



ANALYZING THE RELATIONSHIP BETWEEN INWARD FDI, EDUCATION AND ENTREPRENEURIAL ACTIVITY AT THE MACRO-LEVEL



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Resumen

Investigamos el papel de los flujos de entrada de inversión extranjera directa (IED) y la educación para explicar las diferencias en los niveles de emprendimiento entre países. Es ampliamente conocido que la IED pueden tener externalidades positivas pero también negativas sobre la actividad emprendedora. Argumentamos que ambos tipos de externalidades (positivas y negativas) pueden verse reforzadas por los altos niveles de educación de la población. Utilizando datos para 75 países entre 2001 y 2015, estimamos un modelo 2SLS que evalúa el papel moderador de la educación. Encontramos evidencia favorable a una interacción negativa de la IED y la educación a nivel macro en la tasa de actividad empresarial, lo que sugiere que, en países con una fuerza laboral altamente calificada, los flujos de entrada de IED generan más empleos asalariados que nuevos empresarios. Se discuten las implicaciones de política de estos resultados.

Palabras clave: Actividad emprendedora, flujos de entrada de IED, externalidades.

Clasificación JEL: F21, F23, I21, L26

Abstract

We investigate the roles of inward FDI and education in explaining country levels of entrepreneurship. It is widely recognised that inward FDI may have positive but also negative spillover effects on entrepreneurial activity. We argue that both types of spillovers (positive and negative) may be reinforced by high education levels of the labour force. Using a database across 75 countries between 2001 and 2015, we estimate a 2SLS model that tests for this moderating role of education. We find support for a negative interaction effect of FDI and macro-level education on the rate of entrepreneurial activity, suggesting that in countries with highly educated labour forces, inward FDI leads to more jobs in the wage sector rather than a higher number of entrepreneurs. Policy implications are discussed.

Key words: Entrepreneurial activity, Inward FDI, Spillover effects.

JEL Classification: F21, F23, I21, L26

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1. Introduction²

The relationship between inward FDI and domestic entrepreneurship forms part of a broader debate in international economics analysing the net spillovers from FDI to domestic economies. Studies show that these spillover effects may be positive or negative (Burke et al., 2008; Meyer & Sinani, 2009). If multinational companies (MNCs) outsource their need for intermediate goods and services to local entrepreneurs, inward FDI may have a positive impact on entrepreneurial activity. Moreover, their employees may be inclined to start their own business using the knowledge obtained while working in the MNC (Acs et al., 2013). Alternatively, FDI may suppress and ‘crowd out’ domestic entrepreneurship as a result of the increased competition in domestic product and factor markets (De Backer & Sleuwaegen, 2003). The extent of the spillover effects, either positive or negative, depends on the linkages between MNCs and domestic firms (Sun et al., 2017) but this may also depend on the education levels of employees, entrepreneurs and the population as a whole.

A high level of human capital (as reflected by high education levels) may reinforce the above-mentioned positive spillover effects as a highly educated labour force reflects higher absorptive capacity of local firms, making it easier for MNCs to outsource activities in the local economy. Moreover, it may be argued that more highly educated employees in MNCs may consider starting up their own firm (positive moderation effect). On the other hand, higher education levels of a country’s labour force may also cause higher real wages, making it more attractive to be an employee, rather than a business owner (Lucas, 1978; Kher et al., 2012), potentially reducing the incidence of entrepreneurship. This phenomenon may be reinforced by the presence of MNCs as these companies increase the supply of well-paid jobs, i.e. a negative moderation effect (Danakol et al. 2017). Hence, the relationship between inward FDI and domestic entrepreneurship may be influenced by a labour force’s education level, and the moderating impact of education on this relationship may be either positive or negative.

² **Acknowledgement:** *The present paper is a considerably shortened version of Berrill et al. (2020). Reprinted and adapted by permission from Springer Nature: Springer Science+Business Media, LLC; [Small Business Economics](#); The moderating role of education in the relationship between FDI and entrepreneurial activity — Jenny Berrill, Martha O’Hagan-Luff, André van Stel; Copyright 2018; Advance Online Publication: 29 November 2018; DOI: <https://doi.org/10.1007/s11187-018-0121-6>*

Surprisingly however, the influence of education on the spillover effects from inward FDI to domestic entrepreneurship has remained rather implicit in the literature. Hence, the first contribution of our paper is that we explicitly model this moderating effect of macro-level education, and estimate its magnitude using a multi-country and multi-year database. In particular, we investigate the impact of the interaction between inward FDI and the education level of a country's labour force on domestic entrepreneurial activity. A second contribution is that also theoretically, we unravel the relationship between inward FDI, entrepreneurial activity and macro-level education. As we will show in the next section, this is not straightforward, as for both the direct relationships FDI-entrepreneurial activity and education-entrepreneurial activity as well as for the moderating effect of education, plausible arguments exist for positive but also for negative relationships. Hence it is crucial to provide all these arguments in a systematic manner in order to be able to interpret the empirical results. In brief, we contribute to extant literature by explicitly modelling and estimating the complex interrelationship between FDI, education and entrepreneurship and by providing the necessary arguments (for and against) to interpret empirical findings.

The moderating role of education is of great policy importance as well. For instance, assuming a positive relationship between inward FDI and entrepreneurship, then a positive moderation effect would imply that, in highly educated countries, the impact of FDI on entrepreneurship is reinforced, so that stimulation of inward FDI would at the same time enhance entrepreneurship. If, on the other hand, the moderation effect is negative, stimulation of inward FDI in highly educated countries would at the same time reduce entrepreneurship, i.e. FDI policy and entrepreneurship policy may then work against each other.

Using country-level data on entrepreneurship from the Global Entrepreneurship Monitor (GEM) database, we estimate a two stage least squares (2SLS) model with entrepreneurship as the dependent variable, and inward FDI, macro-level education and their interaction as the main independent variables. We take account of the endogeneity of FDI by using marginal corporate tax rates as an instrumental variable. We use data for 75 countries from 2001 to 2015.

Our main finding is as follows. We find support for a negative interaction effect of FDI and education on the rate of entrepreneurship, suggesting that in countries with a highly educated labour force, inward FDI leads to an increase in high-paid jobs in the wage sector rather than

a higher number of entrepreneurs. Essentially, FDI increases the opportunity costs of entrepreneurship, by increasing the supply of well-paid jobs, which dampens the incentives for independent entrepreneurial activity. An implication of our results is that entrepreneurship policy and FDI policy should be formulated in tandem, as in this context, higher levels of inward FDI may occur at the expense of entrepreneurial activity.

The remainder of this paper is structured as follows. We review the literature and develop our hypotheses in Section 2. We introduce our data and methodology in Section 3 and discuss our results in Section 4. Finally, Section 5 concludes and discusses policy implications in more detail.

2. Literature Review and Hypothesis Development

2.1. FDI and Entrepreneurial Activity

The effect of FDI on entrepreneurship may be either positive or negative (Doytch and Epperson 2012). Positive spillover effects may occur because foreign firms are sources of new knowledge and human capital that might spill over to the local economy and create opportunities for entrepreneurship (Smarzynska Javorcik, 2004). Such spillovers may occur in various ways. Foreign entrants may help new firms extend their activities by subcontracting activities or by developing collaborations for different activities (De Maeseneire & Claeys, 2012). FDI may also provide positive managerial, technical and informational externalities (Rodríguez-Clare, 1996; Newman et al., 2015) for host country firms.

It may also be the case that employees of multinationals start their own firm, exploiting knowledge obtained at the MNC. This may occur in circumstances where the employee cannot convince the decision makers within the MNC to pursue a new idea the employee has created (Acs et al., 2013). More generally, it is difficult for foreign MNCs to lock in their human capital (Fosfuri et al., 2001) and this will benefit the available supply of human capital for new ventures.

Finally, FDI provides support for trade flows, boosts export competitiveness and stimulates import-competing production, which may benefit local firms. Governments encourage FDI in anticipation of positive spillovers to the domestic economy and much of the empirical evidence confirms this positive impact (Borensztein et al., 1998; Alfaro et al., 2004). Görg et al. (2000) find a positive effect of FDI on the entry of

new domestic firms in Ireland. Doytch & Epperson (2012) show that FDI positively affects entrepreneurship but only in middle-income countries.

The arguments above lead to Hypothesis 1a:

Hypothesis 1a: A country's level of inward FDI is positively related to its rate of entrepreneurship.

However, some studies find evidence of limited positive spillovers (Haskel et al., 2007; Blalock & Gertler, 2008), or negative or no spillovers (Aitken & Harrison, 1999; Görg et al., 2000). Negative spillover effects occur when foreign-owned firms compete for the same customers and resources and 'crowd out' domestic firms (De Backer & Sleuwaegen, 2003) by exploiting advanced technology and economies of scale (Ayyagari & Kosová, 2010). Moreover, as multinational firms create (well-paid) jobs, FDI increases the opportunity costs of entrepreneurship and hence the impact of FDI on entrepreneurship may be negative (Kher et al., 2012). Negative spillover effects or no effects are often reported for emerging markets (Sabirianova et al., 2005) but have also been found for developed economies (Danakol et al., 2017).

These arguments are consistent with Hypothesis 1b:

Hypothesis 1b: A country's level of inward FDI is negatively related to its rate of entrepreneurship.

The theoretical arguments presented in this section suggest that the impact of FDI on entrepreneurship may be either positive or negative. Which mechanisms dominate in practice is an empirical matter.

2.2. *Education and Entrepreneurial Activity*

Formal education may improve entrepreneurial skills such as recognizing business opportunities, understanding markets and managing large sets of resources. This may make entrepreneurship an attractive labour market option to individuals with high education. Moreover, due to the spatial concentration of knowledge spillovers and the importance of agglomeration benefits, firms often tend to cluster in regions with high numbers of highly educated individuals (Parker 2009, p. 149). Indeed, several empirical studies find a positive relation between

education measured at the regional level and the region's rate of entrepreneurship (Armington and Acs, 2002; Bosma and Schutjens, 2011). To the extent that these mechanisms at the regional level also apply at the country level, we can formulate the following hypothesis.

Hypothesis 2a: The education level of a country's population is positively related to the country's rate of entrepreneurship.

The famous occupational choice model by Lucas (1978) predicts that individuals with higher entrepreneurial ability have a higher probability of ending up in entrepreneurship rather than wage-employment. Also, through their higher ability to coordinate larger amounts of resources, higher-ability entrepreneurs are better able to exploit scale economies, and tend to run larger firms. Therefore, in the equilibrium of the Lucas model, the number of entrepreneurs is *lower* in a situation where the labour force as a whole is more highly educated, but the entrepreneurs run larger firms on average.

The theoretical predictions by Lucas are confirmed by various empirical studies, including Van Praag and Van Stel (2013), Millán et al. (2014), and Sorgner et al. (2017). All of these studies suggest that, while education has a positive association with entrepreneurial performance and success (Van der Sluis et al., 2008; Unger et al., 2011), this results in relatively *low* numbers of larger firms with (many) employees, rather than a large number of small firms with few or no employees. Therefore, according to these arguments, in a country with a more highly educated population, the number of entrepreneurs or *rate* of entrepreneurship will be lower:

Hypothesis 2b: The education level of a country's population is negatively related to the country's rate of entrepreneurship.

2.3. The Moderating Role of Education in the Relationship between FDI and Entrepreneurship

As we have seen, inward FDI may have both positive and negative effects on domestic entrepreneurship. The education level of the labour force may moderate these effects, where this moderation effect itself may also be positive or negative. In terms of positive spillovers, it may be argued that a highly educated labour force may be a particularly conducive environment for knowledge spillovers to occur (Acs et al., 2013), for two reasons. First, a highly educated labour force may

translate into a higher absorptive capacity of local firms, facilitating outsourcing of technical tasks and production of high-quality (intermediate) goods to local firms. Second, highly educated employees may be more likely to generate technological ideas in an MNC which they want to exploit in their own firm. These arguments suggest that education *reinforces* the positive effect of FDI on domestic entrepreneurship, i.e. a *positive* moderating role for a country's education level. The above arguments lead to the following hypothesis.

Hypothesis 3a: The relationship between inward FDI and entrepreneurship is positively moderated by a country's level of education.

In terms of the negative effect of FDI on domestic entrepreneurship associated with crowding out effects, one may argue that a highly educated labour force may benefit both MNCs and local firms. If the 'extra' highly-educated workers (i.e. those in excess of the natural or average level of highly educated workers in an economy) are disproportionately often hired by MNCs rather than local firms, the crowding out effect may be reinforced. Alternatively, if they are disproportionately often hired by local firms, it will make local firms more competitive. In this case the crowding out effects may thus be weakened by a better educated workforce. Hence, the sign of the moderating effect of a country's education level may depend on whether the ('extra') highly educated workers are employed by MNCs or local firms. Below we will discuss the likely answer to this question from a labour demand and a labour supply perspective.

In terms of labour demand, we look at internalisation theory, as developed by Buckley and Casson (1976, 2009) and Hymer (1976). According to this theory, MNCs will attempt to internalize certain factor markets, such as educated labour, across national borders, and will choose transaction cost-minimizing entry modes such as FDI whereby they can internalize knowledge-based resources, including human capital in the form of well-educated local employees, inside their firm boundaries in order to effectively offset additional costs from the liability of foreignness (Zaheer, 1995). The Ownership-Location-Internalization (OLI) paradigm (Dunning, 1973) and the firm-specific advantages (FSAs) and country-specific advantages (CSAs) framework (Rugman, 1981) also support this view, where firms choose locations based on country-specific or locational advantage including a well-educated workforce. These theories, therefore, suggest that firms may choose to invest in countries

with highly educated labour forces. This will lead to greater demand from MNCs for this scarce resource, at the expense of local firms, which may have a *negative* effect on domestic entrepreneurship.

In terms of labour supply, if higher education levels attract more MNCs, this may lead to relatively more safe and well paid jobs in the economy. In particular, for highly educated individuals, the benefits of a safe and high wage income in an MNC may outweigh the benefits of entrepreneurship such as higher autonomy and job satisfaction (Benz and Frey, 2008). This may apply in particular for risk-averse individuals as entrepreneurship involves risks such as a potential lower income, reputational damage and stress. Hence, many highly educated potential entrepreneurs may opt for a well-paid wage job in an MNC instead (Danakol et al., 2017), suggesting a *negative* interaction effect between FDI and education on entrepreneurship.

Hypothesis 3b: The relationship between inward FDI and entrepreneurship is negatively moderated by a country's level of education.

In summary, we have presented possible positive and negative moderating effects of education on the relationship between FDI and entrepreneurship. However, given the importance of the higher opportunity costs of entrepreneurship implied by greater MNC presence, i.e. higher potential wages (Danakol et al., 2017; Kher et al., 2012), and the greater demand for highly educated labour by MNCs, we expect the negative moderating effect to dominate (H3b). Nevertheless, similar to Hypotheses 1 and 2, which effects dominate in practice is ultimately an empirical matter.

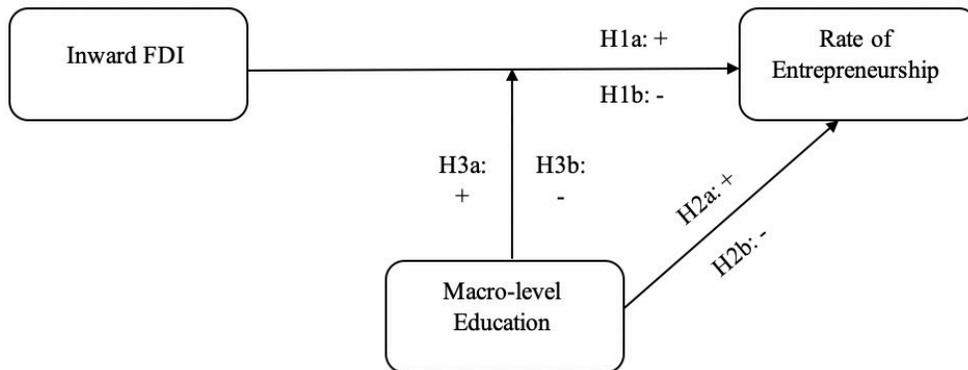
The hypothesised relationships between our main variables are depicted graphically in Figure 1.

2.4. Endogeneity of FDI

The relationship between FDI and entrepreneurship works both ways in that entrepreneurship may also have an impact on FDI. This may be linked to FDI motivations, for example, knowledge-seeking or strategic asset seeking (including distribution networks) FDI. In these cases, MNCs may locate in areas with high levels of entrepreneurship, in order to learn and gain access to strategic assets in the host country (Makino and Delios, 1996). Studies suggest that FDI may be motivated by the need to gain access to firm networks of local suppliers and

customers that share cultural or ethnic backgrounds similar to the investing firms (Chen and Chen, 1998).

Figure 1: Graphical representation of our hypotheses



In order to address this potential issue of endogeneity of inward FDI, we use the corporate tax rate as an instrumental variable, which has been found to be a major factor in FDI location decisions (Becker et al., 2012; Feld and Heckemeyer, 2011). Specifically, we use the *marginal* corporate tax rate (i.e. the highest tax rates, applied above a certain level of profits) as this is what typically drives FDI decisions of multinationals (Hajkova et al. 2006). This is because MNCs are typically very large firms with high absolute profit levels (O'Hagan-Luff and Berrill 2016). While marginal corporate tax rates can be influential on MNC location decisions, they do not influence the rate of nascent and new business entrepreneurs (our dependent variable, see next section), as the vast majority of them start (very) small and do not use the corporation legal form, and are therefore not liable for corporate tax. This makes the marginal corporate tax rate a good instrument.

3. Data and Methodology

3.1. *Data and descriptive statistics*

We test our hypotheses using data from several sources. Table 1 details all variables used, their definitions and data sources. To measure entrepreneurial activity for each country, we use data from the Global Entrepreneurship Monitor (GEM). Our measure for entrepreneurship is the Total early-stage Entrepreneurial Activity (TEA) rate, defined as the percentage of the 18-64 population who are either a nascent entrepreneur or owner-manager of a new business that is less than 42 months old. Between 2001 and 2015, 101 countries participated in the GEM survey, but not all countries participated in every year. There are 710 observations for TEA in total. However, due to missing values for some of our independent variables, our final estimation sample is comprised of 542 observations distributed over 75 countries. The number of observations for each of the 75 countries in our final dataset can be found in Berrill et al. (2020).

Inward FDI is measured as the percentage of a country's inward flow of foreign capital relative to its gross domestic product in a given year. This variable is typically positive but can be negative if divestments exceed investments by foreign investors. We use the share of the total labour force holding tertiary education as our country measure of education. Tertiary education, in particular, has been found to be important for innovation and endorsing economic growth in developed economies (Hanushek & Woessmann, 2008; Vandenbussche et al., 2006).

To account for alternative explanations for the variation of our dependent variable (TEA) across countries, we include several control variables (see Table 1). The rationale behind inclusion of each of these control variables in our models can be found in Berrill et al. (2020). By and large, our estimation results for the control variables were as expected. Again, we refer the interested reader to Berrill et al. (2020) for details.

We list the descriptive statistics for all of our variables in Table 2 for our sample of 542 observations. Pairwise correlation coefficients between the variables can be found in Berrill et al. (2020). The highest correlations between independent variables are around 0.6, low enough not to cause issues of multicollinearity.

Table 1: Data Sources and Definitions

Variable	Definition	Source
Total early-stage Entrepreneurial Activity (TEA)	TEA is the percentage of the 18-64 population who are either a nascent entrepreneur or owner-manager of a new business that is less than 42 months old.	Global Entrepreneurship Monitor (GEM).
Inward FDI	Inward foreign direct investment are the net inflows of investment (new investment inflows less disinvestment) to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. Inward FDI is expressed as a percentage of GDP.	IMF / World Bank
Education	The percentage of the total labour force that completed tertiary education.	International Labour Organization (ILO), Key Indicators of the Labour Market database.
Control of Corruption	Index ranging from -2.5 to 2.5 reflecting perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	World Bank's Worldwide Governance Indicators research project
Trade	Trade is the sum of exports and imports of goods and services measured as a percentage of gross domestic product.	World Bank and OECD national accounts data
GDP Growth	The percentage annual growth of GDP is based on a constant local currency, using 2005 US dollars.	World Bank and OECD national accounts data
Population Growth	Measured in annual percentage growth.	United Nations Population Division
Unemployment rate (UE rate)	Unemployment, as a percentage of the total labour force.	ILO, Key Indicators of the Labour Market database.
Employment in Agriculture	Employment in agriculture, hunting, forestry and fishing, as a percentage of total employment.	ILO, Key Indicators of the Labour Market database.
Employment in Services	Employment in services (broadly defined), as a percentage of total employment.	ILO, Key Indicators of the Labour Market database.
High Technology Exports	High-technology exports, as a percentage of manufactured exports. High-technology exports are products with high R&D intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery.	United Nations Comtrade database
Marginal Corporate Tax Rate (MCTR)	Marginal corporate tax rate, applied in the highest segment of profits.	KPMG Corporate tax rates table, January 2018. https://home.kpmg.com/xx/en/home/services/tax/tax-tools-and-resources/tax-rates-online/corporate-tax-rates-table.html

Table 2: Descriptive Statistics

	Mean	Median	Minimum	Maximum	Std. Dev.
Entrepreneurship (TEA)	9.48	7.35	1.48	40.27	6.12
Inward FDI	4.24	2.70	-16.09	36.74	5.56
Education	26.19	25.23	0.10	56.30	9.72
Trade	87.37	70.52	20.26	422.33	58.39
Control of Corruption	0.84	0.86	-1.21	2.55	1.03
GDP Growth	2.69	2.78	-14.35	18.29	3.50
Population Growth	0.76	0.70	-2.26	13.81	1.10
UE Rate	8.48	7.35	0.70	34.90	5.26
Agriculture	9.36	5.25	0.20	55.80	9.80
Services	65.30	67.25	25.20	87.00	10.61
High Tech Exports	14.48	11.18	0.16	70.79	11.26
Marginal Corporate Tax Rate	0.27	0.28	0	0.55	0.08

Notes: This table shows the descriptive statistics for our dependent, independent, control and instrumental variables for our sample of 542 observations

3.2. Methodology

We begin by estimating an OLS model with TEA as the dependent variable and FDI and Education as the main explanatory variables, with control variables and time and country dummies as described above. For the parameter estimates, standard errors robust to heteroskedasticity and serial correlation (i.e., Newey-West) are used. Because the effect of a country's inward FDI on entrepreneurship may be moderated by the education level of the country (see Hypotheses 3), we create an interaction term of these two independent variables, i.e. we multiply our measure of education by inward FDI.

As explained in Section 2.4, FDI may be endogenous. It is possible that the coefficients may be affected by reverse causality, or, alternatively, that there is an underlying unobserved factor covarying with FDI and TEA, leading to omitted variable bias. To address this, our main estimation results are derived from a two stage least squares regression model (2SLS). As explained before, we use the marginal corporate tax rate (MCTR) as instrument for inward FDI. Accordingly,

for our interaction term $\text{Inward FDI} \times \text{Education}$, we use $\text{MCTR} \times \text{Education}$ as an instrumental variable.³

4. Results

The results from our regression analysis are presented in Table 3. Models (1) and (2) use OLS while models (3) and (4) use 2SLS. Hypotheses 1a and 1b (positive or negative relationship between FDI and entrepreneurship) and 2a and 2b (positive or negative relationship between education and entrepreneurship) are tested by Models (1) - (4) in Table 3. For models (2) and (4), i.e. the models that include the interaction term between FDI and education, hypotheses 1 and 2 are evaluated in the sample means of Education and Inward FDI, respectively. Hypotheses 3a and 3b (positive or negative moderation of education on the relationship between inward FDI and entrepreneurship) are tested by Models (2) and (4). In the case that the results of the various models contradict each other, we consider Model (4) to be our main model and evaluate our hypotheses based on this model. Model (4) is our most complete model (i.e. it includes the interaction term) and also accounts for endogeneity of FDI, by using 2SLS. Models (1)-(3) serve for the purpose of comparison.⁴

In the linear models (1) and (3), Inward FDI is not significant. However, in the complete models (2) and (4) that include the interaction term, Inward FDI is significantly positive when evaluated in the sample mean of Education (see the bottom panel of the table). A positive relationship suggests that employees gain skills and knowledge by working in MNCs, which they may use to start a business on their own, supporting previous findings by Rodríguez-Clare (1996) and Newman et al. (2015). An alternative explanation is that MNCs create demand for goods and services that is serviced by local firms (De Maeseneire & Claeys, 2012). We note however that the coefficient is only significant at the 10 percent level. We therefore conclude that hypothesis 1a is weakly supported while hypothesis 1b is not supported. Regarding a country's education level, we find a significant negative sign in the linear models (1) and (3), while the sign is also significantly negative, at the 1% level, when evaluated in the sample mean of Inward FDI in the nonlinear

³ Details on endogeneity tests for FDI and $\text{FDI} \times \text{Education}$ plus instrument validity tests for their instruments, can be found in Berrill et al. (2020).

⁴ Full estimation results of the first stage regressions of our 2SLS models can be found in Berrill et al. (2020).

models (2) and (4). Hypotheses 2b is thus strongly supported (and H2a rejected), suggesting that in economies with higher educated labour forces, the number of entrepreneurs is smaller but the average firm size is bigger (Van Praag and Van Stel, 2013).

From Models (2) and (4) in Table 3 we note a negative interaction between Inward FDI and Education which is significant at the 5% level, supporting hypothesis 3b (but not H3a). Using model (4) estimates, the impact of Inward FDI on the rate of entrepreneurial activity (TEA) varies between 3.54 for the minimum value of Education in our estimation sample (0.10, see Table 2) and -0.96 for the maximum value of Education in our sample (56.3, see Table 2). In particular, the turning point can be estimated as 44.3, i.e. for countries where more than 44.3% of the total labour force completed tertiary education, the impact of Inward FDI on TEA is negative, with more negative impacts for higher shares of tertiary education.⁵ It seems that in highly educated workforces, more (highly educated) workers will prefer a safe and well-paid wage job in a multinational firm rather than starting a business on their own account and at their own risk.

5. Conclusions

We use data on 75 countries from 2001 to 2015 to investigate the relationship between inward FDI, education and entrepreneurial activity. We estimate a two stage least squared (2SLS) model with country rates of entrepreneurship as dependent variables, and inward FDI, macro-level education and their interaction as the main independent variables. We are particularly interested in the spillover effects of inward FDI on domestic entrepreneurship, and the impact that the education level of the labour force may have on this relationship. In theory, for countries with higher education levels, the positive spillover effects may be stronger due to higher absorptive capacity of the local economy, facilitating outsourcing of economic activity by MNCs. Alternatively, there may be a negative interaction as MNCs provide high-paid, safe wage jobs, which increase the opportunity costs of entrepreneurship for highly educated individuals (Lucas, 1978; Kher et al., 2012).

⁵ The turning point can be computed from Model (4) estimates as $3.552/0.080=44.4$. The value of 44.3 is computed using more decimals for the relevant coefficients.

Table 3: Explaining Country Rates of Entrepreneurial Activity (TEA)

	(1) OLS	(2) OLS	(3) 2SLS	(4) 2SLS
Constant	-15.852 *** (5.172)	-16.684 *** (5.081)	4.709 (16.474)	-11.554 (8.656)
Inward FDI	0.025 (0.029)	0.357 ** (0.147)	1.925 (1.397)	3.552 ** (1.740)
Education	-0.117 *** (0.031)	-0.071 * (0.037)	-0.150 ** (0.065)	0.213 (0.170)
Inward FDI * Education		-0.010 ** (0.004)		-0.080 ** (0.040)
Trade	-0.011 *** (0.004)	-0.011 *** (0.004)	-0.095 (0.065)	-0.055 * (0.033)
Control of Corruption	-1.091 *** (0.364)	-1.131 *** (0.363)	-2.580 ** (1.254)	-2.170 *** (0.823)
GDP Growth	0.327 *** (0.106)	0.303 *** (0.107)	-0.049 (0.290)	-0.049 (0.231)
Population Growth	0.636 ** (0.267)	0.654 ** (0.277)	0.435 (0.388)	0.671 * (0.358)
UE rate	-0.150 *** (0.051)	-0.151 *** (0.051)	-0.269 ** (0.107)	-0.218 *** (0.081)
Agriculture	0.466 *** (0.071)	0.466 *** (0.070)	0.268 (0.168)	0.365 *** (0.111)
Services	0.373 *** (0.066)	0.374 *** (0.065)	0.191 (0.156)	0.284 *** (0.096)
HT Exports	-0.066 ** (0.026)	-0.072 *** (0.027)	-0.038 (0.066)	-0.096 * (0.050)
Year Dummies	Yes	Yes	Yes	Yes
Country Group Dummies	Yes	Yes	Yes	Yes
Impact of Inward FDI evaluated in sample mean of Education		0.083 * (0.044)		1.453 * (0.821)
Impact of Education evaluated in sample mean of Inward FDI		-0.116 *** (0.031)		-0.127 *** (0.045)
N	542	542	542	542
R-squared	0.452	0.457	N.A.	N.A.
Adjusted R-squared	0.426	0.430	N.A.	N.A.

Notes: The dependent variable is Total early-stage Entrepreneurial Activity (TEA). A lag of one year has been applied to all independent and control variables. The estimation method is OLS for models (1) and (2) and 2SLS for models (3) and (4). The marginal corporate tax rate (MCTR) is used as an instrumental variable (IV) for Inward FDI in models (3) and (4), and the interaction term (MCTR * Education) is used as an IV for our interaction term (Inward FDI * Education) in model (4). Robust standard errors are in brackets.

*** Significant at 0.01 level, ** 0.05 level, * 0.10 level.

The main findings of our empirical analysis are as follows. On average, we find positive (albeit weak) spillover effects of inward FDI on entrepreneurship (TEA rate), in line with earlier findings by Smarzynska Javorcik (2004), Newman et al. (2015) and various other studies.⁶ Moreover, we find a strong negative association between education and entrepreneurship, suggesting that in countries with higher educated populations, the number of entrepreneurs is lower but average firm size is higher. This result is consistent with Lucas (1978), Van Praag and Van Stel (2013), Sorgner et al. (2017) and various other studies. When considering moderation effects, we find support for a negative interaction effect of FDI and education on entrepreneurship, suggesting that in highly educated countries, inward FDI leads to more high-paid jobs in the wage sector rather than a higher number of entrepreneurs. Our results suggest that in an economy with high levels of inward FDI and a highly educated workforce, more (highly educated) workers will opt for safe and well-paid wage jobs in a multinational firm rather than starting a business on their own account and at their own risk. Interestingly, although using a completely different methodology, this outcome is also implied by Danakol et al. (2017). Specifically, our estimation results suggest that countries where more than 44.3% of the total labour force have completed tertiary education, are associated with a negative impact of inward FDI on a country's rate of entrepreneurial activity.

Our results have implications for theory and practice. Regarding theory, our paper has made clear that the interrelationship between inward FDI, education and entrepreneurship is complex, with various mechanisms being at play that often work in opposite directions (see Figure 1). Perhaps more important, although the relationship between inward FDI and domestic entrepreneurship has often been studied, the education level of the host country's population is seldomly taken into account. Our paper shows that it is actually crucial to take the education level into account, as this determines whether the relationship between FDI and entrepreneurship is positive or negative, and how strong the relation is. Regarding practice, our paper shows that in highly-educated countries with increasing FDI levels, domestic entrepreneurs should take into account that they may face fiercer competition in the labor market, i.e. they may expect serious competition from MNCs to hire qualified employees.

⁶ With 'on average' we mean the impact of FDI evaluated in the sample mean of Education (see Table 3, model 4).

Our results also have implications for public policy. Government may promote economic activity and job creation by encouraging either inward FDI or entrepreneurship or both. In order to evaluate the success of these policies, they need to be considered jointly as the success of one policy may be at the expense of the other, particularly in countries with highly educated workforces. For example, a small open economy such as Ireland invests substantial resources in promoting inward FDI, while also funding semi-state bodies to support entrepreneurship (Acs et al., 2007; Breznitz, 2012). Our results suggest that these policies may be counter-productive and the encouragement of inward FDI may be, in fact, to the detriment of entrepreneurial activity. This is because a potential highly-educated entrepreneur may now choose a well-paid, safe wage job in a multinational firm instead of starting a new venture independently on one's own account and risk. Hence, the opportunity costs of becoming an entrepreneur are higher in countries with higher levels of inward FDI, education and wages. The employment prospects created by inward FDI in these contexts make working as an employee more attractive relative to the risks of striking out alone. Therefore, governments should be aware of this potential negative interaction when formulating policy.

Another policy implication relates to entrepreneurship education. In many modern economies, entrepreneurship courses are being developed and taught at universities, stimulating students to start their own businesses (Sánchez, 2011). The strong negative association between a country's education and development levels on the one hand, and the rate of entrepreneurship on the other, suggests that the market space for entrepreneurship is limited in highly developed countries. This implies that entrepreneurship courses should also focus on making students become familiar with other forms of entrepreneurial activity, including intrapreneurship (Van Praag and Van Stel, 2013; Millán et al., 2014).

In summary, notwithstanding limitations (see Berrill et al., 2020, for details), our paper contributes to the literature by examining the moderating role of country-level education in the relationship between inward FDI and entrepreneurial activity. In particular, we have shown that the relationship between FDI and a country's rate of entrepreneurial activity may vary between a negative relationship and a positive one, depending on the education level of the country's labour force.

6. References

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