FDI spillovers in the presence of political connections: Evidence from Bulgaria

Marc Schiffbauer [*] Dea Tusha[†]

Preliminary Draft (November 2024)

Abstract

This paper investigates the impact of political connections (PC) on the productivity spillovers from Foreign Direct Investment (FDI) in Bulgaria. Political connections are known to provide firms with exclusive advantages, such as market share expansion and access to finance, which may hinder overall economic efficiency. Using firm-level Orbis data for Bulgaria in 2011-2018 and combining it with novel data on politically connected firms in the country, we study the effect of FDI, political connections and their interactions for manufacturing and non-manufacturing firms in the private sector. We find that while FDI generates positive spillovers for domestic firms in terms of backward linkages, the presence of politically connected firms in downstream industries significantly erodes productivity in upstream manufacturing industries. In non-manufacturing industries, politically connected firms have a negative effect on the productivity of firms in the same industry and in downstream industries. This suggests that PC firms may negatively impact the competitiveness of their suppliers or buyers through rent-seeking behaviors and holdup problems. Interestingly, we find no evidence that political connections alter how firms benefit from FDI, indicating that political connections primarily affect firms' productivity through their position in the supply chain. The study highlights the importance of addressing the negative externalities generated by politically connected firms along the value chain.

JEL Classification: F21, O17, D73, L14, L22

Keywords: FDI spillovers, politcal connectedness, productivity, competitiveness, Bulgaria.

[1]The World Bank, Vienna, Austria. Email: mschiffbauer@worldbank.org.

[2]**Corresponding Author.** University of Groningen, The Netherlands. Email: d.tusha@rug.nl. Telephone number: +31626796607

1 Introduction

Political connections—defined as formal or informal ties between firms and individuals in positions of political power—are a pervasive feature of global economies. Such connections can profoundly shape market dynamics, firm behavior, and macroeconomic outcomes. Empirical evidence underscores their prevalence, especially in countries characterized by high levels of corruption and low openness to foreign direct investment (FDI) (Faccio, 2006). This paper explores the intersection of political connections and FDI spillovers, focusing on how politically connected (PC) firms influence productivity outcomes within industries and along value chains. We contribute to the growing literature by examining whether political connections amplify or diminish the potential benefits of FDI in host economies.

Literature has shown that political connections can confer significant advantages on firms. Faccio (2006) finds that political connections increase corporate value, particularly in environments where corruption is prevalent, and institutional barriers are high. Firms with such ties often gain exclusive access to regulatory, financial, and market advantages unavailable to their competitors. Rijkers et al. (2015, 2017) document that politically connected firms in Tunisia evaded import tariffs and benefited from exclusive policy privileges. Similarly, Fisman (2013) finds that politically connected firms are often exempted from stringent regulatory standards, allowing them to operate under looser constraints than their competitors.

Another important channel through which firms can benefit from political connections is access to financial resources. Politically connected (PC) firms tend to have better access to credit, often securing loans on favorable terms despite exhibiting higher default rates (Cull and Xu, 2005; Faccio et al., 2006). Claessens et al. (2006) show that such firms are more likely to be bailed out during periods of financial distress, reducing their risk exposure and enhancing their market resilience. Diwan (2015) further identifies that PC firms frequently receive government subsidies, which bolster their market positions but distort resource allocation. Together, these advantages may give PC firms market dominance and potentially crowd out more efficient competitors.

While political connections offer substantial benefits to connected firms, their broader economic consequences are often detrimental. By diverting resources toward rent-seeking activities and away from productive investments, PC firms contribute to resource misallocation (Faccio and McConnell, 2023). Such distortions can stifle competition, inhibit innovation, and reduce overall economic effi-

ciency. Francis et al. (2018) provide evidence that politically connected firms are less likely to engage in innovative activities, choosing instead to allocate resources toward lobbying and securing privileges. This divergence undermines the broader benefits of competitive markets, leading to stagnation in productivity growth.

Furthermore, the performance of PC firms themselves is not uniformly positive. While some studies find that political connections enhance profitability (Ramalho, 2003; Boubakri et al., 2009; Earle and Gehlbach, 2015), others suggest that they can result in inefficiencies. Faccio (2007, 2010) and Bertrand et al. (2018) show that PC firms often exhibit lower returns on assets, particularly when politically connected individuals wield significant decision-making power. La Rocca et al. (2022) argue that such firms are prone to inefficiencies stemming from misaligned incentives and over-reliance on political rents, rather than competitive market strategies.

FDI is widely recognized as a key driver of economic development, offering host countries access to advanced technologies, managerial expertise, and global networks. These benefits often manifest through spillover effects, where domestic firms experience productivity gains due to their interactions with foreign firms. The literature identifies several channels for these spillovers. Supply chain linkages, where domestic firms become suppliers to foreign multinationals, are among the most robustly documented channels (Javorcik, 2004; Blalock and Gertler, 2008). Alfaro-Urena et al. (2022) provide recent evidence from Costa Rica, demonstrating that domestic firms significantly improve their productivity through direct interactions with foreign buyers.

A second channel for spillovers, especially for firms in the same industry as FDI firms, is competition. The entry of foreign firms into domestic markets often intensifies competition, compelling domestic firms to innovate and adopt more efficient practices (Aitken and Harrison, 1999). However, the effects of competition-induced spillovers are mixed. While some firms respond positively, others may be displaced or fail to adapt to the new competitive environment. Evidence on within-industry (horizontal) spillovers is particularly ambiguous. Gorodnichenko et al. (2021) find that productivity spillovers depend heavily on the absorptive capacity of domestic firms, including their ability to assimilate and apply new technologies.

Despite the rich literature on both political connections and FDI spillovers, the interplay between these two phenomena remains underexplored. Political connections may alter the competitive dynamics necessary for FDI spillovers to materialize. For example, PC firms could dilute the competitive pres-

sure exerted by foreign entrants, either by leveraging their political influence to secure protectionist policies or by engaging in predatory practices that undermine market competition. Rijkers et al. (2015, 2017) find that such practices distort resource allocation, which could erode the potential benefits of FDI by preventing efficient resource reallocation within industries.

Moreover, PC firms may distort the supply chain linkages that facilitate FDI spillovers. Alfaro et al. (2014) argue that the quality of local institutions plays a crucial role in determining the extent of FDI spillovers. In environments dominated by politically connected firms, institutional distortions could limit the ability of domestic firms to engage productively with foreign multinationals.

While there have been some recent studies exploring the relationship between political connections and FDI, they have focused either on Outward Foreign Direct Investment (OFDI) or on how FDI affects firms' need for political connections. Deng et al. (2018) find that outward FDI (OFDI) strategies by politically connected firms are often influenced by domestic political incentives, rather than purely economic considerations. On the other hand, Dong et al. (2024) highlight that increased FDI inflows can reduce the need for reliance on political connections by providing firms with alternative resources and market opportunities.

This paper investigates the intersection of political connections and inward FDI spillovers, focusing on how PC firms moderate the productivity effects of FDI in domestic economies. To do so, we focus on Bulgaria — a country characterized by significant political influence over economic activity (CSD, 2019). We use Bulgarian firm-level balance sheet data from the Orbis dataset for the period 2011-2018 and combine it with novel data on politically connected firms to answer the following questions: (1) Are PC firms more or less productive than non-PC firms? (2) Do FDI spillovers differ for PC firms compared to non-PC firms? (3) How does exposure to PC firms within industries and along value chains affect the productivity of domestic and foreign firms? (4) Do PC firms moderate the effect of FDI spillovers in the economy?

Our study contributes to the literature in several ways. First, we establish new stylized facts about the interaction between FDI and politically connected firms, drawing on a rich dataset that combines information on firm-level political connections and industry-level FDI exposure. Second, we adapt methodologies from the FDI spillover literature to measure the impact of PC firms at the industry level both within industries and along the value chain. Third, we provide insights into how political connections influence the broader economic benefits of FDI to the private sector, shedding light on an underexplored

channel of resource misallocation.

The rest of the paper is organized as follows. Section 2 describes the data and explains the methodology. Section 3 provides descriptive statistics of both FDI and political connections in Bulgaria over the period of our study. Section 4 presents and discusses the results from our analysis for manufacturing and non-manufacturing firms and section **??** concludes.

2 Data and Methods

2.1 Data

For this paper, we combine data from two sources. The first is the Orbis dataset for Bulgaria for the period 2011-2018. Beside financial information from the firms' balance sheet, such as revenues, labour, capital etc., the Orbis dataset provides extensive information on the ownership structure of the firm, including both direct and indirect firm ownership linkages. A substantial amount of preparatory work went into merging the financial information of the Bulgarian enterprises with information on their domestic or foreign owners.[1] The data covers enterprises in Manufacturing, Services and other sectors, such as Mining and Utilities. For the baseline analysis, we focus on the effect of FDI spillovers and political connectedness on Manufacturing firms. However, to construct the inter-industry measures of FDI and PC exposure, we use information on all firms in the private sector (NACE industry codes A01-N82). In our heterogeneity analysis, we also show results for firms in the services sector.

The balance sheet and ownership data is further complemented by data on Bulgarian Producer Price Indices at the two-digit NACE industry level to construct yearly deflators. To build backward and forward supply chain linkages between sectors, we build coefficients using Romanian Input-Output tables at producer prices.[2]

The second data source is a unique dataset of politically exposed persons (PEP) and the public posi-

[1] For a detailed description of the preparatory work for the ownership variable in the Orbis dataset, see Appendix A.

[2] We decide to use Romanian Input-Output tables (IOTs) because the Bulgarian Statistics office (NSI) only provides supply-use tables up to 2014. Since our data spans the time period 2011-2018 and given the similarity of the Romanian and Bulgarian economies, we believe the Romanian IO tables do a good job at describing the structure of the Bulgarian intersectoral dynamics. Similar approaches were taken to construct IOTs for e.g. Latvia and Cyprus, using Estonian and Greek IOTs as a basis (Rueda-Cantuche et al., 2009). Bulgarian Input-Output tables are available from Eurostat for the entirety of the period of interest, but we opt to use the data from the National Statistics Office, because industries in the IO table are more disaggregated. However, we use the more aggregated IO tables from Eurostat to compare Bulgarian and Romanian IO coefficients. In 2011, we find that the average correlation between the coefficients is 0.61 for backward linkage coefficients and 0.54 for forward linkage coefficients. These are rather stable over time, with average correlation in 2018 equal to 0.63 for backward linkages coefficients and 0.56 for forward linkage coefficients. Thus, the structure of the two economies has become slightly more similar over time.

tions they held in Bulgaria from 2011 to 2021. This information was collected from a number of public data sources, such as asset declarations of persons holding senior public office; the Office of Foreign Assets Control (OFAC) of the US Department of the Treasury's list of sanctioned businessmen for involvement in serious corruption (also known as Global Magnitsky list); ownership information of firms for PEPs and their relatives in the Bulgarian Business Register; hidden ownership information disclosed in business registry data from other countries and in offshore leakages (such as the Panama Papers, Paradise Papers, Luxemburg Leaks etc.). We adopt a broad definition of political positions that are recorded in this dataset. Thus, PEPs could be part of the local government (e.g. mayor, city council member), the national government with legislative (e.g. members of parliament) or executive power (e.g. minister, head of government department), or a director or a member of the governing board of a State Owned Enterprise (SOE).

We are able to link the Orbis and PEP datasets using firm names. Using the information on firm ownership, we consider a foreign firm to be foreign if any of its shareholders with more than 10% equity is foreign (i.e. the first two letters of its Bureau van Dijk's identifier, which indicate the country it is registered in, are not "BG"). We consider firms to be politically connected if they were (co-)owned or managed by a PEP at one point in the time period covered by the PEP dataset. We follow previous literature on political connections (Fisman, 2001; Khwaja and Mian, 2005) and define a firm to be politically connected for the entirety of the period that it appears in the data if it is politically connected in at least one year. This is done to both simplify the modelling of political connections and to reflect the assumption that political relationships are long-lasting and have lasting effects on the firm's behavior. Following this definition, we identify 4,566 politically connected firms in the Orbis dataset. For the purposes of our analysis, we do not distinguish among different types of PEPs, so the politically connected variable is a zero/one dummy.

2.2 Variable Construction

We build industry-level variables of intra-industry exposure to FDI, by adopting the conventional measure used in the literature (Smarzynska Javorcik, 2004; Blalock and Gertler, 2008), which measures the share of output produced by foreign firms over total industry output:

$$HorizontalFDI_{jt} = \frac{\sum_i FDI_{ijt} \times Y_{ijt}}{\sum_{ijt} Y_{ijt}} \tag{1}$$

In equation 1 $FDI_i\,j\,t$ is a dummy equal to one if firm i operating in industry j in time t is foreign and $Y_i\,j\,t$ is firm i's revenue in that year.

We use the same method to construct an industry-level variable of exposure to PC firms, by measuring the share of industry output produced by PC firms in the industry:

$$HorizontalPC_{jt} = \frac{\sum_i PC_{ijt} \times Y_{ijt}}{\sum_{ijt} Y_{ijt}} \tag{2}$$

To construct inter-industry FDI (and analogously, PC) exposure variables, we use the calculated coefficients from the Input-Output tables.

$$BackwardFDI_{jt} = \sum_{k \neq j} \alpha_{j \to k} HorizontalFDI_{kt} \tag{3}$$

In equation 3, Backward FDI is calculated as the weighted sum of the horizontal FDI measures in all industries k, downstream of the industry j that firm i operates in. The weights $\alpha_{j \to k}$ are the coefficients that calculate the share of output of industry j that goes to industry k. We calculate exposure to FDI in upstream industries in a similar fashion.

$$ForwardFDI_{jt} = \sum_{k \neq j} \alpha_{k \to j} HorizontalFDI_{kt} \tag{4}$$

In equation 4, Forward FDI is a weighted sum of the Horizontal FDI measures in industries k upstream of the industry j that firm i operates in. The weights $\alpha_{k \to j}$ are the share of inputs that industry j gets from industry k. We build the Backward and Forward PC variables in the same way, replacing Horizontal FDI with Horizontal PC in equations 3 and 4, which yields equations 5 and 6 below:

$$BackwardPC_{jt} = \sum_{k \neq j} \alpha_{j \to k} HorizontalPC_{kt} \tag{5}$$

$$ForwardPC_{jt} = \sum_{k \neq j} \alpha_{k \to j} HorizontalPC_{kt} \tag{6}$$

Finally, we also build a variable of the interaction between FDI and PC exposure within the industry

and the corresponding backward and forward variables, as in equations 7 - 9:

$$HorizontalFDIxPC_{jt} = HorizontalFDI_{jt} \times HorizontalPC_{jt} \tag{7}$$

$$BackwardFDIxPC_{jt} = \sum_{k \neq j} \alpha_{j \rightarrow k} HorizontalFDIxPC_{kt} \tag{8}$$

$$ForwardFDIxPC_{jt} = \sum_{k \neq j} \alpha_{k \rightarrow j} HorizontalFDIxPC_{kt} \tag{9}$$

2.3 Empirical Strategy

To measure the productivity of domestic firms, a series of productivity measures are constructed, including output per worker, value added per worker, and total factor productivity (TFP). Total Factor Productivity is the residual from estimating a sector's production function, using sales as dependent variable, and labor, capital and raw materials as independent variables. While several methods are used to account for the endogeneity of inputs in the estimation of the production function, only the results with log(value added per worker) and log(TFP) as dependent variables in the FDI spillover estimations are presented in the analysis. However, the productivity estimates are highly correlated to one-another and are available upon request. To estimate productivity we use the following variables:

- Natural logarithm of the value of sales in constant prices – the price deflators used to deflate sales are based on Producer Price Indices by 2-digit industry . We transform the variable by adding 1 to avoid missing values when taking logarithms.
- Natural logarithm of the value of raw materials – the price deflator used to deflate raw materials are based on Intermediate Input Deflators. We transform the variable by adding 1 to avoid missing values when taking logarithms.
- Natural logarithm of the value of capital – Capital is defined as the value of tangible fixed assets. The price deflators used to deflate capital are based on Producer Price Indices for several categories (investment goods, construction goods). We transform the variable by adding 1 to avoid missing values when taking logarithms.

- Natural logarithm of the number of employees.

We estimate productivity separately for each industry, where industries are defined according to the NACE Revision 2 classification, at the 2-digit level. This industry definition is also used for the price deflators. TFP is estimated using the Ackerberg, Caves and Frazer (Ackerberg et al., 2015) correction of the semi-parametric estimation method first introduced by Levinsohn and Petrin (2003) only for firms in the manufacturing sector. We run the analysis for the services sector as well but due to the known issues with estimating TFP for services, we only use the natural logarithm of value added per worker as a dependent variable.

Equation 10 describes the baseline regression specification. To estimate the own effect of FDI and PC variables on the productivity measure (TFP or Value Added per Worker) of firm i, ω_{ijt}:, we perform a fixed effects regression analysis at the firm level.

$$\begin{aligned}\omega_{ijt} = \beta_1 HorizontalFDI_{jt} + \beta_2 BackwardFDI_{jt} + \beta_3 ForwardFDI_{jt} + \beta_4 HorizontalPC_{jt} \\ + \beta_5 BackwardPC_{jt} + \beta_6 ForwardPC_{jt} + \beta_7 PC_{it} + \beta_8 Foreign_{it} + \gamma_t + \gamma_{jt} + \epsilon_{ijt}\end{aligned} \tag{10}$$

We also control for year fixed effects (γ_t), industry-year fixed effects (γ_{jt}), foreign onwership and a firm size categorical variable. To correct for the correlation of error terms, we cluster standard errors at the 2-digit NACE industry level (i.e. the same level of aggregation as our FDI and PC variables).

To study the effect of political connections on FDI spillovers, we introduce interaction terms between the horizontal and vertical FDI variables and the PC variables, both at the firm level and at the industry level (i.e. horizontal PC exposure variable), in addition to the own effects:

$$\begin{aligned}\omega_{ijt} = \beta_1 HorizontalFDI_{jt} + \beta_2 BackwardFDI_{jt} + \beta_3 ForwardFDI_{jt} + \beta_4 HorizontalPC_{jt} + \\ \beta_5 BackwardPC_{jt} + \beta_6 ForwardPC_{jt} + \beta_7 HorizontalFDI_{jt} PCvar_{i\backslash jt} + \beta_8 BackwardFDI_{jt} PCvar_{i\backslash jt} \\ + \beta_9 ForwardFDI_{jt} PCvar_{i\backslash jt} + \beta_{10} PC_{it} + \beta_{11} Foreign_{it} + \gamma_t + \gamma_{jt} + \epsilon_{ijt}\end{aligned} \tag{11}$$

We detail the different interactions we test for in the results section.

3 FDI and PC in Bulgaria

3.1 Descriptive statistics of foreign and PC firms

In the last decade, foreign firms accounted for one percent of all firms in Bulgaria, but this share fluctuated considerably during this time period. The share of foreign firms in Bulgaria fell for most of the time period between 2011 and 2017, but increased again in 2018. The share was highest in 2011 and lowest in 2017. The absolute number of foreign firms was highest in 2013 (6020 firms) and lowest in 2012 (4588). Hence, both the share and absolute number of foreign firms have fluctuated considerably in the last decade.

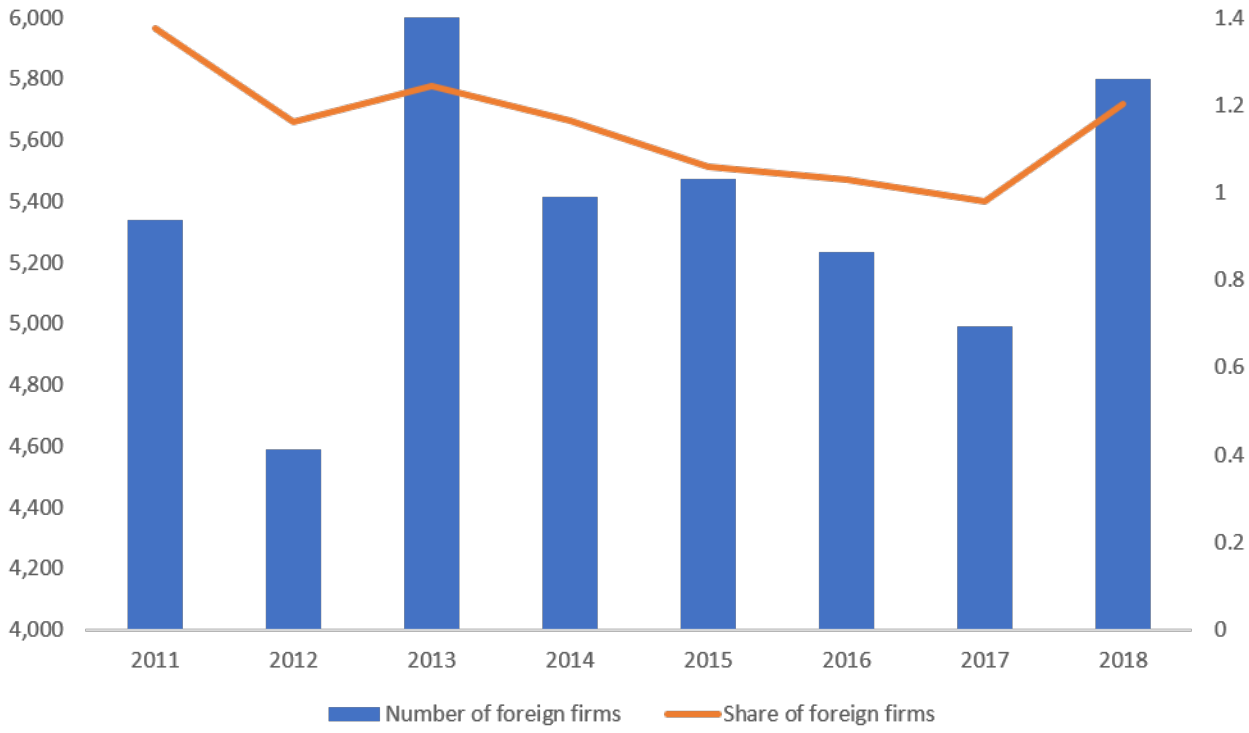


Figure 1: Number and share of foreign firms over time

Although foreign firms account for only one percent of all firms, they produce on average 14.44 percent of output. Over the period 2011-2018 they also accounted for 6.22 percent of total employment, on average. Hence, foreign firms account for a disproportionate share of each sector's economic activity, compared to domestic firms. However, as with the share of foreign firms in the population of firms, their sectoral output and labour share decreased between 2011 and 2015. While it started to increase again after 2015, in 2018 it was still lower than at the start of the period.

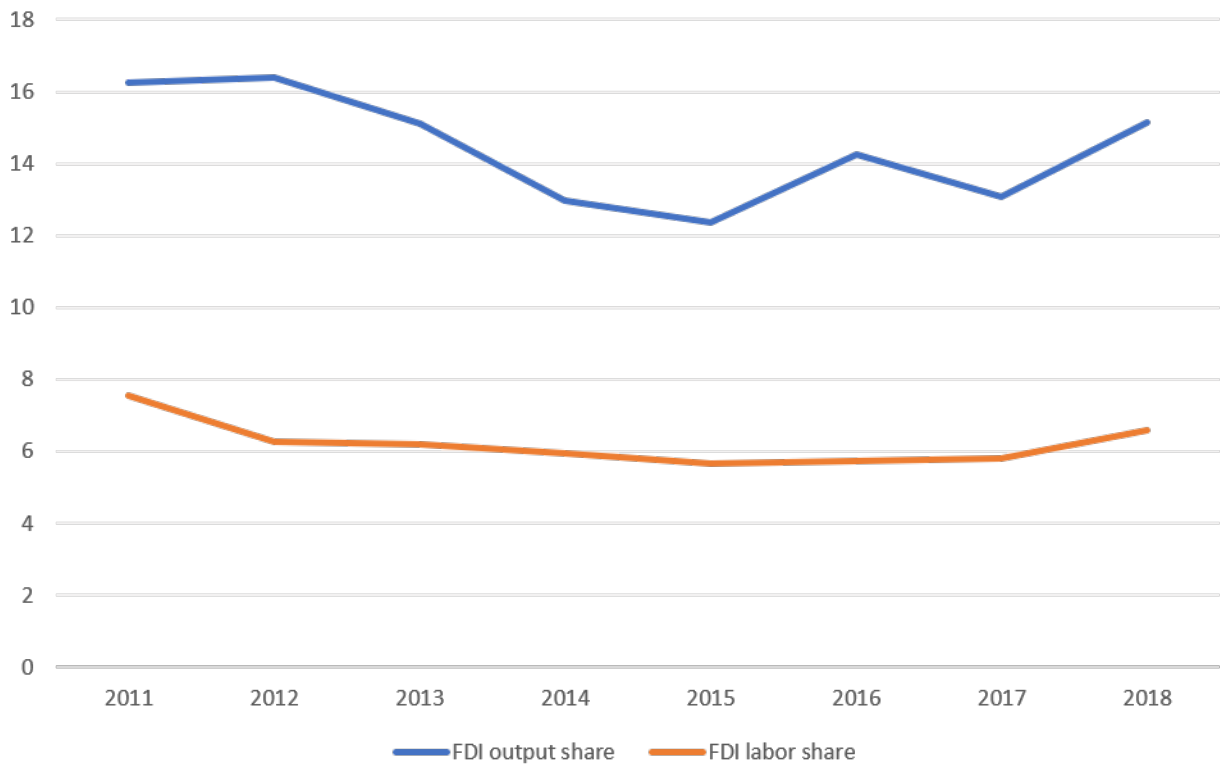
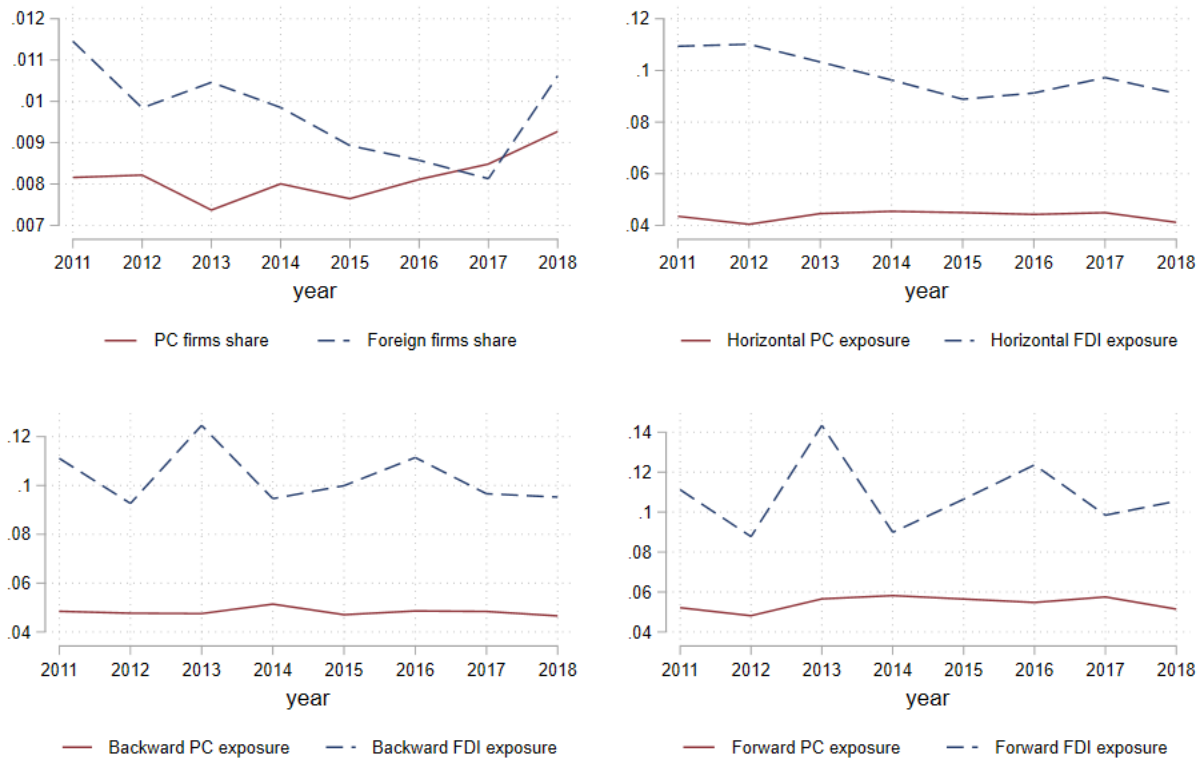


Figure 2: FDI output and labour share

In figure 3 we show the evolution of FDI and PC firms in Bulgaria over the period 2011-2018. While the share of FDI firms in the population oscillates over time, the share of PC firms is more steadily growing. Focusing on the share of FDI and PC output in the upper-right panel, we find that the share of PC output is much lower than FDI output share, even for the years when the share of PC firms is similar or higher (2016-2017). This is a first indication that on average foreign firms are producing a larger share of industry output than PC firms. A similar story holds for inter-industry measures of FDI and PC exposure, with much lower and steadier PC measures than FDI measures. Hence, domestic firms are less exposed to PC firms along the supply chain through inputs from or output to these firms than to FDI firms.

Figure 4 shows the distribution of foreign firms and the average FDI exposure variables by broad sectors. The highest share of foreign firms is found in the Mining and Quarrying and Utilities sectors, as well as in Real Estate services. Similarly, the industries with highest within-industry exposure to FDI output are in Mining, but also in Manufacturing, ICT and financial services. While exposure to FDI firms in downstream sectors is more evenly distributed across sectors, exposure to FDI in upstream sectors is very uneven, with Utilities, ICT and Scientific and Professional services being the most exposed. Hence,

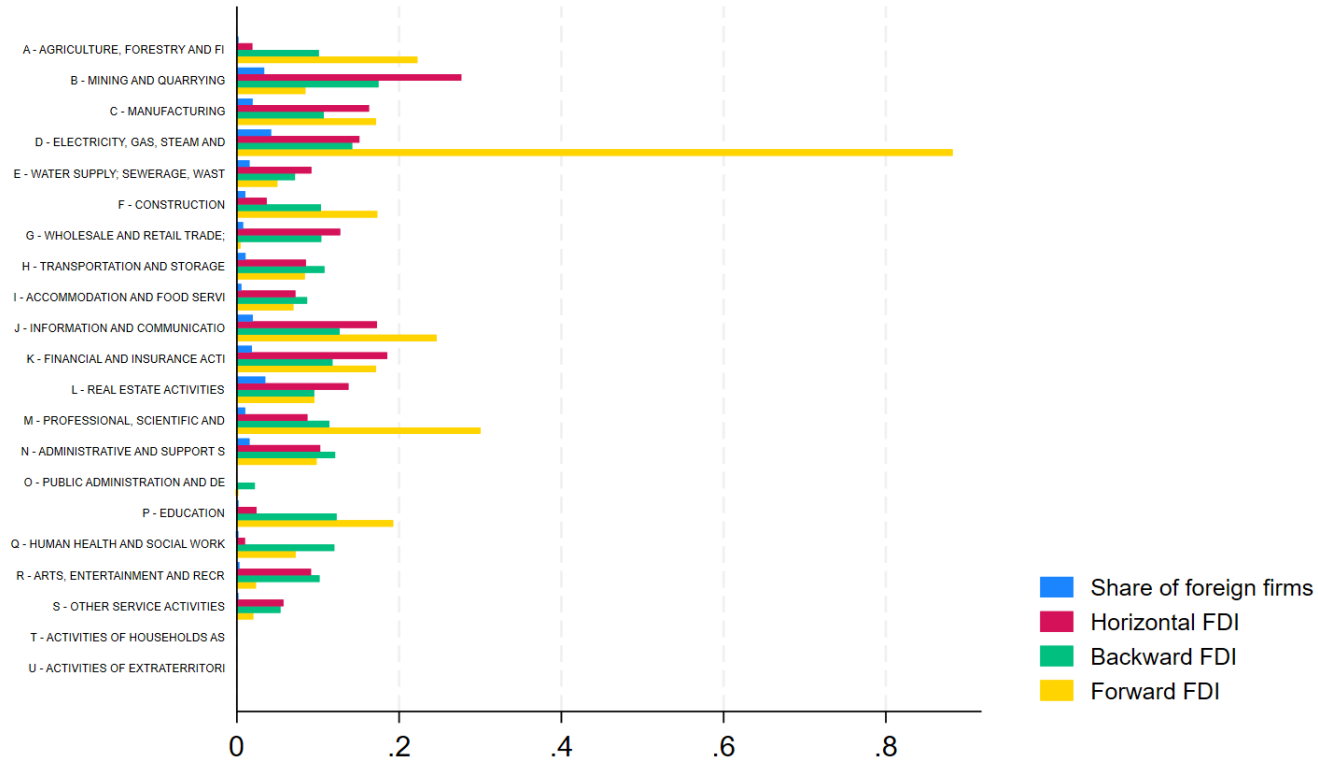


Note: Upper-left panel shows shares of FDI and PC firms in terms of number of firms. Upper-right panel shows the evolution of horizontal FDI and PC measures (Equations 1 and 2) over time. Lower-left panel shows the evolution of backward FDI and PC measures (Equations 3 and 5). Lower-right panel shows the evolution of backward FDI and PC measures (Equations 4 and 6).

Figure 3: FDI and PC firms over time

domestic firms in these sectors are purchasing their inputs from industries with higher concentrations of output by foreign firms.

Figure 5 depicts the distribution of PC firms by sector. Similarly to FDI firms, they are mostly concentrated in the Mining and Quarrying and the Utilities sectors, but they are also very present in public services sectors, such as Health services and Arts and Entertainment, especially in terms of sector output share. PC firms are also concentrated in industries that provide inputs to firms in the Utilities, Construction, ICT and Professional Services sectors. Overall, we find significant overlaps between FDI and PC exposed sectors, even though these are not necessarily the same firms (as shown by the small number of politically connected foreign firms in the sample, only 374). This empirical observation justifies our decision to test the effect of the interaction of FDI and PC variables in the regression analysis, since the

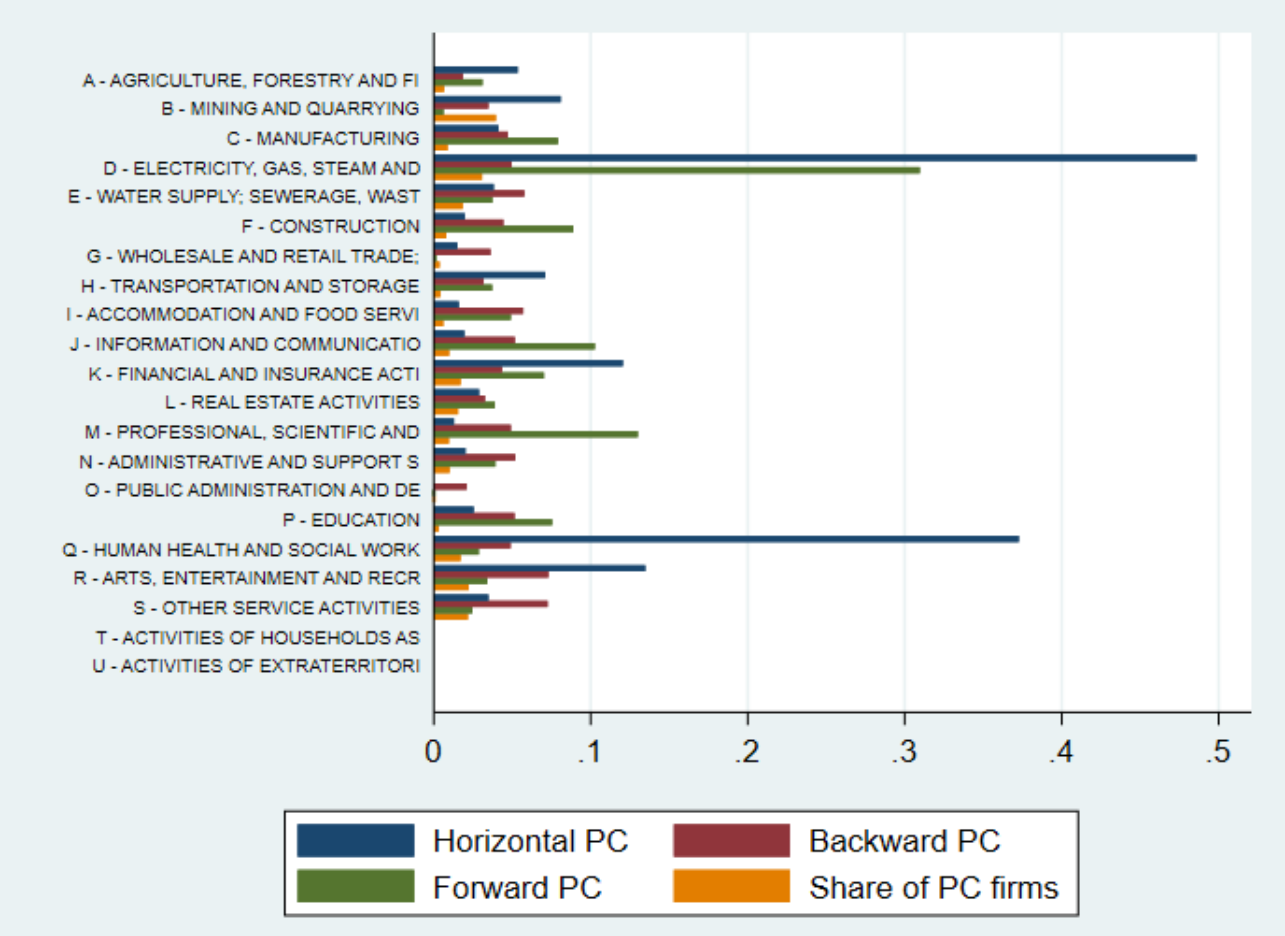


Note: For this graph, broader 1-digit NACE Rev. 2 level sector categories are used. All firms are considered, including those in public sectors O-U, which are not included in the regression analysis.

Figure 4: Distribution of foreign firms by sector

existence of PC firms in the same upstream or downstream industries with high concentration of FDI firms could weaken FDI spillovers from those industries.

In panel A of table 1 we divide our sample into four non-overlapping categories of firms, by foreign ownership and political connection status. Using the largest category (not foreign, not politically connected firms) as the base category, we run simple Pooled OLS analyses to compare the value added per worker, TFP, number of employees, capital and sales revenues of firms in the different groups, controlling for industry fixed effects. Beside difference coefficients from the base group, we also report the significance of the coefficient differences between the other groups. We find that all groups are more productive (measured by value added per worker and TFP) and larger (in terms of number of employees, capital and sales) than firms that are neither foreign-owned, nor politically connected. There is a hierarchy to these results, with firms that are both foreign owned and politically connected being the largest and the most productive on average, across all measures. Foreign firms are more productive than PC



Note: For this graph, broader 1-digit NACE Rev. 2 level sector categories are used. All firms are considered, including those in public sectors O-U, which are not included in the regression analysis.

Figure 5: Distribution of PC firms by sector

firms in terms of value added per worker and TFP, but PC firms are larger than foreign firms in terms of average number of employees, capital and sales. This could be an indication that after controlling for industry-specific characteristics, PC firms seem less able to translate more labour and capital into more productivity than foreign firms. However, they are on average more productive than non-PC domestic firms. It is important to note that, with the exception of the TFP regression, the R-squared of these regressions is rather low, indicating that foreign ownership and political connectedness do not explain a large part of the variation in any of these variables across firms.

In panel B of Table 1 the mean values of the industry-level FDI and PC exposure variables are shown. In line with Figure 3, average horizontal and vertical PC exposure is only about half of the FDI exposure, even though 0.8% of the observations are PC firms, while 1.1% of the observations are foreign firms. This

Panel A

VARIABLES	(1) ln(VApW)	(2) TFP	(3) No. employees	(4) ln(capital)	(5) ln(sales)
Foreign, not PC (foreign_pc=1)	1.030***	0.241***	39.42***	2.171***	0.973***
	(0.0107)	(0.00362)	(0.564)	(0.0269)	(0.0167)
PC, not foreign (foreign_pc=2)	0.401***	0.0595***	50.38***	2.345***	1.314***
	(0.0114)	(0.00390)	(0.578)	(0.0310)	(0.0183)
Foreign, PC (foreign_pc=3)	1.100***	0.245***	152.8***	4.177***	2.294***
	(0.0906)	(0.0307)	(5.120)	(0.255)	(0.157)
Constant	9.814***	10.55***	2.860***	10.07***	10.03***
	(0.00539)	(0.00197)	(0.190)	(0.0163)	(0.00872)
Observations	1,523,078	1,373,087	3,216,260	2,506,385	3,044,909
R-squared	0.199	0.693	0.028	0.154	0.067
p-val_12	0	0.000	0.000	0.000	0.000
p-val_13	0.439	0.892	0.000	0.000	0.000
p-val_23	0.000	0.000	0.000	0.000	0.000

Panel B

Variable	Obs	Mean	Std. dev.	Min	Max
PC firm	4,167,989	0.008	0.089	0.000	1.000
Foreign firm	3,747,890	0.011	0.106	0.000	1.000
FDI horizontal	3,539,478	0.098	0.071	0.000	0.964
FDI backward	2,421,157	0.104	0.029	0.009	0.388
FDI forward	3,539,262	0.109	0.139	0.000	1.359
PC horizontal	3,539,478	0.044	0.083	0.000	0.963
PC backward	2,421,157	0.048	0.022	0.009	0.236
PC forward	3,539,262	0.055	0.070	0.000	0.522

Note: In panel A, results are based on a pooled OLS analysis where we control for industry fixed effects. foreign_pc is a categorical variable where the base category (foreign_pc=0) are not foreign, not PC firms. Standard errors in parentheses. Reported p-values at the end of the table refer to F-tests on whether the coefficients of the different foreign_pc groups are statistically different from each-other.

Table 1: Regressions with separate and triple interaction terms

implies that compared to PC firms, FDI firms have a disproportional effect in the economy in terms of output.

4 Results

Table 2 depicts the results from the analysis performed on firms in the manufacturing sector only (including industries C10-C33). Nevertheless, as manufacturing firms both sell output to and buy inputs from other sectors in the economy, the industry-level variables are built by considering all industries in the private sector. The dependent variable in each column is TFP. In columns 1 and 2 we control for the FDI and PC variables separately. In column 1, we find weak evidence of negative horizontal FDI spillovers and positive backward FDI spillovers. This is in line with previous empirical studies on FDI spillovers, which have found that acting as a supplier to foreign firms (Backward FDI) is often associated with productivity benefits, through technology transfer, trainings, increase in suppliers' capabilities to be able to meet buyers' demands and standards (**?**). Negative spillovers from FDI firms in the same industry have also been found previously in the literature, and can be explained through increased competition from more technologically advanced, larger foreign firms, which drive domestic firms in the industry out of the market (Aitken and Harrison, 1999). We find no evidence of spillovers from foreign firms in upstream industries.

In column 2 we find that exposure to PC firms in downstream industries (Backward PC) has a significant negative effect on the productivity of domestic firms in upstream manufacturing industries. This effect is also economically significant, being three times as large as the positive spillover effect of Backward FDI. It implies that a high concentration of PC firms affects the suppliers of these industries negatively, possibly through lack of competitiveness and holdup problems. Considering the distribution of Horizontal PC in 5, these results are possibly driven by the manufacturing industries that supply the Utilities and Finance and Insurance sectors, where the market is dominated by large companies that could use their size and possibly political connections to creat holdup problems for their suppliers. We find no significant effects of either Horizontal or Forward PC variables.

In column 3 we introduce an interaction term between the FDI variables and the PC dummy, to investigate whether politically connected firms are affected differently by FDI spillovers. We find no evidence to support this hypothesis. It should be noted that by definiton the PC dummy does not change

over time, so the interaction terms capture the change in FDI variables. Since the own effect of the backward and horizontal FDI is the same as in column 1, they probably capture the main effects of the variation in FDI variables.

In column 4, we introduce FDI and PC variables simultaneously and find that the results do not change qualitatively: horizontal and backward FDI spillovers are similar to those estimated in columns 1 and 3, while backward PC spillovers are still negative and significant. In column 5, we run a similar regression to column 4, but include an interaction term between the foreign and PC dummies, to see if these are affected differently by either FDI or PC spillovers. The coefficient is insignificant, but this could also be a result of the fact that the number of foreign PC firms in our sample is very small, as discussed earlier. On the other hand, a consistent finding throughout all regression specifications is that once we control for a number of fixed effects, we find no significant TFP premium for foreign manufacturing firms. Hence the finding that foreign PC firms are not significantly more productive may be an extension of the fact that foreign firms in general are not more productive than domestic firms. Yet, foreign firms do seem to have a negative spillover effect on their competitors in the industry (possibly driven by their size, financial resources etc) and a positive spillover on their suppliers (which could also be driven by foreign firms not in the manufacturing sector). Column 6 revisits the findings of column 3, but now controlling for PC exposure variables. However, we still find no significant results for the interaction between FDI variables and the PC dummy.

In columns 7-9 we try different specifications with interactions between the horizontal PC exposure and the FDI variables. The mechanism we are trying to capture through these interaction terms is whether and how being having a higher concentration of PC firms in their own industry affects the FDI spillovers that domestic firms experience. For example, does an industry whose competitiveness is eroded by political connections also benefit less from FDI spillovers both within the industry and from other industries? The results in columns 7-9 show that for manufacturing firms this is not the case. While these firms are still negatively affected by having a higher exposure to PC firms in downstream industries, the FDI spillovers from these downstream industries are still positive, even if the industry itself has higher shares of output from PC firms.

Finally, in column 10 we study the effect of the interaction of FDI and PC firms in upstream or downstream industries. To do so, we first build a new variable, that captures the interaction of horizontal PC and horizontal FDI (Hor_FDI*Hor_PC). We then use the Input-Output weights to construct backward

and forward FDI*PC variables. These variables capture the effect of exposure to FDI in downstream or upstream industries when there is also a higher concentration of PC firms in these industries. Our reasoning for this specification is similar to that of columns 7-9: are e.g. spillovers from FDI in downstream industries smaller if those same downstream industries also have more exposure to politically connected firms? We find all constructed interaction terms to be insignificant, but interestingly, once we control for them, we also find that the positive effect of backward spillovers has become insignificant, while the effect of Backward PC remains significant and negative.

In summary, we find that PC firms are not affected differently by FDI spillovers and that being more exposed to PC firms in the own industry does not affect FDI spillovers for manufacturing firms. However, higher exposure to PC firms in downstream industries has a direct negative effect on domestic firms in supplying industries and makes positive spillovers from those downstream industries insignificant. This is a novel finding that point to the fact that political connections might not only affect the PC firms operate in, but also has detrimental effect for their suppliers in upstream industries, in both direct and indirect ways.

In Table 3 we show the results of the regressions with firms in non-manufacturing sectors, which include services, mining and quarrying, utilities, construction and all other industries in the private sector. As explained in Section 2, we prefer to use Value Added per Worker as the dependent variable across all these regressions due to the issues of estimating TFP for non-manufacturing sectors.[3]

A first important and robust finding is that spillovers from FDI are not the same for services firms as for manufacturing firms. While intra-industry spillovers are not significant and backward spillovers are only weakly significant and positive in only some of the specifications, forward spillovers are negative and significant throughout the analysis. Hence, acting as a customer to industries with high concentration of foreign firms leads to negative spillover effects for domestic firms in non-manufacturing sectors. Referring to Figure 4, these results are probably driven by the Utilities, ICT and Professional and Scientific industries.

Moreover, we find that higher exposure to PC firms in the own industry (Horizontal PC) and in upstream industries (Forward PC) has a negative effect on the productivity of domestic firms. Hence, the erosion of competitiveness in the industry that the literature has previously found is confirmed for non-

[3]We perform robustness checks where TFP is used instead, as well as regressions with manufacturing firms where VApW is used as dependent variable. The results are available upon request.

manufacturing firms. In addition to that, a new finding from our results is that having higher concentration of PC firms in the sectors they receive their inputs from also affects firms' productivity negatively, possibly through the same channels that we discussed for Backward PC spillovers in the case of manufacturing firms. Here as well, the industries with highest shares of output from PC firms are Utilities,

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Only FDI	Only PC	FDI*PC dummy	FDI & PC	FDI dummy * PC dummy	FDI, PC & FDI*PC dummy	FDI, PC & Hor_PC*Hor_FDI	FDI & Hor_PC*FDI	FDI, PC & Hor_PC*FDI	FDI, PC & FDI*PC
Horizontal FDI	-0.0408*		-0.0405*	-0.0414**	-0.0413**	-0.0411**	-0.0439**	-0.0417*	-0.0421*	-0.0424*
	(0.0201)		(0.0201)	(0.0194)	(0.0194)	(0.0195)	(0.0208)	(0.0219)	(0.0211)	(0.0222)
Backward FDI	0.107*		0.107*	0.134*	0.134*	0.134	0.134*	0.214*	0.214*	0.211
	(0.0549)		(0.0564)	(0.0772)	(0.0773)	(0.0795)	(0.0774)	(0.107)	(0.116)	(0.124)
Forward FDI	0.00574		0.00262	-0.0399	-0.0399	-0.0431	-0.0397	-0.0473	-0.0927	-0.0962
	(0.0609)		(0.0613)	(0.104)	(0.104)	(0.105)	(0.104)	(0.0884)	(0.132)	(0.142)
Horizontal PC		-0.0317		-0.0319	-0.0317	-0.0318	-0.0354	-0.0787	-0.141	-0.0418
		(0.0512)		(0.0518)	(0.0519)	(0.0519)	(0.0518)	(0.219)	(0.255)	(0.0523)
Backward PC		-0.366***		-0.383***	-0.384***	-0.383***	-0.383***		-0.339***	-0.322**
		(0.109)		(0.0983)	(0.0984)	(0.0987)	(0.0981)		(0.114)	(0.129)
Forward PC		0.114		0.185	0.185	0.185	0.184		0.194	0.251
		(0.0894)		(0.223)	(0.223)	(0.223)	(0.223)		(0.227)	(0.261)
PC*Horizontal FDI			-0.0138			-0.0153				
			(0.0799)			(0.0798)				
PC*Backward FDI			-0.0312			-0.0339				
			(0.315)			(0.313)				
PC*Forward FDI			0.222			0.222				
			(0.185)			(0.186)				
Foreign	-0.00576	-0.00621	-0.00574	-0.00571	-0.00522	-0.00570	-0.00575	-0.00584	-0.00584	-0.00584
	(0.0153)	(0.0152)	(0.0153)	(0.0154)	(0.0152)	(0.0153)	(0.0154)	(0.0154)	(0.0154)	(0.0154)
Foreign*PC					-0.0484					
					(0.0914)					
Hor_FDI*Hor_PC							0.0437	0.00428	0.00399	
							(0.0312)	(0.0567)	(0.0592)	
Back_FDI*Hor_PC								-2.581	-1.958	
								(1.748)	(1.837)	
For_FDI*Hor_PC								1.169	1.082	
								(0.926)	(0.945)	
Hor_FDI*Hor_PC										0.0362
										(0.0351)
Back_(FDI*PC)										-0.453
										(0.446)
For(FDI*PC)										0.257
										(0.201)
Small	-0.0851***	-0.0850***	-0.0851***	-0.0850***	-0.0850***	-0.0850***	-0.0850***	-0.0852***	-0.0851***	-0.0850***
	(0.0118)	(0.0118)	(0.0118)	(0.0117)	(0.0117)	(0.0118)	(0.0117)	(0.0117)	(0.0117)	(0.0117)
Medium	-0.173***	-0.173***	-0.173***	-0.173***	-0.173***	-0.172***	-0.173***	-0.173***	-0.173***	-0.173***
	(0.0311)	(0.0312)	(0.0312)	(0.0311)	(0.0311)	(0.0311)	(0.0311)	(0.0311)	(0.0311)	(0.0311)
Large	-0.366***	-0.366***	-0.366***	-0.366***	-0.366***	-0.366***	-0.366***	-0.366***	-0.366***	-0.366***
	(0.101)	(0.102)	(0.101)	(0.101)	(0.101)	(0.101)	(0.101)	(0.101)	(0.101)	(0.101)
Constant	8.838***	8.852***	8.838***	8.846***	8.846***	8.846***	8.846***	8.842***	8.849***	8.839***
	(0.0140)	(0.0109)	(0.0141)	(0.0125)	(0.0125)	(0.0126)	(0.0124)	(0.0197)	(0.0166)	(0.0165)
Observations	160,318	160,318	160,318	160,318	160,318	160,318	160,318	160,318	160,318	160,318
R-squared	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936	0.936
Year-industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R2	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922	0.922
N	160318	160318	160318	160318	160318	160318	160318	160318	160318	160318
Clusters	23	23	23	23	23	23	23	23	23	23

Note: Dependent variable in all regressions is Value Added TFP. Standard errors clustered at the 2-digit industry level.

Table 2: FDI and PC productivity spillovers - manufacturing

Mining, and Finance and Insurance. Hence, the results could be driven to a large degree by these sectors, with big firms that might be foreign, be (partially) state-owned or be politically connected.[4]

Similar to firms in manufacturing, we do not find a differential effect of FDI spillovers for PC firms (interactions terms between FDI variables and the PC dummy are insignificant), or for firms in sectors with higher PC concentration (interaction terms between FDI variable and horizontal PC are also insignificant). The only exception is the interaction of Backward FDI with Horizontal PC, whose coefficient is weakly significant and positive. This indicates that, while overall Backward FDI spillovers are not significant, non-manufacturing firms in industries with more PC concentration do benefit from positive Backward FDI spillovers. Alternatively, it can be interpreted as firms in industries with higher exposure to FDI in downstream sectors being less affected by the negative and significant effect of exposure to PC firms in their own industry.

Finally, in column 10, we find no effect of the interaction of FDI and PC exposure in upstream or downstream industries. Foreign firms in non-manufacturing sectors have a productivity premium compared to domestic firms in terms of VApW in all specifications, but politically connected foreign firms are not significantly different from other foreign firms. Thus, the results for the non-manufacturing sectors reiterate the findings from the manufacturing sector that PC firms have an negative impact on the productivity of other firms in the economy, but the firms that are affected are different for manufacturing and non-manufacturing sectors. Moreover, in non-manufacturing sectors, the negative effects of PC firms in the own industry are alleviated by FDI spillovers from downstream industries.

[4] As a next step in our research, we plan to conduct a heterogeneity analysis focusing only on these industries and a robustness check where these industries are left out, to see if the results still hold.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Only FDI	Only PC	FDI*PC dummy	FDI & PC	FDI dummy * PC dummy	FDI, PC & FDI*PC dummy	FDI, PC & Hor_PC*Hor_FDI	FDI & Hor_PC*FDI	FDI, PC & Hor_PC*FDI	FDI, PC & FDI*PC
Horizontal FDI	-0.0329		-0.0392	0.0563	0.0563	0.0501	-0.00627	-0.0473	-0.00677	-0.0193
	(0.103)		(0.102)	(0.114)	(0.114)	(0.114)	(0.151)	(0.156)	(0.152)	(0.149)
Backward FDI	0.841*		0.844*	0.604	0.605	0.608	0.599	0.693	0.325	0.584
	(0.468)		(0.471)	(0.496)	(0.496)	(0.499)	(0.491)	(0.438)	(0.477)	(0.463)
Forward FDI	-0.386***		-0.386***	-0.193**	-0.193**	-0.194**	-0.186**	-0.330***	-0.129	-0.241**
	(0.0823)		(0.0825)	(0.0832)	(0.0832)	(0.0846)	(0.0812)	(0.0861)	(0.103)	(0.0975)
Horizontal PC		-0.872**		-0.870**	-0.870**	-0.869**	-1.031***	-1.143***	-1.283***	-1.002***
		(0.351)		(0.360)	(0.361)	(0.361)	(0.354)	(0.296)	(0.323)	(0.350)
Backward PC		0.821		0.589	0.588	0.586	0.714		0.808	0.506
		(1.378)		(1.493)	(1.494)	(1.495)	(1.545)		(1.575)	(1.684)
Forward PC		-0.832***		-0.519**	-0.519**	-0.515**	-0.513**		-0.577**	-0.438*
		(0.219)		(0.221)	(0.221)	(0.222)	(0.220)		(0.227)	(0.226)
PC*Horizontal FDI			-0.136			-0.115				
			(0.556)			(0.552)				
PC*Backward FDI			-0.00343			-0.00249				
			(0.236)			(0.235)				
PC*Forward FDI			0.289			0.271				
			(0.274)			(0.278)				
Foreign	0.0441*	0.0443*	0.0441*	0.0441*	0.0458**	0.0441*	0.0441*	0.0438*	0.0437*	0.0441*
	(0.0229)	(0.0229)	(0.0229)	(0.0229)	(0.0225)	(0.0229)	(0.0229)	(0.0230)	(0.0230)	(0.0229)
Foreign*PC					-0.110					
					(0.106)					
Hor_FDI*Hor_PC							0.922	0.957	0.972	
							(0.983)	(0.954)	(0.995)	
Back_FDI*Hor_PC								2.845*	3.481*	
								(1.676)	(1.745)	
For_FDI*Hor_PC								-0.671	-0.637	
								(1.941)	(1.948)	
Hor_(FDI*PC)										0.945
										(0.983)
Back_(FDI*PC)										0.940
										(3.159)
For_(FDI*PC)										0.203
										(0.451)
Small	-0.207***	-0.207***	-0.207***	-0.207***	-0.207***	-0.207***	-0.207***	-0.207***	-0.207***	-0.207***
	(0.0384)	(0.0384)	(0.0384)	(0.0384)	(0.0384)	(0.0384)	(0.0384)	(0.0384)	(0.0384)	(0.0384)
Medium	-0.421***	-0.422***	-0.421***	-0.422***	-0.422***	-0.422***	-0.422***	-0.422***	-0.422***	-0.422***
	(0.0662)	(0.0662)	(0.0662)	(0.0661)	(0.0662)	(0.0661)	(0.0661)	(0.0662)	(0.0662)	(0.0661)
Large	-0.677***	-0.679***	-0.678***	-0.679***	-0.679***	-0.679***	-0.679***	-0.678***	-0.678***	-0.679***
	(0.0990)	(0.0988)	(0.0990)	(0.0987)	(0.0987)	(0.0988)	(0.0987)	(0.0989)	(0.0988)	(0.0987)
Constant	9.760***	9.842***	9.760***	9.792***	9.792***	9.792***	9.795***	9.800***	9.815***	9.799***
	(0.0503)	(0.0418)	(0.0504)	(0.0593)	(0.0593)	(0.0593)	(0.0613)	(0.0499)	(0.0617)	(0.0619)
Observations	741,282	741,282	741,282	741,282	741,282	741,282	741,282	741,282	741,282	741,282
R-squared	0.752	0.752	0.752	0.752	0.752	0.752	0.752	0.752	0.752	0.752
Year-industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R2	0.687	0.687	0.687	0.687	0.687	0.687	0.687	0.687	0.687	0.687
N	741282	741282	741282	741282	741282	741282	741282	741282	741282	741282
Clusters	50	50	50	50	50	50	50	50	50	50

Note: Dependent variable in all regressions is Value Added per Worker. Standard errors clustered at the 2-digit industry level.

Table 3: FDI and PC productivity spillovers - non-manufacturing

5 Conclusion

This study explores the intersection of political connections (PC) and foreign direct investment (FDI) spillovers in Bulgaria, shedding light on the effects of political connections on firm productivity through the FDI channel. Our analysis shows that politically connected (PC) firms, particularly in downstream industries, have a negative impact on the productivity of domestic suppliers in upstream sectors. This effect is likely driven by reduced competitiveness, due to market distortions caused by holdup problems, where powerful firms use their political leverage to extract favorable terms from their suppliers, diminishing overall productivity.

While FDI spillovers in the manufacturing sector show typical patterns—positive backward spillovers from foreign firms to their suppliers and negative horizontal spillovers due to increased competition from larger foreign firms—PC firms do not appear to experience significantly different spillovers from FDI. Notably, the concentration of PC firms in upstream or downstream industries does not significantly alter the positive spillover effects of FDI in these sectors. However, the negative impact of PC firms in the same industry as domestic firms for the non-manufacturing sector remains consistent with previous literature. The novel finding in our study is that PC firms affect firms not only in the same industry, but also in upstream (in the case of manufacturing firms) and downstream industries (in the case of non-manufacturing firms), both directly and indirectly, but reducing the significance of backward FDI spillovers (in the manufacturing sector). In non-manufacturing sectors, FDI spillovers from downstream industries alleviate the negative effects of PC firms in the industry on productivity.

Our findings have several policy implications. First, the detrimental effects of PC firms on upstream industries suggest a need for strengthening competition policies to prevent political capture of key sectors. Regulators should consider mechanisms to limit the concentration of politically connected firms in critical industries, such as Utilities, Mining and Financial sector. Furthermore, policies that enhance transparency in public procurement and reduce the influence of political connections in market transactions could help mitigate these negative externalities.

Second, while FDI remains a key driver of productivity, the positive spillovers from FDI could be undermined by the prevalence of political connections in certain sectors. Policymakers could enhance FDI spillovers by creating more level playing fields for domestic firms and ensuring that foreign investors face fewer barriers related to political influence. This would allow for a more efficient distribution of FDI

benefits across industries.

Our study suffers from several possible limitations. As mentioned in our results interpretation, both FDI and PC firms seem to be concentrated in a few industries, such as Utilities, Mining, ICT and Professional Services. To understand if these industries are driving our results, we plan to perform robustness checks excluding these industries and heterogeneity analysis for specific sectors of interest. Secondly, the relationship between FDI and PC is bidirectional, which could lead to issues of endogeneity arising from firms' strategies, such as e.g. foreign firms trying to avoid investing in industries with higher political influence, or PC firms being more prevalent in industries that are less open to FDI. Lagging the FDI variables would be a possible way to address this issue. Finally, not all political connections are the same and the position of the politically exposed person in the political scene could be of importance. Unfortunately, although we possess this information, the number of firms in each PC category is too small (and probably not exhaustive) to derive any significant conclusions. We leave this issue to future research with more detailed and encompassing data.

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