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An Australian study of cross-border profit shifting channels

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Motivation and Overview

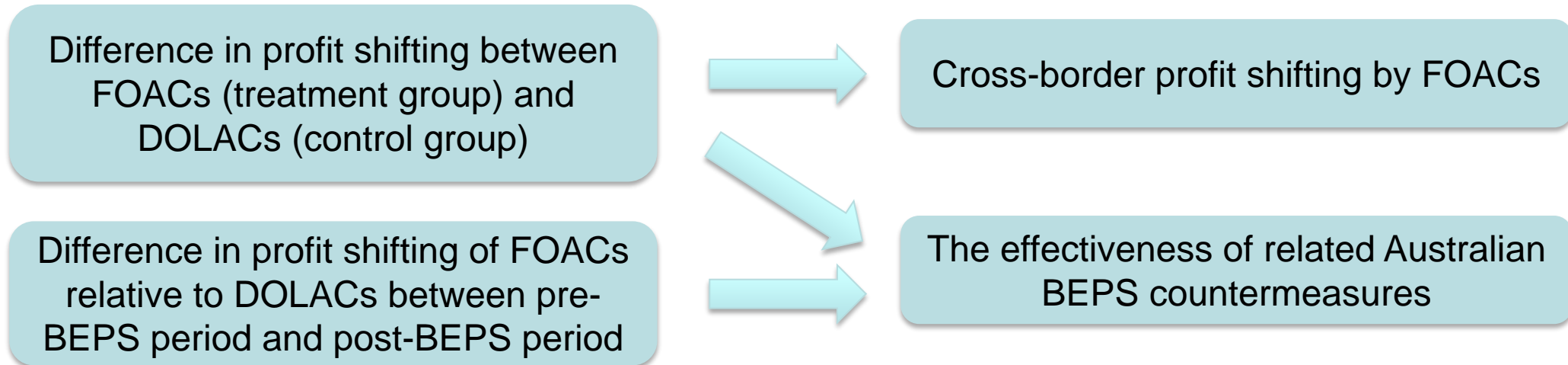
- Previous tax studies have critically evaluated the Base Erosion and Profit Shifting (BEPS) Project of the OECD and some BEPS countermeasures from the legal and regulatory perspectives.
- **The impact of BEPS activities and the real effect BEPS countermeasures remain to be quantified by empirical studies (OECD, 2015).**
- We investigate:
 1. whether cross-border profit shifting happens in Australia, focusing on:
 - **tax-motivated intra-group transfer pricing** and
 - **debt/interest expense loading;**
 2. whether Australian BEPS countermeasures targeting these two channels are effective in reducing cross-border profit shifting out of Australia.

Overview of Measurement

- **In the first stage:** we adopt an **identification strategy** that relies on **the differences in profit shifting between foreign-owned Australian companies (FOACs) and mainly domestic-owned listed Australian companies (DOLACs)** to measure the extent of cross-border profit shifting by Australian subsidiaries of foreign MNEs (i.e. FOACs) through the two specific channels.
- The extent of cross-border profit shifting by FOACs in Australia is estimated by **comparing a set of financial ratios of FOACs with those of DOLACs.**

Overview of Measurement

- In the second stage: we adopt a **difference-in-differences approach** to estimate whether and to what extent cross-border profit shifting by FOACs is reduced in the period after the implementation of related BEPS countermeasures (i.e. **the post-BEPS period from 2013 to 2020**).



Hypotheses Development

- Under the Australian dividend imputation system, DOLACs and FOACs exhibit **distinct attitudes towards avoidance of Australian corporate income tax.**
- DOLACs (with $\leq 20\%$ foreign ownership) have **little incentives** to avoid Australian income tax as corporate income tax can reduce the personal income tax of Australian resident shareholders;
- FOACs have **strong incentives and opportunities** to shift profits out of Australia to reduce their Australian income tax as their foreign shareholders cannot enjoy the full benefits of dividend imputation system.

Tax-motivated Transfer Pricing

- If FOACs use suppressed selling prices or inflated purchase prices in related party transactions to shift profit, they will have **a lower gross profit to sales revenue ratio** than DOLACs.

H1a: After matching firm size and industry, FOACs have a lower gross profit to sales ratio than that of comparable DOLACs in the pre-BEPS period.

- If FOACs use royalties, management fees and other non-financial expenses in related party transactions to shift profit, they will have **a lower earnings before interest and tax, or EBIT, to sales revenue ratio** than DOLACs.

H1b: After matching firm size and industry, FOACs have a lower EBIT to sales ratio than that of comparable DOLACs in the pre-BEPS period.

Hypotheses Development

- FOACs could also use intra-group debt financing and/or interest expense loading.
- Under such scheme, FOACs' heavy debt financing and/or inflated interest rates are manifested in **higher net interest expense to sales ratio** and/or **higher leverage ratio** than those of DOLACs.

***H1c:** After matching firm size, industry and capital intensity, FOACs have a higher net interest expense to sales ratio than that of comparable DOLACs in the pre-BEPS period.*

***H1d:** After matching firm size, industry and capital intensity, FOACs have a higher leverage ratio than that of comparable DOLACs in the pre-BEPS period.*

Hypotheses Development

- Cross-border profit shifting activities of FOACs through two profit shifting channels are likely to result in **reduced accounting profit before tax** in Australia and **reduced income tax expense** reported in their financial statements.

***H1e:** After matching firm size and industry, FOACs have a lower profit before tax to sales ratio than that of comparable DOLACs in the pre-BEPS period.*

***H1f:** After matching firm size and industry, FOACs have a lower income tax expense to sales ratio than that of comparable DOLACs in the pre-BEPS period.*

Hypotheses Development

Relevant Australian BEPS countermeasures are expected to reduce the extent of cross-border profit shifting by FOACs through these two channels.

- **Legal perspective:** Comprehensive transfer pricing rules and tightened thin capitalisation rules tackle the two major profit shifting channels and expand the reach of Australian tax law.
- **Capital market perspective:**
 - Corporate social irresponsibility.
 - Reputation losses and negative consumer reactions.
 - Stock crash risks.

Hypotheses Development

H2a: *The post-BEPS change in gross profit to sales ratio for FOACs is more positive (or less negative) than that for comparable DOLACs.*

H2b: *The post-BEPS change in EBIT to sales ratio for FOACs is more positive (or less negative) than that for comparable DOLACs.*

H2c: *The post-BEPS change in net interest expense to sales ratio for FOACs is more negative (or less positive) than that for comparable DOLACs.*

H2d: *The post-BEPS change in leverage ratio for FOACs is more negative (or less positive) than that for comparable DOLACs.*

H2e: *The post-BEPS change in profit before tax to sales ratio for FOACs is more positive (or less negative) than that for comparable DOLACs.*

H2f: *The post-BEPS change in income tax expense to sales ratio for FOACs is more positive (or less negative) than that for comparable DOLACs.*

Study Period and Sample

- Study period – 14 years from 2007 to 2020: the six years from 2007 to 2012 is the pre-BEPS period; the eight years from 2013 to 2020 is the post-BEPS period. **The dividing line is 2013.**
- The population of interest is foreign-owned Australian companies (FOACs): they are Australian subsidiaries of foreign multinationals.
- DOLACs serve as the control group for comparison to detect cross-border profit shifting by FOACs. DOLACs are mainly domestic-owned listed Australian companies with *foreign ownership no more than 20 percent*.

Application of Two Matching Techniques

- To achieve a fair comparison in profit shifting between FOACs and DOLACs, we employ **propensity score matching (PSM)** to match each FOAC to a DOLAC with the closest propensity score.
- Matching variables include firm size, industry affiliations, year and capital intensity (only in the case of debt financing/interest expense loading).
- Acknowledging the weakness of PSM, we also adopt **coarsened exact matching (CEM)** as an alternative matching technique. We adopt two alternative options in the application of CEM: **CEM (weighted)** and **CEM (k-to-k)** when conducting the matching.

Advantages of matching FOACs with DOLACs

- The use of matching either by PSM or CEM allows us to rule out alternative explanations (i.e. non-tax factors) leading to the differences in financial ratios between FOACs and DOLACs that we use to detect profit shifting.
- Non-tax factors can be firm size (e.g. economies of scale), industry affiliation, year, and capital intensity.
- Confounding factors that effect profitability, leverage, etc. are supposed to be same for both FOACs and their matched DOLACs.

Measurements of Outcome Variables

Profit shifting channels	Description	Outcome variables (Financial ratios)
Tax-motivated transfer pricing	By suppressing the sales prices or inflating the purchases prices in related party transactions with affiliates overseas	Gross profit to sales revenue ratio (<i>GrosProfR</i>)
	By manipulating expenses in the form of royalty payments for the use of intellectual properties, payments of management fees, etc. to related parties overseas	Earnings before interest and tax to sales revenue ratio (<i>EBITR</i>)
Tax-motivated debt financing/interest expense loading	By financing with high level of debts (including intra-group debts)	Leverage ratio (<i>Lev1, Lev2, Lev3</i> and <i>Lev4</i>)
	By financing with high level of debts and/or charging inflated interest rates	Net interest expense to sales revenue ratio (<i>NFinExpR</i>)
Results of profit shifting arrangements of FOACs	Reduced accounting profit before tax	Profit before tax to sales revenue ratio (<i>ProfBTaxR</i>)
	Reduced tax expense	Tax expense to sales revenue ratio (<i>TaxExpR</i>)

Regression Models – Tax-motivated Transfer Pricing

$$GrosProfR = \beta_0 + \beta_1 FOAC_i + \beta_2 PostBEPS + \beta_3 FOAC_i \times PostBEPS + \beta_{4-21} Ind_i + \beta_{22} Size_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$EBITR = \beta_0 + \beta_1 FOAC_i + \beta_2 PostBEPS + \beta_3 FOAC_i \times PostBEPS + \beta_{4-21} Ind_i + \beta_{22} Size_{i,t} + \varepsilon_{i,t} \quad (2)$$

Two financial ratios capture tax-motivated intra-group transfer pricing. Tax-motivated transfer pricing leads to **reduced gross profit margin** and **reduced operating profit margin**.

An indicator variable, *FOAC*, takes value of “1” if the company is a FOAC, and “0” otherwise. The coefficient of this indicator captures the differences in *GrosProfR* or *EBITR* between FOACs and DOLACs in the pre-BEPS period. The regression coefficient of *FOAC* is expected to be **negative**.

An indicator variable for post-BEPS period. Its regression coefficient captures the change in *GrosProfR* or *EBITR* for DOLACs between the pre-BEPS period and the post-BEPS period.

The coefficient of this interaction term captures **the incremental effect of the implementation of relevant BEPS countermeasures on tax-motivated transfer pricing by FOACs**.

When $PostBEPS = 0$, FOACs’ transfer pricing behaviours are captured by β_1 . When $PostBEPS = 1$, FOACs’ transfer pricing behaviours are captured by $\beta_1 + \beta_3$, where β_3 is the incremental effect of BEPS countermeasures on transfer pricing. β_3 is expected to be **positive**.

Empirical Results–Tax-motivated Transfer Pricing

Table 6
Summary of Regression Results
(p-value is reported in the parentheses below the regression coefficient)

	OLS (clustered)		PSM		CEM (k-to-k)		CEM (weighted)	
	<i>FOAC</i>	<i>FOAC</i> × <i>Post</i> <i>BEPS</i>	<i>FOAC</i>	<i>FOAC</i> × <i>PostB</i> <i>EPS</i>	<i>FOAC</i>	<i>FOAC</i> × <i>Pos</i> <i>tBEPS</i>	<i>FOAC</i>	<i>FOAC</i> × <i>Post</i> <i>BEPS</i>
<i>GrosProfR</i>	-0.03661	0.00555	-0.05294	-0.00214	-0.04893	-0.00441	-0.05133	0.01225
(p-value)	(0.019)	(0.626)	(0.005)	(0.909)	(0.008)	(0.766)	(0.002)	(0.401)
No. of Obs	6,111		1,930		3,144		5,282	
<i>EBITR</i>	-0.03508	-0.00528	-0.04091	-0.01502	-0.02943	-0.01391	-0.02549	-0.01076
(p-value)	(0.000)	(0.448)	(0.000)	(0.121)	(0.003)	(0.164)	(0.011)	(0.265)
No. of Obs	6,553		2,486		3,346		5,390	

Empirical Results–Debt Financing/Interest Expense Loading

Table 6
Summary of Regression Results

(p-value is reported in the parentheses below the regression coefficient)

	OLS (clustered)		PSM		CEM (k-to-k)		CEM (weighted)	
	<i>FOAC</i>	<i>FOAC</i> × <i>Post</i> <i>BEPS</i>	<i>FOAC</i>	<i>FOAC</i> × <i>PostB</i> <i>EPS</i>	<i>FOAC</i>	<i>FOAC</i> × <i>Pos</i> <i>tBEPS</i>	<i>FOAC</i>	<i>FOAC</i> × <i>Post</i> <i>BEPS</i>
<i>NFinExpR</i>	0.00836	0.00179	0.00480	0.00372	0.00906	0.00314	0.00525	0.00479
(p-value)	(0.070)	(0.610)	(0.233)	(0.357)	(0.031)	(0.437)	(0.173)	(0.197)
No. of Obs	5,520		2,714		1,584		2,190	
<i>Lev1</i>	-0.01902	0.01921	-0.02562	0.02693	-0.02734	0.03127	-0.03744	0.03618
(p-value)	(0.069)	(0.040)	(0.035)	(0.051)	(0.047)	(0.024)	(0.004)	(0.008)
No. of Obs	8,185		3,860		2,772		4,226	
<i>Lev2</i>	0.01581	0.02059	0.00469	0.02909	-0.01108	0.05236	-0.03290	0.07230
(p-value)	(0.226)	(0.069)	(0.755)	(0.065)	(0.495)	(0.002)	(0.132)	(0.001)
No. of Obs	8,153		4,334		2,766		4,211	
<i>Lev3</i>	-0.00899	0.01331	-0.01095	0.01954	-0.01648	0.02127	-0.03255	0.03388
(p-value)	(0.424)	(0.190)	(0.441)	(0.228)	(0.273)	(0.145)	(0.032)	(0.027)
No. of Obs	8,167		3,064		2,762		4,214	
<i>Lev4</i>	0.11438	-0.00213	0.09911	0.01679	0.10317	0.01939	0.08878	0.01944
(p-value)	(0.000)	(0.859)	(0.000)	(0.409)	(0.000)	(0.264)	(0.000)	(0.347)
No. of Obs	7,889		2,404		2,610		3,930	

Empirical Results—Results of Profit Shifting Arrangements

Table 6
Summary of Regression Results
(p-value is reported in the parentheses below the regression coefficient)

	OLS (clustered)		PSM		CEM (k-to-k)		CEM (weighted)	
	<i>FOAC</i>	<i>FOAC</i> × <i>Post</i> <i>BEPS</i>	<i>FOAC</i>	<i>FOAC</i> × <i>PostB</i> <i>EPS</i>	<i>FOAC</i>	<i>FOAC</i> × <i>Pos</i> <i>tBEPS</i>	<i>FOAC</i>	<i>FOAC</i> × <i>Post</i> <i>BEPS</i>
<i>ProfBTaxR</i>	-0.02764	-0.00816	-0.03253	-0.01082	-0.02729	-0.00560	-0.02185	-0.00870
(p-value)	(0.001)	(0.257)	(0.002)	(0.313)	(0.005)	(0.565)	(0.021)	(0.350)
No. Obs	6,353		2,292		3,260		5,215	
<i>TaxExpR</i>	-0.00536	0.00192	-0.00707	0.00083	-0.00813	0.00122	-0.00742	0.00176
(p-value)	(0.023)	(0.413)	(0.036)	(0.816)	(0.002)	(0.655)	(0.006)	(0.493)
No. Obs	6,812		2,802		3,732		5,868	

Empirical results–Effectiveness of BEPS countermeasures

- Regression coefficients of the interaction between *PostBEPS* and *FOAC* are not statistically significant across models with different outcome variables and with different matching techniques.
- Up to 2020, we cannot find any evidence to support the hypotheses that the Australian BEPS countermeasures are effective in reducing cross-border profit shifting by FOACs through the two profit shifting channels.
- We argue that empirical results reported above are **robust** because the results are quite consistent across models that use different matching techniques and **even after breaking down the post-BEPS period by years in an additional test.**
- The results of a **further test (adopting an alternative difference-in-differences design)** are also consistent with the results in the main test.

Discussion of the findings

- We find evidence for the existence of cross-border profit shifting by FOACs via the two profit shifting channels: intra-group transfer pricing and interest expense loading throughout the entire 14-year study period.
- For every dollar of sales revenue earned, FOACs **report less profits before tax** in Australia and thus **incur less income tax expense** than comparable DOLACs do due to their profit shifting arrangements.

Discussion of the findings

- The lack of evidence for the effectiveness of the related BEPS countermeasures up to 2020 might be explained by the following points:
 - Current transfer pricing rules and thin capitalisation rules have limitations;
 - Law enforcement or administrative time lags exist.
- **It may be premature for us to conclude that the relevant BEPS countermeasures adopted by the Australian Parliament are not effective.**

Contributions of this study

- We extend the existing literature by using the differences in financial ratios between FOACs and DOLACs as a source of identification of cross-border profit shifting using two channels.
- We use two different matching methods and two difference-in-differences designs to enhance the credibility of our findings.
- We investigate the extent of profit shifting activities of foreign multinationals in the Australian context.
- Our study period is long, including a pre-BEPS period and a post-BEPS period, which allows us to assess whether the Australian BEPS countermeasures are effective.



Thanks for your listening!

Suggestions and comments are welcomed.