and OECD Efforts

Vast OECD-led multilateral effort against profit shifting

- Arm's length principle adopted by all high-income and most middle- and low-income countries
- OECD established standardized guidelines for intra-group transactions
  - How much affiliates can charge each other
    - E.g., amounts attributed to each affiliate for centralized services such as HR, IT

    How prices can be calculated when a market price is not available
    - E.g., by calculating profitability of each transaction
  - Extensive reporting requirements and monitoring of international transactions

Little rigorous empirical evidence on its effectiveness

- Growing skepticism, as profit shifting continues

Background: The Chilean Transfer Pricing Reform

Timeline

- 2011: New specialized unit to monitor and prosecute transfer pricing
- 2012: New transfer pricing law passes congress
- 2013: New reporting requirements filed for first time (on 2012 activities)

Main components of the reform

- Significantly expanded reporting requirements for multinational firms
- Shifted the burden of proof from tax authority to firms
- Increased resources devoted to enforcing taxes on multinational firms

Context: high administrative capacity and low corruption

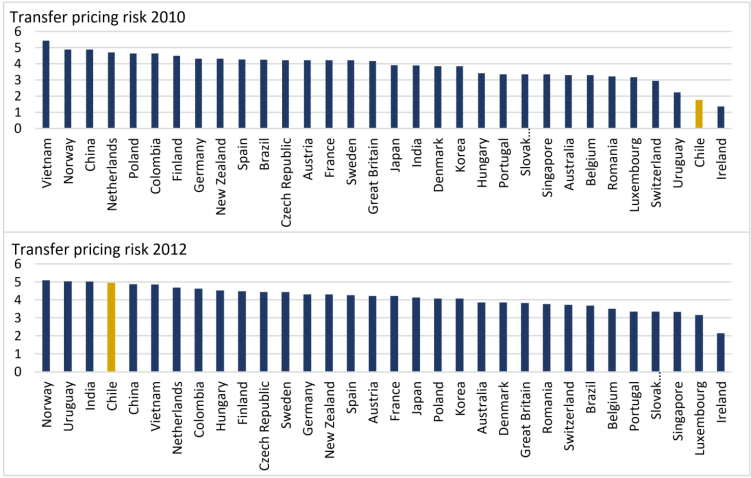
- Transparency International, 2012: Chile 20th least corrupt out of 180 countries (US 19th)

▸ Chile corporate income tax

Strictness of Transfer Pricing Enforcement Before and After Reform

Survey of 76 transfer pricing experts from Big 4 accounting firms (Mescall & Klassen, 2018)

Chile: 31st in 2010 ⇒ 4th in 2012 in firms' risk to receive a penalty for transfer pricing activities



▸ Criteria

Data & Sample

Administrative micro-level data

- Annual corporate income tax filings, including line items
- Tax forms on international transactions
- Orbis and Dunn & Bradstreet databases
- Customs data: imports and exports at the transaction-level

Sample

- Universe of all medium and large firms with at least one international transaction
  - Reform does not affect smaller firms
- Active throughout 2007-2015: positive costs and wages

Semi-structured interviews

- With transfer pricing experts: in-house accountants, consultants, tax officers
  - Topics: evolution of transfer pricing advisory services, adjustment mechanisms

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Background: Do Multinationals Make Tax-Motivated Intra-Group Payments?

- Do firms make more payments to affiliates in lower-tax jurisdictions?
  - Following e.g., Huizinga and Laeven (2008), Clausing (2016)
- Analyze sensitivity of payments with respect to destination country tax rate
  - Within-firm analysis comparing payments to affiliates vs non-affiliates
  - Controlling for destination country fixed effects, destination country GDP per capita and firm-year fixed effects
    - This avoids confounding changes in taxes with firm-level shocks, country-level differences and changes driven by GDPpc growth

$$\ln(\text{Payment}_{ijat}+1) = \beta_1 \text{ Tax Rate}_{jt} + \beta_2 \text{Tax Rate}_{jt} \times \text{Affiliate}_a + \beta_3 \ln(\text{GDPpc})_{jt} + u_{it} + \alpha_{ia} + \mu_j + e_{ijat}$$

- $Payment_{ijat}$ = amount paid by firm i to firm in country j with affiliate status a in year t
- Standard errors clustered at the firm level

More Payments to Low-Tax Countries for Affiliates but Not for Non-Affiliates

	(1) All	(2) Royalties	(3) Services	(4) Interests	(5) Other
Tax rate × affiliate	-0.055***	-0.028***	-0.029***	-0.009**	-0.005
	(0.012)	(0.008)	(0.009)	(0.004)	(0.003)
Tax rate	0.011	-0.006	0.016	0.004	-0.005
	(0.014)	(0.009)	(0.013)	(0.006)	(0.005)
Log(GDPpc) in destination country	Yes	Yes	Yes	Yes	Yes
Firm FE × year	Yes	Yes	Yes	Yes	Yes
Firm FE × affiliate	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes
Observations	45,248	45,248	45,248	45,248	45,248
Number of firms	1,206	1,206	1,206	1,206	1,206
Pre-treatment average countries per firm	2.68	2.68	2.68	2.68	2.68
Mean outcome in 2009	2.178	0.821	1.283	0.238	0.220

A 1 p.p. lower tax rate is associated with a 5.5% higher payment amount to affiliates.

Outcome: Ln(Payments+1). Standard errors clustered at firm level. Years 2007-2013.

▸ IHS ▸ Robustness ▸ Longer period

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Impact of the Reform on Royalties, Interests, and Services: Estimation Strategy

- Within-multinational firm difference-in-differences analysis
  - Payments to affiliates versus non-affiliates
- Event study specification
  - 2009: baseline year
  - 2010: placebo year
  - 2011: first post-treatment year
  - $$\begin{aligned}\ln(\text{Payment}_{ijat}) = {} & \beta_1 \text{Tax Rate}_{jt} + \beta_2 \text{Tax Rate}_{jt} \times \text{Affiliate}_a \\ & + \beta_3 \text{Tax Rate}_{jt} \times \text{Affiliate}_a \times \text{Post}_t + \beta_4 \text{Post}_t + \beta_5 \text{Tax Rate}_{jt} \times \text{Post}_t \\ & + \beta_6 \text{Affiliate}_a \times \text{Post}_t + \beta_7 \ln(\text{GDPpc})_{jt} + u_{it} + \alpha_{ia} + \mu_j + e_{ijat}.\end{aligned}$$
  - Same controls as above

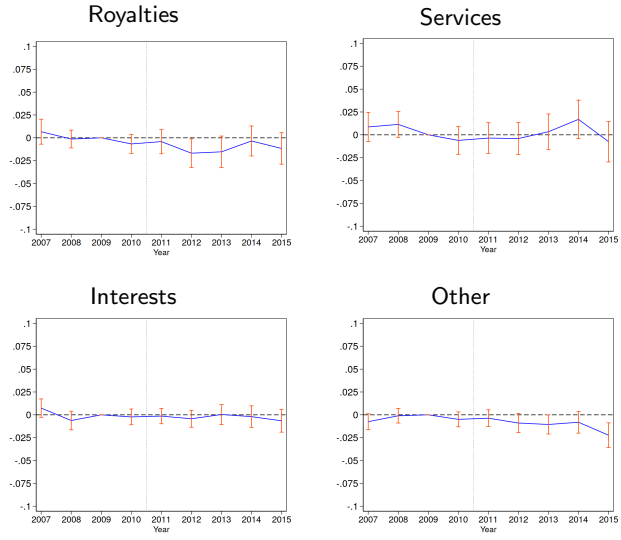
Impact of the Reform on Royalties, Interests, and Services

	All	Royalties	Services	Interests	Other
Tax rate × affiliate × post	-0.013	-0.011*	-0.004	-0.001	-0.004
	(0.010)	(0.007)	(0.008)	(0.004)	(0.004)
Tax rate × affiliate	-0.049***	-0.022***	-0.028***	-0.009*	-0.003
	(0.013)	(0.008)	(0.010)	(0.005)	(0.003)
Tax rate	Yes	Yes	Yes	Yes	Yes
Tax rate × post	Yes	Yes	Yes	Yes	Yes
Log(GDPpc) in destination country	Yes	Yes	Yes	Yes	Yes
Firm FE × year	Yes	Yes	Yes	Yes	Yes
Firm FE × affiliate	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes
Observations	45,248	45,248	45,248	45,248	45,248
Number of firms	1,206	1,206	1,206	1,206	1,206
Pre-treatment average countries per firm	2.68	2.68	2.68	2.68	2.68

- **Sensitivity did not weaken, if anything it got stronger, esp. for royalties**

▸ Up to 2014 ▸ Up to 2015
▸ Results in IHS ▸ Robustness checks

Sensitivity of International Payments to Destination Country Tax Rate



- **Sensitivity did not weaken, if anything it got stronger**

Impact on Prices in Trade of Goods

- Ideally want to compare prices of trade with affiliates to prices of trade with non-affiliates
  - Challenge: data limitation
- Customs data
  - Transaction-level data, including prices, by firm, product and country
  - No information on whether trading partner is affiliate
- How we address this: focus on trade that is likely to be intra-group
  - For the period 2012-2015, new tax form has amounts of intra-group trade at firm-country level
  - Customs data has total amounts of trade (intra- and extra-group combined) at firm-country level
  - Matching the two sources, select firm-country cases where intra-group trade is close to 100% of total trade

Impact on Prices in Trade of Goods

Example

- Tax form: firm A paid USD 900 in intra-group imports from Netherlands
- Customs data: firm A imported USD 1,000 worth of products from Netherlands, in the same period
- 90% of the imports of firm A from Netherlands seem to be intra-group

Selection of treated sample

- Select firm-country pairs with high intra-group trade shares
- Compare their prices to domestic firms' prices

Impact on Prices in Trade of Goods: Regression Equation

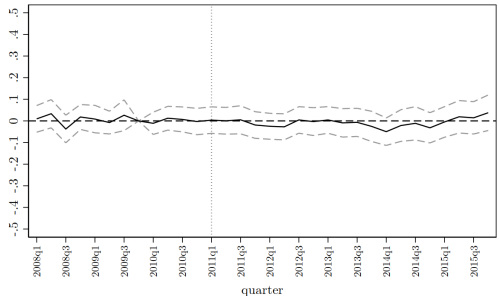
Difference-in-differences specification at the product-quarter level:

$$ln(\text{Price})_{ipt} = \alpha_0 + \beta_1 \text{Multinational}_i \times \text{Post}_t + \mu_i + \nu_{pt} + e_{ipt}$$

- $ln(\text{Price})_{ipt}$ = log of unit price for firm i, product p and quarter t
- $\text{Post}_t = 1$ from 2011 onwards, μ_i = firm fixed effects, ν_{pt} = product by quarter fixed effects
- Standard errors clustered at the firm level

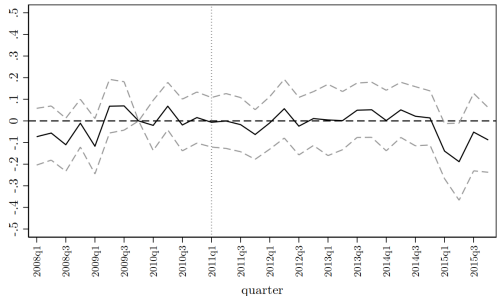
Impact on Unit Prices (Log)

Imports



Less profit shifting would mean lower prices

Exports



Less profit shifting would mean higher prices

Outcome: Log(unit price). Data at the firm-product-quarter level. Standard errors clustered at firm level. Firm and product $\times$ quarter fixed effects. Sample of firm-country pairs with intra-group trade shares of 80 to 120%.

▸ Tables

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Impact on Tax Payments: Identification Strategy

- Compare evolution of tax paid among
  - Treated group: multinationals
  - Control group: internationally active domestic firms
- The two groups have different characteristics

	Multinationals	Domestic firms
Taxes	420	64
Domestic sales	35,443	5,509
Payroll	4,577	881
Taxes/Payroll	0.163	0.162
Number of firms	2,755	11,333

Notes: Means, thousands of USD. Year 2010.

▸ Summary Statistics

Impact on Tax Payments: Estimation Strategy

How we address the difference between treatment and control groups

- Control for pre-treatment characteristics $\times$ year
  - 17-industry classification
  - Pre-treatment average of sales
  - Pre-treatment average of ratios sales/payroll and sales/assets
  - All controls are included both in linear and quadratic terms
- Scale outcomes by a measure of firm size (payroll)
  - Following Torslov, Wier and Zucman (2021) and Yagan (2015)
- $$\frac{y_{it}}{w_{it}} = \beta_1 Multinational_i + \beta_2 Post_t + \beta_3 Multinational_i \times Post_t + \beta_4 X_{it} + \upsilon_i + \varepsilon_{it}$$
  - y_{it} = tax paid by firm i in year t, scaled by payroll w_{it}
  - $Post_t$ = dummy 1 for 2011 and onward; X_{it} = vector of controls; υ_i = firm fixed effects
  - Standard errors clustered at the firm level. All variables winsorized at 99th percentile

Impact on Tax Payments: Estimation Strategy

Identifying assumption

- Nothing else affected the outcome differentially for treatment and control at the time of the reform

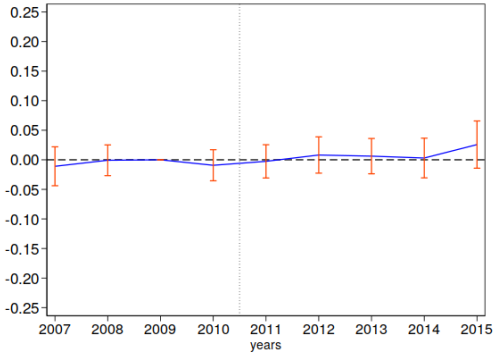
Evidence in support of this

- Parallel trends before the reform in the outcomes
- Parallel trends before and after in placebo outcome (domestic sales/payroll)

Placebo Test: Domestic Sales

Multinationals vs domestic firms

Domestic sales/payroll



Effects in standard deviations.

Winsorized at 99th percentile. Standard errors clustered at firm level.

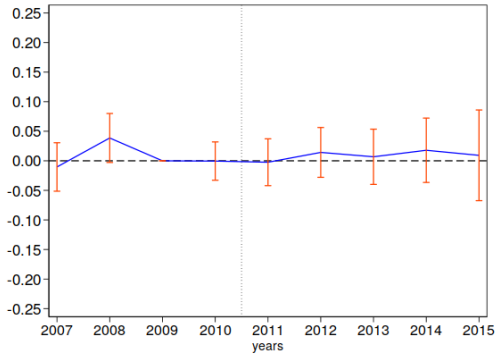
▸ Table

Note: domestic sales evolve most parallel up to 2014

Effect on Tax Payments

Multinationals vs domestic firms

Tax paid/payroll



Effects in standard deviations.
Winsorized at 99th percentile. Standard errors clustered at firm level.

Effect on Tax Payments: Difference-in-Differences Estimation

	Tax Payments/Payroll
Panel A: Up to 2013	
Post × multinational	-0.00027
	(0.00704)
Effect in % change	**-0.18%**
Panel B: Up to 2014	
Post × multinational	0.00084
	(0.00738)
Effect in % change	**0.58%**
Panel C: Up to 2015	
Post × multinational	0.00085
	(0.00820)
Effect in % change	**0.58%**
Controls	Yes
Mean outcome of treated firms in 2009	0.146
Number of treated firms	2,752
Number of control firms	11,325

- For comparison, Torslov, Wier and Zucman (2021) estimate that in 2015, Chile lost the equivalent of 20% of multinationals' corporate tax revenue to profit shifting

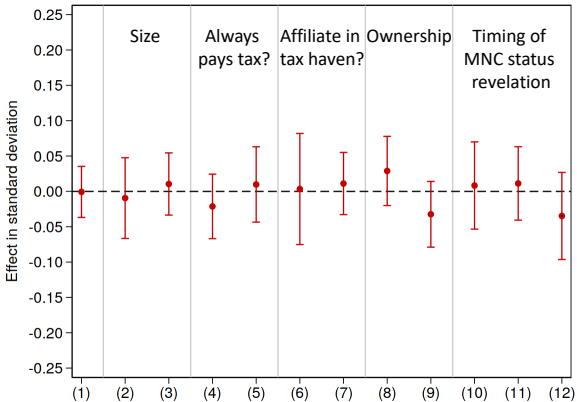
Effect on Tax Payments: Subgroup Analysis

We examine whether the reform impacted differentially to the following groups of firms:

- By firm size: large vs medium
- By whether firm regularly paid taxes in pre-treatment
- By whether multinational has affiliates in tax havens
- By whether multinational is foreign- or Chilean-owned
- By whether multinational status was revealed to the tax authority prior or after the reform, or neither (MNC status identified in external sources)

Effect on Tax Payments: Subgroup Analysis

Difference-in-difference estimates of multinationals vs domestic firms



(1) All
(2) Large
(3) Medium
(4) Regularly paid taxes pre-treatment
(5) Paid zero tax multiple times

(6) Affiliate in tax haven
(7) No affiliate in tax haven
(8) Foreign owned
(9) Chilean owned
(10) MNC status revealed pre-treatment
(11) MNC status revealed post-treatment
(12) MNC status from external sources

Notes: (1)-(5) subgroup of both treatment and control group.
(6)-(12) subgroup of treated vs. full control group.

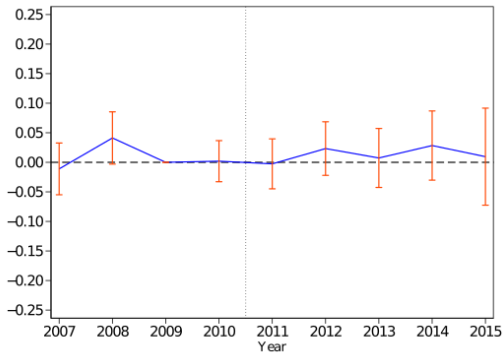
Additional Tax Payments After Audits

- 224 audits conducted
- 33 firms pay additional taxes following an audit
- Data starting in 2010
- 2010: 17.2 million USD
- Post: 68.1 million USD
- 0.3% of total taxes collected from multinationals over whole period

Effect on Tax Payments: Including Audits

Multinationals vs domestic firms

Tax paid/payroll



Effects in standard deviations.
Range of Y axis: ± 0.25 s.d.
Winsorized at 99th percentile.

Standard errors clustered at firm level.

Effect on Tax Payments: Including Audits

	Without audits	With audits
Panel A: Up to 2013		
Post × multinational	-0.00027	0.00048
	(0.00704)	(0.00705)
Effect in % change	-0.18 %	0.33 %
Panel B: Up to 2014		
Post × multinational	0.00084	0.00219
	(0.00738)	(0.00740)
Effect in % change	0.58 %	1.50 %
Panel C: Up to 2015		
Post × multinational	0.00085	0.00186
	(0.00820)	(0.00822)
Effect in % change	0.58 %	1.27 %
Controls	Yes	Yes
Mean outcome of treated firms in 2009	0.146	0.146
Number of treated firms	2,752	2,752
Number of control firms	11,325	11,325

Outcome: tax paid/payroll. Controls include interaction of the following with year dummies: pre-treatment average of sales, pre-treatment average of sales/payroll and its square, pre-treatment average of sales/assets and its square, and industry dummies. Winsorized at 99th percentile. Standard errors clustered at firm level.

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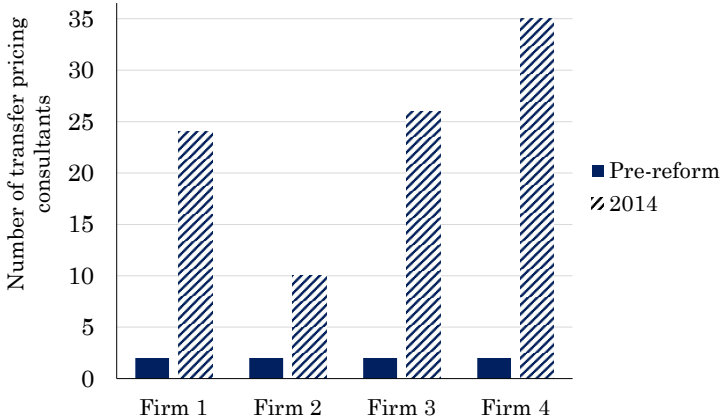
Demand for Tax Advisory Services: Interviews from 2014 and 2021

Twelve-fold increase in number of transfer pricing consultants in top 4 consulting companies in Chile: from 8 to 95 employees



Qualitative Interviews: Main Insights

1. The reform was a large boon to the tax advisory industry, increasing the number of experts working in transfer-pricing consulting twelve-fold within three years ▸ Quotes

2. The strong surge in demand was initially led by the complexity of the new reporting requirements, which drove many multinationals to seek compliance support from specialized consulting services ▸ Quotes

3. There are strong complementarities between compliance support and tax planning services. Tax consultants had strong incentives to up-sell clients on additional tax planning services, and the marginal cost of such planning was lower, once the fixed costs of organizing the books for compliance had been paid ▸ Quotes

Qualitative Interviews: Main Insights

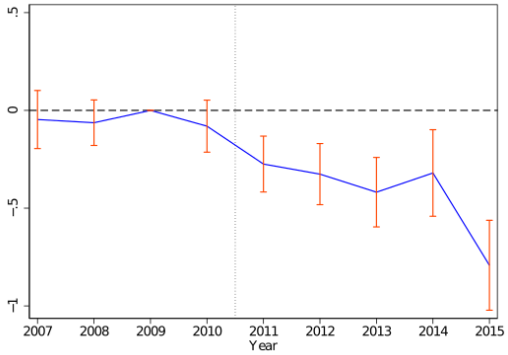
4. The supply response was very elastic because the advisory industry was able to respond quickly to this demand shock by reallocating international experts to Chile and then training the next generation of local advisors ▸ Quotes

5. An important piece of tax planning advice was to centralize cost centers in fewer locations (optimized both from a tax-efficiency and business perspective) - a pattern that we can confirm in the quantitative data. ▸ Quotes

Centralization of Cost Centers

Affiliate vs non-affiliate payments

Countries with affiliates to which firms make payments



Standard errors clustered at firm level.

Centralization of Cost Centers

Affiliate vs non-affiliate payments

Countries with affiliates to which firms make payments

	(1) All	(2) Tax havens	(3) Non tax havens	(4) Royalties	(5) Interests	(6) Services	(7) Other
Post × affiliate	-0.292***	-0.001	-0.291***	-0.029	0.008	-0.179***	-0.051***
	(0.074)	(0.008)	(0.071)	(0.036)	(0.014)	(0.052)	(0.019)
Affiliate	-0.687***	-0.022**	-0.665***	-0.182***	-0.023	-0.637***	-0.006
	(0.121)	(0.009)	(0.116)	(0.044)	(0.024)	(0.108)	(0.013)
Firm × year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,984	11,984	11,984	11,984	11,984	11,984	11,984
Number of firms	856	856	856	856	856	856	856
Pre-treatment average affiliates	1.050	0.022	1.028	0.332	0.093	0.473	0.095
Pre-treatment average non-affiliates	1.689	0.051	1.638	0.436	0.126	1.110	0.097

▸ Up to 2014 ▸ Up to 2015

Qualitative Interviews: Main Insights

6. Tax administrators are outmatched by consulting firms both in the number of transfer pricing staff and their salaries, and there is a recurring pattern of revolving doors cycling transfer pricing experts between the two sectors. Consulting firms see additional enforcement actions by the government as a business opportunity $\Longrightarrow$ tax authorities face an uphill battle in the race between tax enforcement and tax planning Quotes

Similar Experiences e.g., in the UK

HM Revenue & Customs (HMRC) appears to be fighting a battle it cannot win in tackling tax avoidance. Companies can devote considerable resource to ensure that they minimise their tax liability. There is a large market for advising companies on how to take advantage of international tax law, and on the tax implications of different global structures. The four firms employ nearly 9,000 people and earn $2 billion from their tax work in the UK, and earn around $25 billion from this work globally. HMRC has far fewer resources. In the area of transfer pricing alone there are four times as many staff working for the four firms than for HMRC. [...] We have seen what look like cases of poacher, turned gamekeeper, turned poacher again, whereby individuals who advise government go back to their firms and advise their clients on how they can use those laws to reduce the amount of tax they pay.

Public Accounts Committee of the British Parliament (2013)

Summary of the Demand Side Channel

- Reform that increases reporting requirements increases return to compliance support
  - More firms find it worthwhile to pay fixed cost of starting to use external consultant for *compliance*
  - Once this cost is paid, consultant can "upsell" on *tax planning*
- The reform creates an incentive to purchase external tax preparation services for compliance and this in turn incentivizes purchasing of tax planning
- Enforcing regulations with large avoidance opportunities can increase demand for consulting services, which has potential to backfire

▸ Welfare

Summary of the Supply Side Channel

- Increase in demand for external compliance support
  - Worthwhile for big consultancies to pay fixed cost of importing experts from countries that already had similar regulation earlier
- Due to the global nature of this regulation and corresponding compliance and tax planning technologies, supply of consultancy is highly elastic and can be scaled up rapidly to a new country
- **Both the demand and supply channels can lead to an increase in tax planning services as a result of initial increase in tax compliance services**

Overview

1. Background
   - International profit shifting
   - Chilean context and reform
   - Data
   - Evidence on tax-motivated intra-group payments
2. Impacts of the reform
   - Intra-group transactions
   - Tax payments
   - Transfer pricing advisory industry
3. **Conclusion**

Conclusion

- Chile implemented OECD-based reform of tax enforcement on multinational firms
- Reform did not reduce propensity to shift profits to low-tax countries via
  - Copyright
  - Interests
  - Services
  - Goods prices
- No significant increase in tax collection
- Large increase in tax advisory services
  - Centralization of cost centers in fewer countries, especially for services
- Race between tax enforcement and tax planning: it appears that tax planning won

Thank you for your feedback!

Transfer Pricing Risk Criteria, Mescall and Klassen (2018)

- Enforcement variables
  - Degree of transfer pricing enforcement
  - Government discretion over penalty reduction
  - Usage of proprietary tax data in calculation of transfer prices
- Regulation variables
  - Requirement of contemporaneous documentation
  - Presence of advance pricing agreements
  - Availability of benchmark data to taxpayers
  - Preclusion of commissionaire agreements
  - Preclusion of foreign comparables in estimating transfer prices
  - Age of rules adopted

Back

Chile Corporate Income Tax

- 17% from 2007-2010, 20% from 2011-2013, 21% in 2014, and 22.5% in 2015
- Our analyses use intra-firm, intra-destination country variation, comparing payments to affiliates to payments to non-affiliates by the same firm in the same destination country
  - We leverage variation in tax differentials across destination countries of a given multinational

Back

More Payments to Low-Tax Countries for Affiliates vs Non-Affiliates (IHS)

	(1) All	(2) Royalties	(3) Services	(4) Interests	(5) Other
Tax rate × affiliate	-0.058***	-0.029***	-0.032***	-0.009**	-0.005
	(0.012)	(0.008)	(0.010)	(0.005)	(0.004)
Tax rate	0.011	-0.006	0.017	0.004	-0.005
	(0.015)	(0.010)	(0.013)	(0.006)	(0.005)
Log(GDPpc) in destination country	Yes	Yes	Yes	Yes	Yes
Firm FE × year	Yes	Yes	Yes	Yes	Yes
Firm FE × affiliate	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes
Observations	45,248	45,248	45,248	45,248	45,248
Number of firms	1,206	1,206	1,206	1,206	1,206
Pre-treatment average countries per firm	2.68	2.68	2.68	2.68	2.68
Mean outcome in 2009	2.315	0.872	1.368	0.253	0.235

▸ Back

More Payments to Low-Tax Countries for Affiliates vs Non-Affiliates (Robustness)

Back

More Payments to Low-Tax Countries for Affiliates vs Non-Affiliates (Up to 2014)

	(1) All	(2) Royalties	(3) Services	(4) Interests	(5) Other
Tax rate × affiliate	-0.051***	-0.027***	-0.027***	-0.009**	-0.005
	(0.011)	(0.007)	(0.009)	(0.004)	(0.003)
Tax rate	0.015	-0.014	0.034***	0.003	-0.009*
	(0.014)	(0.009)	(0.013)	(0.005)	(0.005)
Log(GDPpc) in destination country	Yes	Yes	Yes	Yes	Yes
Firm FE × year	Yes	Yes	Yes	Yes	Yes
Firm FE × affiliate	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes
Observations	51,712	51,712	51,712	51,712	51,712
Number of firms	1,206	1,206	1,206	1,206	1,206
Pre-treatment average countries per firm	2.68	2.68	2.68	2.68	2.68
Mean outcome in 2009	2.178	0.821	1.283	0.238	0.220

Outcome: Ln(Payments+1). Standard errors clustered at firm level. Years 2007-2014.

▸ Back

More Payments to Low-Tax Countries for Affiliates vs Non-Affiliates (Up to 2015)

	(1) All	(2) Royalties	(3) Services	(4) Interests	(5) Other
Tax rate × affiliate	-0.051***	-0.027***	-0.027***	-0.010**	-0.005*
	(0.011)	(0.007)	(0.009)	(0.004)	(0.003)
Tax rate	0.022	-0.008	0.037***	0.003	-0.009*
	(0.014)	(0.009)	(0.013)	(0.005)	(0.005)
Log(GDPpc) in destination country	Yes	Yes	Yes	Yes	Yes
Firm FE × year	Yes	Yes	Yes	Yes	Yes
Firm FE × affiliate	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes
Observations	58,176	58,176	58,176	58,176	58,176
Number of firms	1,206	1,206	1,206	1,206	1,206
Pre-treatment average countries per firm	2.68	2.68	2.68	2.68	2.68
Mean outcome in 2009	2.178	0.821	1.283	0.238	0.220

Outcome: Ln(Payments+1). Standard errors clustered at firm level. Years 2007-2015.

▸ Back

Impact of the Reform on Royalties, Interests, and Services (IHS)

	(1) All	(2) Royalties	(3) Services	(4) Interests	(5) Other
Tax rate × affiliate × post	-0.014	-0.012*	-0.005	-0.001	-0.004
	(0.011)	(0.007)	(0.008)	(0.004)	(0.004)
Tax rate × affiliate	-0.052***	-0.024***	-0.030***	-0.009*	-0.003
	(0.013)	(0.009)	(0.011)	(0.005)	(0.004)
Tax rate	Yes	Yes	Yes	Yes	Yes
Tax rate × post	Yes	Yes	Yes	Yes	Yes
Log(GDPpc) in destination country	Yes	Yes	Yes	Yes	Yes
Firm FE × year	Yes	Yes	Yes	Yes	Yes
Firm FE × affiliate	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes
Observations	45,248	45,248	45,248	45,248	45,248
Number of firms	1,206	1,206	1,206	1,206	1,206
Pre-treatment average countries per firm	2.68	2.68	2.68	2.68	2.68

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Impact of the Reform on Royalties, Interests, and Services (up to 2014)

	All	Royalties	Services	Interests	Other
Tax rate × affiliate × post	-0.006	-0.009	-0.000	-0.001	-0.004
	(0.010)	(0.007)	(0.008)	(0.004)	(0.004)
Tax rate × affiliate	-0.047***	-0.022***	-0.027***	-0.009*	-0.002
	(0.013)	(0.008)	(0.010)	(0.005)	(0.003)
Tax rate	Yes	Yes	Yes	Yes	Yes
Tax rate × post	Yes	Yes	Yes	Yes	Yes
Log(GDPpc) in destination country	Yes	Yes	Yes	Yes	Yes
Firm FE × year	Yes	Yes	Yes	Yes	Yes
Firm FE × affiliate	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes
Observations	51,712	51,712	51,712	51,712	51,712
Number of firms	1,206	1,206	1,206	1,206	1,206
Pre-treatment average countries per firm	2.68	2.68	2.68	2.68	2.68

▸ Results 2015 ▸ Back

Impact of the Reform on Royalties, Interests, and Services (up to 2015)

	All	Royalties	Services	Interests	Other
Tax rate × affiliate × post	-0.010	-0.009	-0.003	-0.002	-0.007**
	(0.010)	(0.007)	(0.008)	(0.004)	(0.004)
Tax rate × affiliate	-0.045***	-0.021***	-0.025**	-0.009*	-0.001
	(0.012)	(0.008)	(0.010)	(0.005)	(0.003)
Tax rate	Yes	Yes	Yes	Yes	Yes
Tax rate × post	Yes	Yes	Yes	Yes	Yes
Log(GDPpc) in destination country	Yes	Yes	Yes	Yes	Yes
Firm FE × year	Yes	Yes	Yes	Yes	Yes
Firm FE × affiliate	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes
Observations	58,176	58,176	58,176	58,176	58,176
Number of firms	1,206	1,206	1,206	1,206	1,206
Pre-treatment average countries per firm	2.68	2.68	2.68	2.68	2.68

▸ Back

Robustness Check I - Firm-Year-Affiliation Status Fixed Effects

	All	Royalties	Services	Interests	Other
Panel A: Up to 2013					
Tax rate × affiliate × post	0.000	-0.006	0.002	-0.002	-0.005
	(0.014)	(0.009)	(0.011)	(0.004)	(0.004)
Tax rate × affiliate	-0.055***	-0.025***	-0.032***	-0.008	-0.003
	(0.013)	(0.009)	(0.010)	(0.005)	(0.004)
Panel B: Up to 2014					
Tax rate × affiliate × post	0.009	-0.004	0.009	-0.003	-0.004
	(0.013)	(0.008)	(0.011)	(0.004)	(0.004)
Tax rate × affiliate	-0.055***	-0.025***	-0.032***	-0.008	-0.003
	(0.013)	(0.009)	(0.010)	(0.005)	(0.004)
Panel C: Up to 2015					
Tax rate × affiliate × post	0.008	-0.004	0.008	-0.004	-0.005
	(0.013)	(0.009)	(0.011)	(0.004)	(0.004)
Tax rate × affiliate	-0.055***	-0.025***	-0.032***	-0.008	-0.003
	(0.013)	(0.009)	(0.010)	(0.005)	(0.004)

Outcome: Ln(Payments+1). Controls include log of GDP per capita in the destination country, destination country FE and firm-year-affiliation status FE. Standard errors clustered at firm level.

▸ Robustness check II ▸ Back

Robustness Check II - Destination Country-Year Fixed Effects

	All	Royalties	Services	Interests	Other
Panel A: Up to 2013					
Tax rate × affiliate × post	-0.013	-0.011	-0.004	-0.001	-0.004
	(0.010)	(0.007)	(0.008)	(0.004)	(0.004)
Tax rate × affiliate	-0.049***	-0.022***	-0.028***	-0.009*	-0.003
	(0.013)	(0.008)	(0.010)	(0.005)	(0.003)
Panel B: Up to 2014					
Tax rate × affiliate × post	-0.006	-0.009	-0.000	-0.001	-0.004
	(0.010)	(0.007)	(0.008)	(0.004)	(0.004)
Tax rate × affiliate	-0.047***	-0.022***	-0.027***	-0.009*	-0.002
	(0.013)	(0.008)	(0.010)	(0.005)	(0.003)
Panel C: Up to 2015					
Tax rate × affiliate × post	-0.010	-0.009	-0.003	-0.002	-0.007*
	(0.010)	(0.007)	(0.008)	(0.004)	(0.004)
Tax rate × affiliate	-0.045***	-0.021***	-0.025**	-0.009*	-0.001
	(0.013)	(0.008)	(0.010)	(0.005)	(0.004)

Outcome: Ln(Payments+1). Controls include log of GDP per capita in the destination country, firm-year FE, firm-affiliation status FE and destination country-by-year FE. Standard errors clustered at firm level.

Back

Impact on Prices in Trade of Goods: Regression Equation

Difference-in-differences specification at the product-quarter level:

$$ln(\text{Price})_{ipt} = \alpha_0 + \beta_1 \text{Multinational}_i \times \text{Post}_t + \mu_i + \nu_{pt} + e_{ipt}$$

- $ln(\text{Price})_{ipt}$ = log of unit price for firm i, product p and quarter t
- $\text{Post}_t = 1$ from 2011 onwards, μ_i = firm fixed effects, ν_{pt} = product by quarter fixed effects
- Standard errors clustered at the firm level

Back

Impact on Unit Prices (Log): Imports and Exports

Impact on Unit Prices in Imports and Exports: Difference-in-Differences Estimates. Log(Unit Price)

	Imports			Exports		
	(1) 80% to 120%	(2) 90% to 110%	(3) 95% to 105%	(4) 80% to 120%	(5) 90% to 110%	(6) 95% to 105%
Panel A: Up to 2013						
Post × multinational	-0.013	0.010	0.012	-0.006	0.012	0.036
	(0.017)	(0.020)	(0.026)	(0.039)	(0.049)	(0.048)
Observations	999,485	948,294	891,709	92,817	83,927	67,822
Panel B: Up to 2014						
Post × multinational	-0.017	0.008	0.007	-0.003	0.019	0.045
	(0.019)	(0.021)	(0.029)	(0.039)	(0.047)	(0.048)
Observations	1,212,606	1,150,871	1,081,662	110,951	100,407	81,520
Panel C: Up to 2015						
Post × multinational	-0.011	0.019	0.015	-0.021	0.001	0.023
	(0.020)	(0.023)	(0.030)	(0.040)	(0.048)	(0.050)
Observations	1,420,110	1,348,004	1,266,980	128,065	115,820	94,272
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Product × quarter FE	Yes	Yes	Yes	Yes	Yes	Yes

Back

Challenge: Treated and Control Groups are Very Different in Size

Income Tax Data
(Full Sample)

	Domestic firms	Multinational firms
Domestic sales	5,509	35,443
	[1,824]	[8,883]
Payroll	881	4,577
	[306]	[1,495]
Assets	10,834	121,904
	[2,115]	[17,940]
EBIT	610	5,657
	[169]	[770]
Taxes	64	420
	[18]	[40]
Taxes/Payroll	0.162	0.163
	[0.064]	[0.036]
Number of firms	11,325	2,752

International Payments
(Sample with Total Payments > 0)

	Domestic firms	Multinational firms
Total payments	199	1,446
	[49]	[110]
Royalties	95	435
	[0]	[0]
Interests	30	512
	[0]	[0]
Services	57	330
	[1]	[6]
Other	16	169
	[0]	[0]
Number of firms	283	1,136

Variables in thousands of USD, winsorized at the 99th percentile. Medians in brackets. Year 2010.

▸ Table with S.D. ▸ Back

Income Tax Data
(Full Sample)

	Domestic firms	Multinational firms
Domestic sales	5,509	35,443
	(15,537)	(63,234)
	[1,824]	[8,883]
Payroll	881	4,577
	(2,355)	(7,521)
	[306]	[1,495]
Assets	10,834	121,904
	(48,272)	(262,342)
	[2,115]	[17,940]
EBIT	610	5,657
	(2,746)	(13,201)
	[169]	[770]
Taxes	64	420
	(219)	(1,028)
	[18]	[40]
Taxes/Payroll	0.162	0.163
	(0.330)	(0.395)
	[0.064]	[0.036]
Number of firms	11,333	2,755

International Payments
(Sample with Payments > 0)

	Domestic firms	Multinational firms
Total payments	199	1,446
	(554)	(5,977)
	[49]	[110]
Royalties	95	435
	(278)	(1,673)
	[0]	[0]
Interests	30	512
	(356)	(4,669)
	[0]	[0]
Services	57	330
	(191)	(1,065)
	[1]	[6]
Other	16	169
	(200)	(2,038)
	[0]	[0]
Number of firms	283	1,136

Variables in thousands of USD, winsorized at the 99th percentile. Standard deviations in parentheses, medians in brackets. Year 2010.

Back

Impact on Tax Payments: Regression Equation

Difference-in-differences specification:

$$\frac{y_{it}}{w_{it}} = \beta_1 \times T_i + \beta_2 \times I[Post] + \beta_3 \times T_i \times I[Post] + \beta_4 \times X_{it} + \upsilon_i + \varepsilon_{it},$$

- y_{it} = e.g., tax paid by firm i in year t, scaled by payroll w_{it}
- $I[Post] = 1$ from 2011 onward
- X_{it} = vector of controls
- υ_i = firm fixed effects
- Standard errors clustered at the firm level. All variables winsorized at 99th percentile

Event study specification:

- 2009: baseline year
- 2010: placebo year
- 2011: first post-treatment year

Back

Domestic Sales: Difference-in-Differences Estimation

	Multinational vs. domestic firms
Panel A: Up to 2013	
Post × treated	0.208
	(0.292)
Effect in % change	1.70 %
Panel B: Up to 2014	
Post × treated	0.203
	(0.289)
Effect in % change	1.66 %
Panel C: Up to 2015	
Post × treated	0.303
	(0.301)
Effect in % change	2.47 %
Mean outcome of treated firms in 2009	12.248
Number of treated firms	2,752
Number of control firms	11,325

▸ Back

Welfare

- To implement penalties F_2 tax authority requires γF_1 compliance
- Effect of information monitoring on welfare is:

$$\underbrace{\Delta\Pi}_{\substack{\uparrow \text{Compliance Costs} \\ \downarrow \text{Profit Shifting}}} + \lambda[\ \underbrace{-\Delta a}_{\substack{\uparrow \text{Admin} \\ \text{Costs}}} + \underbrace{tN^C\Delta\tilde{\pi}}_{\substack{\downarrow \text{Profit} \\ \text{Shifting}}} - \underbrace{\Delta N^C(\tilde{\pi}^I - \tilde{\pi}^C)}_{\substack{\uparrow \text{Share using} \\ \text{Tax preparers}}}]$$

- Effective reforms increase expected penalties with little compliance
  - This happens when γ is small

Back

Centralization of Cost Centers (up to 2014)

Affiliate vs non-affiliate payments

Countries with affiliates to which firms make payments

	(1) All	(2) Tax havens	(3) Non tax havens	(4) Royalties	(5) Interests	(6) Services	(7) Other
Post × affiliate	-0.287***	-0.002	-0.285***	-0.017	0.016	-0.165***	-0.060***
	(0.072)	(0.008)	(0.069)	(0.035)	(0.014)	(0.052)	(0.018)
Affiliate	-0.687***	-0.022**	-0.665***	-0.182***	-0.023	-0.637***	-0.006
	(0.121)	(0.009)	(0.116)	(0.044)	(0.024)	(0.108)	(0.013)
Firm × year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,696	13,696	13,696	13,696	13,696	13,696	13,696
Number of firms	856	856	856	856	856	856	856
Pre-treatment average affiliates	1.050	0.022	1.028	0.332	0.093	0.473	0.095
Pre-treatment average non-affiliates	1.689	0.051	1.638	0.436	0.126	1.110	0.097

Back

Centralization of Cost Centers (up to 2015)

Affiliate vs non-affiliate payments

Countries with affiliates to which firms make payments

	(1) All	(2) Tax havens	(3) Non tax havens	(4) Royalties	(5) Interests	(6) Services	(7) Other
Post × affiliate	-0.379***	-0.006	-0.372***	-0.026	0.021	-0.223***	-0.074***
	(0.076)	(0.009)	(0.073)	(0.035)	(0.014)	(0.053)	(0.019)
Affiliate	-0.687***	-0.022**	-0.665***	-0.182***	-0.023	-0.637***	-0.006
	(0.121)	(0.009)	(0.116)	(0.044)	(0.024)	(0.108)	(0.013)
Firm × year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15,408	15,408	15,408	15,408	15,408	15,408	15,408
Number of firms	856	856	856	856	856	856	856
Pre-treatment average affiliates	1.050	0.022	1.028	0.332	0.093	0.473	0.095
Pre-treatment average non-affiliates	1.689	0.051	1.638	0.436	0.126	1.110	0.097

Back

1. Growth in the Tax Advisory Industry

- The reform was a large boon to the tax advisory industry, increasing the number of experts working in transfer-pricing consulting twelve-fold within three years.

"There was very little demand for such services prior to the reform. Before the reform, the companies did little or nothing about transfer pricing, neither with external support nor internally. After the reform, the compliance cost for firms increased. It's not that clients often moved from smaller consulting firms to the Big Four. Most clients were newly taking outside council for this."

Big 4 consultant

"For the tax advisors, this whole thing is great. In 2011, we were a team of two. Now, we are 26."

Big 4 consultant

Back

2. Demand for Compliance Support

- The strong surge in demand was initially led by the complexity of the new reporting requirements, which drove many multinationals to seek compliance support from specialized consulting services.

"The big majority of multinationals contracted the consultants for the new transfer-pricing tax annex. Some did it in-house in the beginning, but it was done poorly, and they received complaint notices from the tax authority. Following this, these firms also started relying on consultants."

In-house consultant

"People need experts to have comparable benchmark databases that only the Big Four have. They also know how to classify transactions etc."

Big 4 consultant

Back

3. Complementarity of Compliance Support and Tax Planning Services

- There are complementarities between compliance support and tax planning services. Tax consultants had incentives to up-sell clients on additional tax planning services, and the marginal cost of such planning was lower, once the fixed costs of organizing the books for compliance had been paid.

"In the first years, companies were only focused on compliance. We told them every year about tax planning services. For example 'You are losing a lot of money in this transaction.' And sooner or later, they started to make changes to their transfer prices. Consulting firms see tax planning as a growth opportunity, so they focus on selling tax planning."

Big 4 consultant

"Because the firms were so ignorant and unorganized before, they did not even realize that they left money on the table. The better one knows the company, the more one learns more 'efficient' ways to deal with taxes".

Big 4 consultant

Back

4. Supply Response

- The supply response was very elastic because the advisory industry was able to respond quickly to this demand shock by reallocating international experts to Chile and then training the next generation of local advisors.

"At the beginning, all the tax planning experts were foreigners in the Big Four. We brought in the seniors from abroad, Argentina, Venezuela, and Colombia, and then recruited assistants who were Chilean. Today [2021] about 40% of the senior transfer pricing experts are Chileans."

In-house consultant

"The transfer pricing partners (of the Big Four) were all foreigners. Still many of the partners are today. The advantage for transfer pricing specialists is that the rules are international, so people can move around."

Big 4 consultant

Back

5. Centralization of Cost Centers

- An important piece of tax planning advice was to centralize cost centers in fewer locations (optimized both from a tax-efficiency and business perspective) - a pattern that we can confirm in the quantitative data.

"Many companies started to centralize several activities, for example, instead of having a distributor present in all the countries, they order from one optimally-chosen location."

Big 4 consultant

"Centralizing cost centers is very common, not only from the point of view of taxes, but efficiency in general."

In-house consultant

Back

6. Fighting a Losing Battle

- Tax administrators are outmatched by consulting firms both in the number of transfer pricing staff and their salaries, and there is a recurring pattern of revolving doors cycling transfer pricing experts between the two sectors. Consulting firms see additional enforcement actions by the government as a business opportunity.

"There are many many more people in the consulting firms, and they are better trained than the team in the tax authority."

Big 4 consultant

"The guy who wrote the regulation for Chilean transfer-pricing reform was subsequently hired for a very high salary by a Big Four."

Consultant of a small firm

"The Big Four of course benefit when the tax authority audits. The more audits, the better it is for the Big Four."

Big 4 consultant

Back