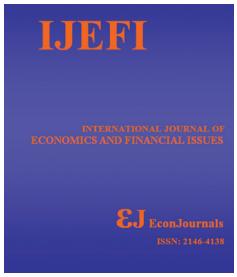

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Does Foreign Capital Increase Tax Revenue: The Turkish Case*

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ABSTRACT

We examine the effect of the foreign direct investment (FDI) on taxes paid for Turkey with a special focus on the differentials between firms operating with different technology levels. We utilize a comprehensive dataset for Turkish manufacturing firms over 2004-2012 period and employ generalized method of moments methodology. The results of the study confirm that foreign affiliation increase the taxes paid by the firms. We find a bigger impact of FDI on taxation for high-technology firms than medium or low technology firms.

Keywords: Foreign Direct Investment, Tax Revenue, and Generalized Method of Moments
JEL Classifications: D22, H2, F23

1. INTRODUCTION

Cross-border flows of foreign direct investment (FDI) have been one of the core features of the globalization process over the last decades. The world economy has seen a significant growth in FDI so that the global inflows of FDI increased from approximately USD 204 billion in 1990 to USD 12 trillion in 2014 (UNCTAD, 2015). Such remarkable growth in FDI flows can be attributed to the policies that attract cross-border investment from multinational corporations (MNC). The arguments in favor of creating incentives for FDI are based on the direct and indirect effects of FDI on host countries. The presence of MNCs are expected to bring additional capital, boost production capacity, enhance technology diffusion and transfer knowledge in terms of production and management skills. As a result, the host economy enjoys a higher welfare level with higher production, trade, productivity and employment levels as well as higher tax revenue (Becker et al., 2012).

Among the various incentives offered by governments to attract multinationals, fiscal incentives, especially taxes play a key role. In fact, recently, there is a tendency of reducing taxes to attract FDI worldwide (e.g., Devereux et al., 2002; Bénassy-Quéré et al., 2005; Loretz, 2008). Empirical evidence also suggests that on average a 1% point increase in the tax rate decreases FDI by 3.7%[1] (OECD, 2008). However, as Becker et al. (2012) states such relationship from taxation to FDI reflects only the quantity effects (i.e., the quantity of assets attracted) not the quality effects (i.e., the effect of FDI on tax revenue and labor income). Becker et al. (2012) define quality effects of taxation on FDI to be the degree to which FDI creates jobs and how it contributes to tax revenue in the receiving country. They further highlight, the actual welfare gains of the host country will depend on the quality effects and, the optimal taxation policies should be designed accordingly.

Most of the studies in the empirical literature focus on the quantity effects of taxation rather than the quality effects. Further, the evidence on the quantity effects is mixed[2]. Despite large number studies indicating a negative relationship between the tax rate and FDI (e.g., Hines, 1996; Cassou, 1997; Gorter and Parikh, 2003), some conclude that the effect of the tax rate is not significant in these decisions (e.g., Slemrod, 1990; Wolff, 2007; Jun, 1994;

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1 This estimate ranges from 0% to 5% in other studies (OECD, 2008). De Mooij and Ederveen (2003) finds that median tax-elasticity of FDI across 25 studies is −3.3.

2 For a survey of the literature (De Mooij and Ederveen, 2003).

Devereux and Freeman, 1995). The relatively scarce evidence on the quality effects quality effects of taxation indicates a positive relationship running from FDI to taxation (e.g., Gropp and Kostial, 2000; Mahmood and Chaudhary, 2013).

Motivated by this idea, the emphasis of this paper is on the quality effects of FDI. The aim of this paper is to provide firm level evidence on the impact of FDI on taxation in Turkey. Specifically, we address the question as to whether FDI has an effect on taxes paid by the firms, by exploiting a comprehensive panel of firms in Turkish manufacturing industry between 2004 and 2012. Furthermore, we identify the differentials for the impact of FDI on firms with different technology levels. For this, we group firms using OECD's classification (2011) as low, middle and high technology firms. Analyzing Turkey over this period provides an interesting case for this setting. Since, being a middle-high income country Turkey has witnessed remarkable FDI inflows over the last decade. Turkey has become one of the main recipients of FDI in its region ranking first among West Asian countries and 11th among developing countries worldwide in 2013 (UNCTAD, 2015).

We contribute to this scarce literature in several ways: First of all, in contrast with the most of the literature that examine this issue with aggregate country-level or industry-level data, we provide firm level evidence on the issue while FDI decisions are typically of firm-level activity. While doing so, we utilize a dynamic approach via generalized methods of moments (GMM) methodology and control for endogeneity issues. We utilize Arellano and Bond (1991)'s difference GMM estimator. A further novel feature of our paper is that we exploit our large dataset by allowing for different effects of FDI on firms operating with different technology levels. Finally, to the best of our knowledge our study is the first to investigate the impact of FDI on the tax revenue for Turkey. The rest of the paper proceeds as follows: Section 2 reviews the literature. Section 3 introduces the data and methodology we employ and, provides the results. Section 4 concludes the paper.

2. LITERATURE REVIEW

The empirical literature has not reached a consensus on the relationship between taxation and FDI. Table 1 provides a summary of findings in recent empirical studies of the effects of various measures of taxation on FDI. Concerning quantity effects of taxation, some of the studies find no impact of tax reduction on FDI (e.g., Cassou, 1997; Gorter and Parikh, 2003). On the other hand, most of the studies confirm a negative relationship between taxation and FDI inflows (e.g., Hartman, 1984; Young, 1988; Swenson, 1994; Wijeweera et al., 2007; Grubert and Mutti, 2000).

The variation in the results partly reflects differences between the industries and countries being examined, or the periods concerned. To illustrate, Pain and Young (1996) analyzes the FDI from Germany and the United Kingdom made in eleven countries between the periods 1977 and 1992. They reach different conclusions for Germany and UK. While the long-run elasticity of FDI with respect to taxes is significantly negative for the UK, it is insignificant for Germany. Analyzing FDI from 11 countries made in 46 locations in the year 1991, Shang-Jin (1997) finds negatively significant long-run elasticity of FDI with respect to taxes. Further, using an aggregated investment demand model Agostini (2007) finds that FDI in manufacturing to be quite sensitive to states' corporate tax rates with a negative semi-elasticity of FDI with respect to taxation. Bellak and Leibrecht (2009) utilize panel gravity models and find a negative relationship between the corporate tax rates and FDI for Central and East Europe Countries. Desai et al. (2004) investigates American MNCs and show that FDI is adversely affected by high tax rates for American multinational firms, and that this association is apparent for all types of taxes. Bénassy-Quéré et al. (2005) show that high relative corporate taxation reduces FDI inflows for 11 OECD countries over the period 1984-2000.

Studying 24 OECD countries, Razin et al. (2005) show that the source-country tax rate works primarily on the selection process whereas; the host-country tax rate affects mainly the magnitude of FDI, once they occur. Varol-İyidoğan and Dalgıç (2015) examine 11 Central and East Europe countries using GMM models and find a negative relationship between taxes and FDI. On the other side, In their analysis for 25 OECD countries with panel gravity models, Beck and Chaves (2012) find that labor income taxes has a positive effect but capital income taxes has a negative effect on FDI.

There exists even less studies exploring the quality effects of taxation, i.e., effects of FDI inflows on taxation. Utilizing a panel data of 19 OECD countries, Gropp and Kostial (2000) find a weak correlation between FDI and corporate income tax and a strong positive impact of FDI inflows on the profit tax and on the total tax revenue. On the other hand, assessing the impact of FDI on Tax Revenue in Pakistan, Mahmood and Chaudhary (2013) show that FDI has a positive impact on tax revenue both in the short-run and the long-run.

3. DATA, METHODOLOGY AND EMPIRICAL RESULTS

We rely on a comprehensive dataset based on two different sources of data on Turkish manufacturing firms over the periods 2004-2012 collected by Turkish State Institute of Statistics (TURKSTAT)[3]. The first one is The Annual Industry and Service Statistics and the second one is Annual Trade Statistics.

i. The Annual Industry and Service Statistics is a census for the firms with more than 19 employees while it is a representative survey for firms with less than 20 employees. Firms are classified according to their main activity, as identified by Eurostat's NACE Rev. 1.1 standard codes for sectoral classification. We select the whole population of private Turkish manufacturing firms with 20 employees or more. We calculate capital stock series of firms applying the perpetual inventory methodology and then estimate total factor productivity using the Levinsohn and Petrin's (2003) methodology. In this semi-parametric approach, demand for

3 These datasets are available under a confidential agreement by which all the elaborations can only be conducted at the Micro-data Research Centre of TURKSTAT.

Table 1: Summary of selected empirical studies

Author	Sample	Methodology	Result
Devereux and Freeman (1995)	7 countries, 1984-1989	GMM analysis	FDI does not effect taxation but taxation effects FDI
Cassou (1997)	7 countries from OECD and USA 1970-1989	Panel data	Negative relationship between taxes and FDI
Gropp and Kostial (2000)	19 OECD countries, 1988-1997	Panel data	Strong correlation FDI inflows on profit tax and total tax revenue
De Mooij and Ederveen (2003)	25 empirical studies	Meta-analysis	Adverse selection between tax rates and FDI
Gorter and Parikh (2003)	All EU countries 1992-1998 period	Panel data	Negative relationship between taxes and FDI
Desai et al. (2004)	American multinational firms 1982, 1989, and 1994	Panel data	Negative relationship between taxes and FDI
Bénassy-Quéré et al. (2005)	11 OECD countries, 1984-2000 period	Panel gravity models	Negative relationship between corporate taxes and FDI
Razin et al. (2005)	24 OECD countries, 1981-1998	Panel data	Negative relationship between taxes and FDI
Agostini (2007)	U.S, for the years 1974, 1980, 1987, 1992, and 1997	Aggregated investment demand model	Negative relationship between taxes and FDI
Wolff (2007)	EU-25, 1994-2003 period	Panel gravity analysis	No impact of tax reduction and FDI
Bellak and Leibrecht (2009)	7 EU, USA and 8 Central and East Europe Countries between 1995 and 2003	Panel gravity models	Negative relationship between taxes and FDI
Feld and Heckemeyer (2011)	46 studies	Meta-analysis	No relation with FDI and taxes
Beck and Chaves (2012)	25 OECD countries 1975-2006	Panel gravity models	Labor income taxes has a positive effect but capital income taxes has a negative effect on FDI
Mahmood and Chaudhary (2013)	Pakistan, 1972-2010	ARDL model	FDI has a positive effect on tax revenue
Varol-İyidoğan and Dalgıç (2015)	11 Central and East Europe Countries	GMM analysis	Negative relationship between taxes and FDI

ARDL: Autoregressive distributed lag models, GMM: Generalized methods of moments, FDI: Foreign direct investment

intermediate inputs are taken as a proxy for the unobserved productivity shocks, while productivity is the residual under the Cobb-Douglas technology with capital and labor taken as inputs

ii. Annual trade statistics: Are collected from customs declarations. The import and export flows are collected for the whole universe of the importers and exporters of goods. Out of this database we first classify the firms according to their trading status. We define the firms engaged in exporting activities as "exporters"; firms engaged in importing activities as "importers."

Table 2: Number of firms and share of foreign affiliated firms over 2004-2012

Year	Number of firms	Foreign affiliated firms (%)
2004	16.443	3.55
2005	18.462	3.46
2006	19.532	3.73
2007	18.481	4.14
2008	17.924	4.49
2009	15.480	3.95
2010	21.076	3.85
2011	22.351	3.41
2012	24.465	3.74

In order to explore the linkages between foreign ownership and taxes paid by the firms; we first classify the firms according to their foreign affiliation. We define firms as foreign affiliated if the share of foreign ownership is positive. Table 2 presents number of total firms and number of foreign affiliated firms in each year over the analysis period. Our unbalanced panel covers longitudinal data of 20,000 firms on average.

Now, we will provide empirical evidence on foreign affiliated firms' tax premia, iw., we search for differentials between domestic and foreign affiliated firms in terms of the amount of the taxes paid. In order to investigate these premia robustly, we need to control for other factors that could impact on taxes paid by the firms. To illustrate, it is well recognized that, on average larger firms are pay larger amount of taxes than smaller firms and foreign affiliated firms are larger than domestic firms. Failing to control for the size of the firms might bias the results in such a way that we can deduct whether the size differentials is the driving force behind the premias. Thus, we estimate the following regression specification:

$$gr\_tax_{it} = \alpha + \beta\, gr\_FDI_{it} + \delta\, Controls + \varepsilon_{it} \quad (1)$$

Where, the subscript i denotes individual firms and t indexes year. The dependent variable gr_tax_{it} measures the growth of total taxes paid by the firm from time $t-1$ to time t. Our main explanatory variable is the growth of foreign ownership share of firm i from time $t-1$ to time t, represented by gr_FDI_{it}. Our interest lies in the value of the coefficient of this variable. The regarding β-coefficient reveals the foreign affiliated firms' average tax premia. That is, it shows the average percentage change in taxes paid when the share foreign ownership increases by 1% while controlling for the firm level characteristics included in the vector of controls. In other words, the regarding β-coefficient reflects the elasticity

of taxed paid with respect to foreign ownership. We employ of number of control variables, which are included in the vector of controls. We control for firm-level productivity (*TFP*), logarithm of number of employees (*EMP*) to measure the scale of operation or size, logarithm of capital intensity (*CAPINT*), logarithm of wage per employee (*WAGE_L*) to measure the scale of operation or size and a dummy variable representing the exporting status of the firm (*EXPDUM*) as well as two-digit sector dummies, region[4] and year dummies.

As a baseline specification Equation (1) is estimated with the pooled ordinary least squares (OLS) methodology. Then, so as to control for unobserved heterogeneity we include firm specific time invariant fixed effects (FEs). Finally, to take the potential endogeneity into account and eliminate unobserved individual effects, we utilize the Arellano-Bond (1991) dynamic GMM estimator in Equation (2). GMM estimator handles firm FEs through differencing. Afterwards, lagged endogenous variables serve as instruments in the level form and lagged exogenous variables are differenced.

$$\Delta gr\_tax_{it} = a\Delta gr\_tax_{it-1} + \beta\, \Delta gr\_FDI_{it} + \delta\, Controls_{it} + \Delta\varepsilon_{it} \quad (2)$$

Table 3 displays the results from the pooled OLS, FE and GMM regressions while the first column corresponds to the outcomes of the standard OLS specification, the second to column presents the results of the FE regressions and the third column corresponds to those for the dynamic specification. The results of the pooled OLS regressions reported in Table 3 show that even after controlling for sector, time, region and firm characteristics (such as productivity, size, etc.), we find a positive and significant coefficient with considerable magnitude for the foreign affiliated firms' tax premia. In particular, we find positively significant tax elasticity so that a 1% increase the foreign ownership is associated with approximately 0.039% increase in taxes paid as a share of total output. In parallel with the literature, we confirm that the more productive, more capital intensive, and the larger the firms are, the more taxes they pay (Gemmel et al., 2010). Wage per employee is surprisingly insignificant. When we control for unobserved heterogeneity, the magnitude of the tax premia coefficients declines significantly in the FE regressions. In fact, the regarding coefficient on premia declines to 0.032 for the growth of share of foreign ownership. Yet, the regarding coefficient is positively statistically significant.

To take possible endogeneity into account, we test a dynamic specification where we include the lagged dependent variable for a robustness check. Such an inclusion may produce biased and inconsistent parameter estimates since firm specific factors may be correlated with these estimates. To avoid this bias, GMM estimators are generally used (Blundell and Bond, 1998; Bond, 2002). We utilize Arellano and Bond (1991)'s difference GMM estimator. We report on the GMM estimations for Equation (2) in Table 3. To check the validity of the instruments, we perform tests for second-order autocorrelation and the Sargan test of over-identifying restrictions. The GMM results are consistent with our previous finding indicating the positive correlation between growth of tax payments and growth of foreign share. Further, the significant coefficient of the lagged dependent variables confirms that a firms' taxation history affects its current behavior.

Table 3: Tax premia regressions (2004-2012)

Variables	OLS	FE	GMM
gr_FDI	0.0392***	0.0322***	0.0312***
	(0.0084)	(0.0075)	(0.0064)
TFP	0.423***	0.348***	0.363***
	(0.0204)	(0.00974)	(0.0109)
EMP	0.151***	0.111***	0.114***
	(0.0426)	(0.0319)	(0.0283)
CAPINT	0.0384***	0.0258	0.0284
	(0.0045)	(0.0190)	(0.0459)
WAGE_L	0.0173	0.0141	0.0147
	(0.0194)	(0.0127)	(0.0194)
$gr\_tax_{(t-1)}$			0.0829***
			(0.0042)
Observations	147,695	147,695	83151

Robust standard errors are given in the parenthesis. The dependent variable is the growth of total taxes paid over total revenue (*gr_tax*) asterisks denote significance levels (***P<1%). All regressions include region, sector, export and year dummies as well as total factor productivity (*TFP*), logarithm of capital intensity (*CAPINT*), logarithm of wages per employee (*WAGE_L*) and logarithm of firms' number of employees (*Employee*) as controls. In the GMM specification, we cannot reject the validity of the instruments and that the null hypothesis of "there is no second degree auto-correlation." OLS: Ordinary least squares, FE: Fixed effects, GMM: Generalized methods of moments

Arguably, firms operating with higher technology levels may react differently to an inflow of FDI than firms operating with lower technology levels in terms of tax payments. Following the OECD (1997) approach in classifying manufacturing industries according to technology intensity, we divide manufacturing sectors into low, medium and high technology industries[5]. We therefore split our sample into firms operating in low technology industries, middle technology industries and high-technology technology industries. We then separately estimate Equation (2) for each group of firms. Estimates support the assumption of inappropriate pooling and show different evidence for the three groups of firms. The estimated results are summarized in Table 4. The estimated coefficients presented in Table 4 indicate that the coefficient of tax premia is positive and significant for all of the technology groups. This suggests that, irrespective of the level of technology, the presence of foreign ownership stimulates tax revenue. Still, foreign affiliated firms' tax premia vary considerably with the level of its technology. The results indicate that impact of FDI on taxation is more pronounced for high-technology firms than medium or low technology firms.

4. CONCLUSION

In the light of the globalization and economic integration, FDI is increasingly being acknowledged as a key factor in the development process of economies. FDI is recognized to bring about new capital, to facilitate knowledge transfers in terms of information and technology as well as easing the access to

4 The region dummies identify the 12 Turkish regions distributed according to the NUTS 2 classification.

5 See Appendix Table 1 for the detailed list of these industries.

Table 4: Tax premia GMM regressions w.r. to technology levels (2004-2012)

Variables	LOW	MEDIUM	HIGH
$gr\_tax_{(t-1)}$	0.0810***	0.0715***	0.0889***
	(0.00522)	(0.00522)	(0.00881)
gr_FDI	0.0294***	0.0309***	0.0357***
	(0.0064)	(0.0065)	(0.0068)
TFP	0.264***	0.290***	0.471***
	(0.0160)	(0.0145)	(0.0321)
lnEMP	0.0753	0.111***	0.121***
	(0.0502)	(0.0319)	(0.0324)
lnCAPİNT	0.0157	0.0272	0.0329
	(0.0364)	(0.0387)	(0.0626)
lnWAGE_L	0.0117	0.0152	0.0168
	(0.0112)	(0.0174)	(0.0126)
Observations	45765	20799	16587

Robust standard errors are given in the parenthesis. The dependent variable is the growth of total taxes paid over total revenue (*gr_tax*) Asterisks denote significance levels (***P<1%). All regressions include region, sector, export and year dummies as well as total factor productivity (*TFP*), logarithm of capital intensity (*CAPINT*), logarithm of wages per employee (*WAGE_L*) and logarithm of firms' number of employees (*EMP*) as controls. In the GMM specification, we cannot reject the validity of the instruments and that the null hypothesis of "there is no 2nd degree auto-correlation". GMM: Generalized methods of moments

international markets. As FDI is shown to promote economic growth and employment (hence domestic income), more and more countries are seeking to attract FDI. In particular, countries are offering tax intensives and developing fiscal policies to ensure their attractiveness to inbound investment. Although such intensives negatively impacts on the total tax revenue directly, the resulting increase in domestic income from FDI creates additional tax revenue from the taxation of wages and profits of foreign-owned companies. Policy makers thus, try to ensure that an adequate domestic tax is collected from multinational enterprises.

Most of the empirical literature focuses on how to attract FDI and studies the relationship from taxation to FDI reflecting only the quantity effects (i.e., the quantity of assets attracted). In contrast, we try to shed light on the quality effects (i.e., the effect of FDI on tax revenue and labor income) of FDI for a developing country Turkey over 2004-2012. Turkey is an interesting case to study as with a striking growth performance during the analysis period, it has integrated into the globalized world, while transforming into one of the major recipients of FDI in its region.

We utilize a rich panel firm level data set for the Turkish manufacturing firms and analyze the relationship between FDI and taxation running from FDI to taxes. We particularly check whether such quality effects vary with level of the technology of the industry that the firms' operate. In order to control for possible endogeneity, we employ GMM specification and utilize Arellano and Bond (1991)'s difference GMM estimator.

We find evidence for the quality effects so that the growth of foreign ownership positively affects the growth of taxes paid by the firm. In particular, we find a bigger impact of FDI on taxation for high-technology firms than medium or low technology firms. Our results suggest that when determining the optimal tax rates to attract FDI, policy-makers should not only be concerned about the quantity effects and elasticity's of FDI with respect to tax rates. The quality effects and the additional tax revenue from the taxation of wages and profits of multinationals should also be taken into account in designing policies.

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APPENDIX

Appendix Table 1: OECD Classification of Manufacturing by Technology Intensity (1997)

High-technology industries (HIGH)
Aircraft and spacecraft
Pharmaceuticals
Office, accounting and computing machinery
Radio, television and communication equipment
Medium-high-technology industries (MEDIUM)
Electrical machinery and apparatus, n.e.c.
Motor vehicles, trailers and semi-trailers
Chemicals excluding pharmaceuticals
Railroad equipment and transport equipment, n.e.c.
Machinery and equipment, n.e.c.
Medium-low-technology industries (MEDIUM)
Coke, refined petroleum products and nuclear fuel
Rubber and plastic products
Other non-metallic mineral products
Building and repairing of ships and boats
Basic metals
Fabricated metal products, except machinery and equipment
Low-technology industries (LOW)
Manufacturing, n.e.c. and recycling
Wood, pulp, paper, paper products
Printing and publishing
Food products, beverages and tobacco
Textiles, textile products
Leather and footwear