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FDI and Human Capital: Empirical Evidence of Gender Effects and Education Spillovers

Ph.D. Thesis

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I would like to dedicate this thesis to my family which I truly love and appreciate with special dedication to my beloved grandmother Konstantina…

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Summary

This series of papers tries to reflect the determinants of inward FDI by placing particular emphasis on human capital, gender disparities in terms of education and even more so on the role of females' education in science fields. The present dissertation consists of three independent essays, of which the first one is devoted completely to the study of human capital, skills and competencies, the second to gender disparities effects in terms of different types and levels of education, and the third to how females' education and culture shape the FDI inflows taking also into account the economic, human capital and institutional environment.

The first essay, which is presented in Chapter 2, evaluates the role of human capital in attracting inward foreign direct investment (FDI) in EU countries. Specifically, it provides a comprehensive investigation on the role of human capital, skills and competencies in the location of inward FDI by comparing Western (EU15) and Central and Eastern (CEE) European Union (EU) members. We go beyond existing studies by examining an extensive list of traditional and newly advanced measures capturing human capital, even differing schooling systems as well as skills and competencies. We assess, for the first time in the FDI literature, vocational vs. general education, following the Vocational and Educational Programs of the EU as well as quality human capital aspects as captured by international scores. Results indicate a major difference regarding theoretical and vocational education programs for both sub-regions; in addition, a major difference is obtained for particular qualifications in international scores. There is evidence for potential internal and external inefficiency in education in CEE countries in contrast to the EU15, which calls for re-evaluation and restructuring in their education system towards more efficient use of funds; this would earn investors' trust and meet labor markets' demands, thus stimulate more and higher value added foreign investments. Results also point to useful implications for managers who should watch closely education reforms.

The second essay, presented in Chapter 3, is a systematic analysis of the relationship between gender educational disparities and inward FDI in Western and CEE EU countries to detect potential differentiations between them. We examine various gender related human capital measures so as to capture the complicated nature of human capital and education concerning level and type with respect to gender to see

which is more important in the eyes of foreign investors. Using panel data estimations, we conclude that the reduction of gender educational gaps in both sub-regions facilitates the absorption of inward FDI. Policymakers should enhance gender equality in vocational education in Western EU members while attention should be given in gender equality in theoretically oriented programmes in the CEE EU ones.

The third essay (Chapter 4) examines how national culture, religion, and females' education, parts of institutions, shape the FDI inflows in a panel of European Union countries for the period 2000-2012. In terms of education, we focus on tertiary level and Science, Technology, Engineering and Mathematics (STEM) fields; the latter is vital in the modern labor market. However, the females' graduate rate in EU is very low. The results reveal that not only tertiary education graduates but even more so tertiary graduates with STEM skills are important in attracting FDI. Moreover, the presence of high female STEM labor force is particularly an attracting feature for FDI. Finally, institutions, culture and the economic environment are important determinants in attracting FDI.

Finally, Chapter 5, presents the concluding remarks of all essays and highlights some policy implications of how human capital, gender education and particularly females' education stimulate FDI and where should policymakers pay most attention.

Περίληψη

Σε αυτή την σειρά άρθρων προσπαθούμε να προσδιορίσουμε τους προσδιοριστικούς παράγοντες των εισερχόμενων άμεσων ξένων επενδύσεων (ΑΞΕ) δίνοντας ιδιαίτερη έμφαση στο ανθρώπινο κεφάλαιο και την εκπαίδευση κατά φύλο. Η παρούσα διδακτορική διατριβή αποτελείται από τρεις ανεξάρτητες εργασίες, εκ των οποίων η πρώτη είναι αφιερωμένη αποκλειστικά στην μελέτη του ανθρωπίνου κεφαλαίου, η δεύτερη στην επίδραση της εκπαίδευσης με βάση το φύλο λαμβάνοντας υπόψιν διαφορετικά είδη και επίπεδα εκπαίδευσης, και η τρίτη στον τρόπο με τον οποίο η εκπαίδευση των γυναικών και η κουλτούρα διαμορφώνει τις εισερχόμενες ΑΞΕ λαμβάνοντας υπόψιν το οικονομικό, εκπαιδευτικό και θεσμικό περιβάλλον.

Η πρώτη εργασία, που παρουσιάζεται στο Κεφάλαιο 2, αξιολογεί το ρόλο του ανθρωπίνου κεφαλαίου στην προσέλκυση ΑΞΕ στις χώρες της Ευρωπαϊκής Ένωσης (ΕΕ). Ειδικότερα, παρέχει μια αναλυτική διερεύνηση του ρόλου του ανθρωπίνου κεφαλαίου, των δεξιοτήτων και των ικανοτήτων στην εγκατάσταση των ΑΞΕ συγκρίνοντας τις Δυτικές (ΕΕ-15) και τις Κεντρικές και Ανατολικές (ΕΕ-11) χώρες της ΕΕ. Σε αντίθεση με τις προϋπάρχουσες μελέτες εξετάζουμε μία εκτεταμένη λίστα παραδοσιακών και καινούριων προηγμένων μέτρων που συλλαμβάνουν το ανθρώπινο κεφάλαιο, ακόμη και διαφορετικών σχολικών συστημάτων. Αξιολογούμε, για πρώτη φορά, στην ιστορία των ΑΞΕ, την τεχνολογική έναντι της γενικής εκπαίδευσης, ακολουθώντας τα Τεχνολογικά και Εκπαιδευτικά Προγράμματα της ΕΕ καθώς και την ποιότητα του ανθρωπίνου κεφαλαίου όπως μετράται με διεθνείς βαθμολογίες. Τα αποτελέσματα υποδεικνύουν μια κύρια διαφορά σχετικά με τα θεωρητικά και τεχνολογικά προγράμματα εκπαίδευσης για τις δύο υπο-περιφέρειες – επιπλέον, λαμβάνουμε μία κύρια διαφορά για συγκεκριμένα προσόντα στις διεθνείς βαθμολογίες. Υπάρχουν αποδεικτικά στοιχεία για πιθανή εσωτερική και εξωτερική αναποτελεσματικότητα στην εκπαίδευση στις ΕΕ-11 σε σχέση με τις ΕΕ-15, που αποτελεί αναγκαίο στοιχείο για επαναξιολόγηση και αναδιάρθρωση του εκπαιδευτικού τους συστήματος σε μια κατεύθυνση αποτελεσματικότερης χρήσης κεφαλαίων – αυτό μπορεί να κερδίσει την εμπιστοσύνη των επενδυτών και να ανταποκριθεί στις απαιτήσεις της αγοράς εργασίας, και επομένως να τονώσει υψηλότερης αξίας ΑΞΕ. Τα αποτελέσματα επίσης υποδεικνύουν χρήσιμα

συμπεράσματα για τα στελέχη που θα πρέπει να παρακολουθούν στενά τις μεταρρυθμίσεις της εκπαίδευσης.

Η δεύτερη εργασία (Κεφάλαιο 3) αποτελεί μία συστηματική ανάλυση της σχέσης των ανισοτήτων στην εκπαίδευση κατά φύλο και των εισερχόμενων ΑΞΕ στις ΕΕ-15 και ΕΕ-13 προκειμένου να εντοπίσει πιθανές διαφορές μεταξύ τους. Εξετάζουμε διάφορα μέτρα ανθρωπίνου κεφαλαίου με βάση το φύλο, ώστε να συλλάβουμε την περίπλοκη φύση του ανθρωπίνου κεφαλαίου και της εκπαίδευσης αναφορικά με το επίπεδο και το είδος της εκπαίδευσης και να δούμε τι είναι πιο σημαντικό στα μάτια των ξένων επενδυτών. Χρησιμοποιώντας εκτιμήσεις διαστρωματικών δεδομένων, συμπεραίνουμε ότι η μείωση των εκπαιδευτικών ανισοτήτων με βάση το φύλο και στις δύο υπο-περιφέρειες διευκολύνει την απορρόφηση των εισερχόμενων ΑΞΕ. Οι υπεύθυνοι χάραξης πολιτικής θα πρέπει να ενισχύσουν την ισότητα με βάση το φύλο στην τεχνολογική εκπαίδευση στα παλαιότερα μέλη της ΕΕ ενώ προσοχή θα πρέπει να δοθεί στην ισότητα στην γενική εκπαίδευση στις Κεντρικές και Ανατολικές χώρες της ΕΕ.

Η τρίτη εργασία (Κεφάλαιο 4) εξετάζει τον τρόπο με τον οποίο η κουλτούρα, η θρησκεία και η εκπαίδευση διαμορφώνουν τις ΑΞΕ στις χώρες της Ευρωπαϊκής Ένωσης για την περίοδο 2000-2012. Αναφορικά με την εκπαίδευση, επικεντρωνόμαστε στην τριτοβάθμια εκπαίδευση και στους τομείς Φυσικής, Τεχνολογίας, Μηχανικής και Μαθηματικών (γνωστών ως STEM – Science, Technology, Engineering and Mathematics) – οι τομείς STEM είναι ουσιαστικής σημασίας για τη σύγχρονη αγορά εργασίας. Ωστόσο, το ποσοστό αποφοίτησης στην ΕΕ είναι πολύ χαμηλό. Τα αποτελέσματα αποκαλύπτουν ότι όχι μόνο οι απόφοιτοι της τριτοβάθμιας εκπαίδευσης αλλά και οι απόφοιτοι της τριτοβάθμιας εκπαίδευσης σε τομείς STEM είναι σημαντικοί παράγοντες για την προσέλκυση ΑΞΕ. Επιπλέον, η παρουσία γυναικών με εκπαίδευση STEM αποτελεί ένα ιδιαίτερα ελκυστικό χαρακτηριστικό για τις ΑΞΕ. Τέλος, το θεσμικό πλαίσιο, η κουλτούρα και το οικονομικό περιβάλλον αποτελούν σημαντικούς καθοριστικούς παράγοντες για την προσέλκυση ΑΞΕ.

Το Κεφάλαιο 5 απεικονίζει τα συμπεράσματα και τονίζει ορισμένες πολιτικές κατευθύνσεις σχετικά με το πώς το ανθρώπινο κεφάλαιο, η εκπαίδευση κατά φύλο

και ιδιαίτερα η εκπαίδευση των γυναικών τονώνουν τις ΑΞΕ και πού θα πρέπει να επικεντρώνονται περισσότερο οι υπεύθυνοι χάραξης πολιτικής.

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Chapter 1. FDI and Human Capital: An Introduction

"The most valuable of all capital is that invested in human beings" (Alfred Marshall)

1.1 Introduction

Foreign direct investment (FDI) plays an important role in the development process of a country (Wang, 2009). It is an integral part of an open and effective international economic system and a major catalyst to development. Many governments from developed and developing countries believe that FDI can help them get through stagnation and even circumvent the poverty trap (Brooks et al. 2010). It has potential for making a contribution to the development through the transfer of financial resources, technology and innovative and improved management techniques along with raising productivity. During the last century huge changes are noticed in world's economy, where very important role is given to various forms of capital movement across different countries. One of the most important tasks for a country's' economic policy has become the attraction of FDI.

Globalization has been on course since the 1980s, when various countries began opening up their economies, welcoming FDI and increasing international trade. Global FDI flows remain as the most stable and preferred component of external financing despite the financial and economic crises witnessed in the global economy (UNCTAD, 2014). Many empirical studies on the role of FDI in host countries suggest that FDI is an important source of capital, complements domestic private investment, and is usually associated with new job opportunities and enhancement of technology transfer, and boosts overall economic growth in host countries (Chowdhury & Mavrotas, 2006).

During the last three decades, FDI has become increasingly important, with increasing volumes of direct investment flowing between and into the developed countries. Between 1990 and 2000 worldwide FDI inflows increased more than five times and since 2000 they have been declined. In 2013, FDI flows returned to an upward trend. Global FDI inflows rose by 9 per cent to $1.45 trillion in 2013. FDI inflows increased in all major economic groupings – developed, developing and transition economies (UNCTAD, 2014). Concerning developing countries received about 13.59 percent of global FDI inflows in 1980 compared with 45.54 percent and 55.48 in 2012 and 2014,

respectively. On the other hand, transition economies received about 6 percent of global FDI inflows and 3.9 in 2012 and 2014 respectively.

Global foreign direct investment (FDI) flows exceeded the pre-crisis average in 2011, reaching $1.5 trillion despite turmoil in the global economy. However, they still remained about 23% below their 2007 peak. Global FDI flows increased tenfold, or by about $2 trillion, from 1990 to 2008 (UNCTAD, 2009), nevertheless a consensus on robust FDI determinants is still elusive. FDI is considered to bring substantial benefit to host economies being a key element in international economic integration. FDI creates direct, stable and long-lasting links between economies. It encourages the transfer of technology and know-how between countries, and allows the host economy to promote its products more widely in international markets. FDI is also an additional source of funding for investment and, under the right policy environment, it can be an important vehicle for development (OECD Factbook, 2013).

Most of FDI transactions were between the developed countries while most of the world inflows of FDI have been directed towards the European Union (EU) reflecting both the increasing internalization of the European economies and the instigation of the European integration process (Barell & Pain, 1999; Mold, 2003). Developed countries received about 86.36% of global FDI inflows in 1980 whereas in 2014 they received only 40.61 percent. Finally, EU-28 received 20.97% of global FDI inflows in 2014. FDI inflows in the European Union rose from 97 billion in 1990 to 900 billion in 2007, making the European Union one of the most important recipient area for FDI. According to Deutse Bank's survey (2014) in 2013, FDI inflows to EU increased by 14% (246 billion USD) compared to years 2012 and 2009 when an exceptionally low volume of inflows was recorded.

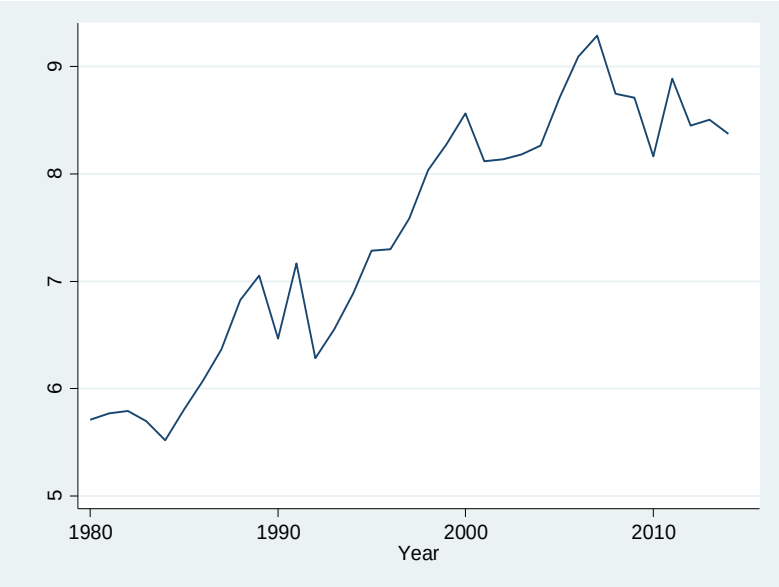

Figure 1: LogFDI Inflows EU-28 (1980-2014), Authors calculations

Over the past decade, developing countries around the world opened their economies to foreign direct investment, and there has been a surge of such investment to many developed and developing regions. In making their location decisions, firms may choose from several alternative sites, and a host of political, economic and cultural factors, including economic and political stability, language, the level of income per capita, the natural resources that are available, and the quality of infrastructure, will be factored into their decision-making. The most powerful attraction for a host country, however, may be found in its work force. The lack of human capital, in turn, may be a significant deterrent to multinational enterprises (Lucas, 1990; Alcacer, 2000).

Based on the above, one of the most significant determinants of inward FDI is considered human capital and education. Human capital plays a prime and indispensable role in the process of economic growth, development and innovation improving the social welfare of people. Education is highly valued, not only because of its potential to generate monetary returns but also because of the social (non-pecuniary) returns it entails, such as the effects on crime, health, mortality, fertility, voting or political participation (Moretti, 2005; Lochner, 2011). Little surprise that education holds such a central role in economic and policy debate. Within the field of development economics, the relationship between FDI and human capital has become a topic of growing interest. This is largely thanks to endogenous growth theory, which privileges human capital in the development process. Endogenous growth theory

posits that national policies with respect to human capital investment play a determinative role in economic development.

While human capital holds a prominent role and has been the subject of much research in economics literature (Carkovic & Levine, 2005; Roaf et al., 2014), we find relatively rare inclusion of the host country's human capital as a relevant factor in International Business (IB) studies addressing decisions of foreign investors in the empirical forefront. What is more, even when human capital is accounted for in a foreign direct investment (FDI) study, this is not accompanied by an explicit theoretical framework. When human capital has been included in models of the determinants of FDI, it appears simply as a control variable, usually without any theoretical rationale for its inclusion or critical discussion of the measures used.

The core aim of this thesis is to fill in this gap and examine the importance of education, skills and competencies by taking into account different levels and types of human capital in facilitating FDI. We apply an extended list of traditional used but also newly developed measures available in order to assimilate their relative significance to foreign investors. Under these lens, we construct some new measures of human capital that may be perceived as important according to literature discussion. We focus on the EU where there is an ongoing agenda and implementation programs towards advancing skills and training, differentiating between general and vocational education effects on foreign investors. By differentiating between Western and Central and Eastern EU members we make inferences about the status between the two in terms of human capital attractiveness to inward FDI. Our aim is not to explain the FDI pattern and differences between the two regions; we instead focus on the effect of different measures of human capital, skills and competencies to foreign direct investors and potential differences between the two regions in terms of significance of these measures.

Particular attention is paid to gender education disparities and how they shape inward FDI, a subject that has not received attention in the empirical literature. Gender inequalities harm well-being and are a form of injustice in most conceptions of equity or justice so that they are problematic both from a well-being and an equity point of view (Klasen, 2002, 2007). Gender bias and discrimination may reduce economic growth (Klasen, 2002) and discourage workers with appropriate qualifications from

entering in a suitable job. Gender related education disparities mean less educated females with less skills and competencies (European Commission, 2009) while disadvantages in education translate into lack of access to skills and limited opportunities in labor market. On the other hand, gender related-education disparities may affect the competitiveness of a country by lowering females' wages and therefore creating a more friendly-FDI environment (Braunstein, 2002). Thus, MNEs may be interest in gender education disparities in order to exploit highly educated females at a lower cost. Though there exists partial evidence on the links between gender inequality and trade (Seguino, 1997; Busse & Spielmann, 2006), the role of gender differences in terms of education in FDI attraction has been ignored so far with few exceptions (Busse & Nunnenkamp, 2009; Brzozowski, 2013; Blanton & Blanton, 2015). We employ different measures of education in order to capture also general and vocational education and detect which one and at which level is considered more important.

When seeking to understand the factors that influence and promote entrepreneurship and innovation, the role of gender is gaining increasing importance. While in the past so few females held important positions (Adler, 1999), nowadays more and more females are present and successful in international and board positions and have achieved professional success despite the difficulties of working in international organizational contexts. Thus, females' education is becoming more and more important. In our view general educational attainment can provide only a part of the explanation for the gender gap in innovation activity because greater educational attainment does not translate into better labor outcomes for females (Dili & Westerhuis, 2018). Thus, the choice of study can be important for understanding the gender gap, especially in innovation. By taking into account the economic and human capital environment we examine how females' education and even more so females' graduates in STEM fields and culture shape inward FDI in EU countries both separately and jointly.

In conclusion, by focusing on human capital we examine whether education and skills by using different measures matter in the eyes of foreign investors and where they should pay more attention. Next, particular attention is paid to gender disparities in terms of education to see whether MNEs prefer these disparities when invest in EU

countries. EU countries are disaggregated into Western and Eastern ones. Finally, by using all the EU countries based on data availability we focus only on females' education and particularly on females' education on science fields in tertiary level in order to draw useful conclusions for policymakers. Our goal is to draw useful conclusions for policymakers in order to focus on specific areas of education and give the required priorities so as to make EU a more attractive place for MNEs.

1.2 Theories of FDI

Various FDI theories have been developed since 1960s and provide the motivations and determinants of FDI to explain FDI. Economists broadly classified FDI theories into macro and micro-level FDI theories (Dunning & Lundan, 2008); macro-level FDI theories present the macroeconomic factors that determine the FDI while micro-level theories discuss the motivation of FDI associated with the firm level. The macro-level includes the capital market theory, the Dynamic macroeconomic theory, the FDI theories based on exchange rates, the FDI theories based on economic geography, the gravity approach to FDI and the FDI theories based on institutional analysis. At the micro-level, we have theories like the Existence of firm specific advantages (Hymer), FDI and oligopolistic markets, Theory of internalization, and Eclectic FDI theory. Recently another type of FDI categories discussed by the economists is the development theories which combine both the micro level and macro-level FDI theories. The development theories are Life cycle theory, Japanese FDI theories and five stage theories.

One of the oldest macroeconomic theories of FDI is capital market theory where FDI is determined by interest rates. Capital market theory is a part of portfolio investment (Aliber, 1971). According to Boddewyn's (1985) capital market theory, three positions attract FDI to the less developed countries (LDCs): the undervalued exchange rate, which allows lower production costs in the host countries, that since there is no organized securities exists, long term investments in LDCs will often be FDI rather than purchase of securities and that since there is limited knowledge about host countries' securities that is why it favours FDI which allows control of host country assets. Another macroeconomic theory is dynamic macroeconomic FDI theory according to which the timing of investments depends on the changes in the macroeconomic environment (SanjayaLall, 1997). This theory states that inward FDI

is a long term function of multinational companies' strategies and times has a prominent role. Similar to these two theories, FDI theories based on exchange rate tried to show the relationship between FDI and exchange rate. The theory tries to explain how FDI inflows affect exchange rates. The theory considered FDI as a tool of exchange rate reduction (Cushman, 1985).

Another macroeconomic FDI theory is based on economic geography which focuses on countries and explains why internationally successful industries emerge in particular countries (Porter, 1990; Nachum & Keeble, 1999). These explanations were based on the differences among countries in terms of availability of natural resources, nature of labour force, local demand, infrastructure etc. The theory explains why some regions/cities within countries are economically successful (Storper, 1997; Sassen, 1994). The Gravity approach to FDI theory explores that if two countries are very close geographically, economically, and culturally, then the FDI flows between the countries is the highest. The theory includes traditional variables such as size, level of development, distance, common language and other institutional variables such as shareholder protection (Pagano & Volpin, 2005) and openness to FDI flows (Shatz, 2000) as determinant of FDI flows.

Another macroeconomic FDI theory, based on institutional analysis, which was developed by Wilhelms (1998), explores the importance of institutional framework on the flows of FDI. Based on this theory political stability is the key factor of a healthy institutional framework. Thus, according to the theory, FDI is determined more by institutional variables namely policies, laws, and their implementation and less by intransigent fundamentals. The four institutions contributing to FDI flows are governments, markets, education and socioculture (Wilhelms & Witter, 1998).

On the other hand, Micro level FDI theories try to explain why MNCs prefer opening subsidiaries abroad rather than exporting or licensing their products, how MNCs choose their investment locations and why they invest where they do. Hymer (1976) developed the Firm Specific Advantage theory of FDI according to which firms invest abroad because of certain firm specific advantages such as, access to raw materials, economies of scale, intangible assets (such as trade names, patents, superior management etc.), low transaction costs etc. If markets work effectively and there are no barriers in terms of trade and competition, international trade is the only way to

participate in the international market (Kindleberger, 1969). He saw FDI as a means of transforming knowledge and firm assets both tangible and tacit in order to organize production abroad (Sethi et al., 2003).

FDI and oligopolistic markets argued that in a two-tier oligopoly model, there are two foreign investors; the one produces intermediate products and the other produces final products. The two investors decide independently whether or not they will enter a host country. The entry of either of the firms incurs some fixed costs and generates technological spill over for the local firms of the same sector and reduces the marginal cost of production (Lin & Saggi, 2011). When one firm in an oligopolistic markets moves, the other firms also reacts with countermoves at both domestic and international levels (Schenk, 1996).

Turning to the development theories of FDI, the product life cycle theory was developed by Vernon in 1966. The theory can be used to analyze the relationship between product life cycle and possible FDI flows. According to Vernon's, the firms originally developed the product to establish manufacturing facilities to produce the product in foreign markets. Generally FDI can be seen in the maturity phase and then decline. The key factors of the theory are technological innovation and market expansion. Technology creates and develops a new product and the market size and market structure influenced the extent and type of international trade.

Japanese FDI theories analysed the relationship of FDI, competiveness and economic development based on the ideas of Michael Porter. Ozawa (1992) was the main representant of the theory and it was initially developed in the 1970s. He identified three main phase of development when he analysed the waves of FDI flows of a country. In the first phase of economic growth, the country is an underdeveloped one and it is targeted by foreign companies to use its potential advantages especially low labour costs. The country experienced the inflows of FDI and there is no outflow of FDI from the country. In the second phase more and more FDI inflows were enter to the country. The labour costs raises and the standard of living of the people goes up. As the labour costs raises, outflow of FDI takes place. In the third phase, the country face serious completion and this completion is based on innovation. The incoming and outgoing of FDI are motivated by market factors and technological factors (Kojima & Ozawa, 1985).

Buckley & Casson (1976) and Hennart (1982) developed the Theory of internalization. Due to market imperfections, firms aspire to make use of their monopolistic advantage themselves. Buckley & Casson (1976) suggest that firms can overcome the market imperfections by internalising their own markets. That means, internalisation involves a vertical-integration in the form of bringing new operations and activities under the governance of the firm. Earlier these activities were carried out by the intermediate firms. Initially, the theory was developed by Coase (1937) in a national context and Hymer (1976) in an international context. Hymer identified two major determinants of FDI—one is removal of competition and the other is advantages which some firms possess in a particular activity (Denisia, 2010).

One of the most influential and widely used FDI theory belongs to Dunning. Dunning's eclectic paradigm (OLI) has been the most influential framework for empirical investigation of determinants of FDI. OLI offers a holistic framework to investigate the significance of factors influencing both the initial expansion of multinational enterprises (MNEs) by foreign production and the subsequent growth of their activities (Tolentino, 2001). The framework facilitates comparison between different theories by establishing the common ground between various approaches and by clarifying the specific questions theorists have posed, as well as the different levels of analysis (Cantwell & Narula, 2001). Thus, besides the theories mentioned above, one of the most important theory which has been a cornerstone in FDI literature is Dunning's theory.

Dunning (1980, 1988) considered the internalisation theory as very important and used it in his eclectic theory. He argued though that internalisation theory explains only part of FDI flows. In contrast to the eclectic paradigm, internalization theory is mainly used to explain the choice of entry mode. For example, advantages overcome the externality of knowledge as a public good, such that FDI is preferred to licensing, joint ventures, or alliances. Dunning draws partly on macroeconomic theory and trade as well as microeconomic theory and firm behaviour. The eclectic theory of Dunning is a mix of three different theories of FDI, i.e. OLI (Denisia, 2010). From OLI theory four types of FDI derived, they are a) Resource seeking FDI b) Market seeking FDI c) Efficiency seeking FDI and d) Strategic asset/capabilities seeking FDI (Dunning, 1993).

Specifically, the eclectic paradigm has been developed by Dunning in a series of publications (Dunning 1980, 1981, 1988, 1992). There are three factors that determine the international activities of multinational enterprises (MNEs). These are ownership (O), location (L), and internalization (I) advantages. Thus, Dunning's eclectic paradigm is also known as the OLI paradigm. The OLI paradigm explains foreign direct investment (FDI). It suggests that MNEs develop competitive O advantages at home and then transfer these abroad to specific countries (depending on L advantages) through FDI, which allows the MNE to internalize the O advantages. Ownership advantages refer to intangible assets which are possess by the firm exclusively and may transferred within MNCs at lower costs, leading to higher incomes or reduced costs. Ownership of limited natural resources, patents, trademarks etc, is some of the examples of ownership advantages. When the first condition is fulfilled, then location advantages determine who will become the host country for the activities of MNCs. Benefits of quantitative and qualitative factors of production, resource availability, lower costs of transportation, telecommunications, and large market size, common government policies, and distance from the home country, cultural relations etc. are the location specific advantages. I stand for internalisation. When the first two conditions are fulfilled, it must be profitable for the firm to use these advantages in collaboration of some of the factors outside the country of origin (Dunning, 1973, 1980, 1988). The eclectic paradigm of OLI shows that OLI parameters are different from company to company and it reflects the economic, political and social conditions of the host countries.

The Investment Development Path (IDP) is based on the notion that the outward and inward direct investment position of an economy is systematically related to its economic development that was first put forward by Dunning in 1979 (Dunning & Narula, 1996). The Investment Development Path suggests that countries are likely to go through five different stages of development and that these stages can be classified according to the tendency of those countries to be outward and/or inward direct investors. The Investment Development Path was originally put forward in order to show the relevance of the eclectic paradigm in explaining the net outward investment position of countries (Dunning & Narula, 1996).

Five stage theories of John Dunning suggest that countries tend to go through five main stages of development and these can be classified according to the propensity of

those countries to be outward and inward direct investors. At the first stage, the country is unable to attract inward FDI since it has no specific advantages except the possession of natural resources. At this stage, little outward FDI can be seen and foreign companies will prefers to export and import from the country. In the second stage, inward FDI starts rising and outward FDI remains low. Domestic markets may grow either in size or purchasing power, and making some local productions by the foreign firms. Initially this production by foreign firms takes the form of import substitution manufacturing investments. Low labour cost and growing infrastructure and government policies able to establish export oriented firms by the foreign investors. Outward FDI is still low in this stage as well. In the Third stage marked by declining rate of inward investments and growing outward investment which results in raising Net Outgoing Investment. Large inward investments lead to high technological capabilities and standardise products. High labour costs leads to high income and demand high quality products. In the fourth stage, the comparative advantage of low labour costs deteriorated and outward investment will directed to the low wage countries. Outflows of investments takes place strongly and seeks advantages in the foreign countries especially low labour cost. And in the final stage, the inflows and outflows of investments come into balanced and the investment decisions are completely based on the strategies of MNCs.

Taking into account all the above mentioned theories, the analysis of the present thesis is mainly based on Dunning's OLI paradigm (1977). The OLI paradigm, since its inception in late 1970s (Dunning, 1977), has been the dominant theoretical framework for understanding FDI. As we mentioned above, according to the eclectic paradigm, three factors explain foreign direct investment stock of countries; ownership, location and internalization (OLI) advantages. Ownership advantages refer to competitive advantages of domestic firms (trademarks, patents, managerial know how, etc.), location advantages refer to the host country's attractiveness to other countries in terms of economic and political system, infrastructure, education, etc.) and internationalization advantage refer to the advantages for the firm to exploit the ownership advantages in the international markets; more profitable for the firm to exploit its assets in international market rather than in domestic market.

Studies in recent decades shifted their interest mainly in location determinants for increasing FDI inflows (Dunning, 2000), especially due to intensified globalization and the transition process of newer European Union member countries. One of the most relevant and crucial location determinants is considered human capital for the attraction of MNEs, which is our main focus in the present study.

The FDI literature illustrates that the importance of location advantages has increased with the emphasis changing from natural and cost-related input endowments to knowledge-based competencies. Over the recent decades, the composition and significance of competitiveness-enhancing assets have changed (Dunning and Lundan, 2008b), from pure production-capability related assets such as technology to more institutionally related assets such as human capital (Hao et al., 2011). Though human capital is a valuable location factor, the original OLI paradigm did not give any particular attention to that.

Later, Dunning & Lundan (2008) included the availability and, by implication, cost of highly-motivated semi-skilled labour in MNEs' location decisions. They extended the determinants of inward FDI by including policy-induced effects generated by institutions. Their work combines institutional analysis with international business studies and incorporates institutions into the OLI paradigm, emphasizing the role of various institutions in shaping OLI. Based on the extension, in the present thesis we incorporate institutional effects captured by gender education disparities as an important location factor.

Institutions are considered an important factor explaining innovation and can be divided into formal and informal ones (Redmond, 2005). Formal institutions refer to explicit rules in a society such as laws, regulations, and protection of property rights (Dunning & Lundan, 2008). They have to be explicitly established by an authority or an organization/individual, they are susceptible to change over time and can anticipate the desirable behavior of individuals and organizations from general and simple exchanges (e.g. through laws) to specific and complex ones (e.g. by a contract or a judicial resolution). Informal institutions, on the other hand, can be defined as those constraints that people in a society impose upon themselves to give a structure to their relations with others (North, 1990). As constraints, they structure human interaction, and can be formal (written rules, laws) or informal norms (customs, conventions, and

other social norms). These rules are transmitted from one generation to another by teaching and imitation (Boyd and Richerson, 1995) and are considered part of the heritage that we call culture (Norton, 1990). Tradition, religion, language, customs, values and trust-based relationships are some examples of informal institutions (Dunning & Lundan, 2008). Unlike formal institutions, informal institutions have their source in the values of a society and are difficult to change over time (North, 1990). In this context, females' education are considered part of informal institutions (Singh, 2007; Peng et al., 2008).

1.3 Human Capital: Location Determinant of inward FDI

MNEs, which undertake FDI, posses certain competitive (ownership) advantages and they are able to internalize transaction costs (internalization). In their decision making process, the key remaining factor are considered the locational advantages of the host country. Location-specific advantages are the "immobile natural or created endowments" (Dunning, 2000, pp. 164) which become an incentive to invest in a particular country and reflect the macroeconomic environment of the host countries. In the recent years, there has been a shift to knowledge-intensive assets and learning experiences rather than access to markets or natural resources. The availability and quality of human capital resources and the institutional framework have an important influence on location decisions (Dunning, 1998a). Thus, among location advantages, one of the most important motives for MNEs to invest in a country is human capital. While the role of human capital is quite significant within the OLI paradigm as a location factor, none study until now focuses especially on human capital and education while most of them use it simply as a control factor.

Although generally insufficiently recognized and inappropriately addressed in FDI theory, human capital has gained a prominent and central role in economic growth literature in the last two decades (Temple, 2001; Goldin & Katz, 2008; Jones & Romer, 2010; Hanushek & Woessmann, 2011a). The relationship between human capital and economic growth, can inform the analysis of human capital in relation to FDI. However, causation in the human capital-inward FDI relationship can also work in the opposite direction: foreign enterprises can develop the skills of the workforce in the host country. Such feedback effects from FDI to human capital pose a potential problem in the empirical estimations to be undertaken in the subsequent chapters

because they may cause the key regressor(s), i.e., human capital variable(s), to be endogenously determined.

Our analysis is set within Dunning's (1988) OLI paradigm. As we mentioned earlier, OLI framework is used widely as a theoretical framework given the significant role it assigns to location-bound characteristics that multinational enterprises (MNEs) seek to utilize in a host country in conjunction with their firm-specific (ownership) advantages (Dunning, 1993).

Technological change has led to a shift from resource based towards more capital-intensive activities, and later to more knowledge and skill intensive activities (Dunning & Narula, 2000; Bevan et al., 2004; Dunning, 2004). Foreign investors' capabilities are a function of their own investments in formal and informal R&D, both at home and abroad, as well as their engagement with the knowledge infrastructure in locations (Narula & Kodiyat, 2016). Consequently, the available knowledge base of a nation such as scientific infrastructure and educational qualifications of the labor force, the presence of good universities and the availability of skilled workers, are considered main location determinants of inward FDI (Narula & Bellak, 2009).

1.3.1 The Role of Human Capital in Economic Growth Theory

From a theoretical point of view, the rationale for human capital being a factor that determines the location of firms' value-added activities can be derived from human capital theory and theories of economic growth. In the former (neoclassical) theory (Schultz, 1961; Becker 1964; Mincer, 1974) human capital is considered a means of production; investment in human capital through schooling, training or work experience enhances the skill level of individuals and hence their productive capacity. Their productive capacity in turn determines their wage level, i.e. returns to schooling. Hence, according to this view, human capital obtained through education translates into productivity and productivity translates into the wage level; in the simplest neoclassical labour market, the observed wages perfectly reflect productivity. The human capital theory approach was incorporated in theories of growth after the 1980s (e.g. Lucas, 1988; Mankiw et al, 1992). Mankiw et al. (1992), for instance, incorporate human capital into the standard neoclassical growth model developed by

Solow (1956). Instead of assuming a homogeneous labour input, Mankiw et al. (1992) distinguished between uneducated and educated labour, the latter being proxied by the share of labour force that has completed secondary education. In line with human capital theory, an increase in educational attainment (assumed to be highly correlated with human capital investment) enhances the productivity of the workforce and hence the level of output produced in the economy.

1.3.2 The Effect of Human Capital on Inward FDI: Literature Review

Human capital is one of the most important factors that influence decisions regarding location of FDI. The evidence on the FDI – human capital relationship though differs depending on the sample used and the corresponding examining period.

Beginning with mixed samples of countries results appear to be far from conclusive. In a cross-section analysis, Kucera (2002) finds a positive effect of human capital as being measured by literacy rates, and average years of education in the population aged 15 and over, on inward FDI during the period 1993-1999. A similar result is found by Schatz (2003) in a sample of 109 developing, developed and transition economies by using either average years of schooling or population with completed primary, secondary and tertiary level of education as a measure of human capital. Human capital being measured by average years of schooling in the population is also used by Alfaro et al. (2004) in their study of determinants of total capital inflows (i.e. FDI and portfolio capital) in a similar sample of 47 mixed economies where is found to have a positive effect on inward FDI, but its level of significance varies in different specifications and turns insignificant when different measures are used for capital flows (e.g. gross capital inflows). On the other hand, some results of panel studies, do not provide conclusive evidence on the impact of human capital on FDI. Blanton and Blanton (2007) and Alsan et al. (2006) both find that inward FDI was not significantly affected by human capital in the 1980s and 1990s, as measured by enrolment rate in secondary education and the percentage of population who have completed secondary schooling, respectively. More recently though, Chousa et al. (2008) and Al-Sadig (2009) do find a significant effect of human capital as being measured by literacy rates on FDI flows focusing on developed and developing countries. Similarly, Bellak et al. (2009) found FDI flows to be positively affected by human capital, measured by the share of skilled hours worked in total hours worked in each industry for the period

1995-2004 in 10 developed and transition economies. Finally, contrary to theoretical predictions, some studies have found a negative effect of human capital in FDI inflows. At firm level, Urata & Kawai (2000) investigate the determinants of Japanese FDI in manufacturing in 117 developed and developing economies during the period 1980-1994. The results of their logit estimation suggest that higher enrolment rates in secondary education in a host country decreases its probability of being chosen as a location for investment.

At the same time, international test scores are becoming increasingly employed as a measure of education achievement. Good foundation skills, like reading, mathematics and science, which are important for later learning and indeed 'learning to learn', are growing in importance (Innovation Union Competitiveness Report, 2013). Yet, few papers use measures of international test score differences as a proxy for human capital (Altinok & Murseli, 2007; Hanushek & Woessman, 2008; Castelló-Climent & Hidalgo-Cabrillanna, 2012; Islam, 2014); the ones that include such measures are concentrated on growth and confirm that quality of human capital is a significant growth enhancing factor. The FDI literature lacks such analyses. Choi (2015) is an exception including international test scores of primary and secondary school student achievement in maths and science as a measure of cognitive achievement and a proxy for education quality (at primary and secondary level) for the period 1985-2004. He finds that an increase in the quality of education in the partner country leads to an increase in the intensity of bilateral foreign affiliates' business activity. While this analysis does not provide evidence that education quality affects inward FDI in particular, it does suggest that this may be a relevant dimension when measuring human capital in relation to FDI.

In general, evidence from developed countries appears to almost uniformly support the hypothesis that relatively high levels of human capital is considered a significant location advantage attracting foreign investors (Nicoletti et al., 2003; Agiomirgianakis et al., 2006; Ghosh et al., 2012; Serwicka et al., 2014; Dorozynska & Dorozynski, 2015). Most studies though, employ one or two measures of human capital, randomly. For example, Nicoletti et al. (2003) estimate a dynamic panel to analyse the determinants of inward FDI in 19 OECD countries in the period 1980-2000 and found that human capital, measured by average years of schooling, has a positive effect on inward FDI. Also in a dynamic panel analysis, Agiomirgianakis et al. (2006) found

that human capital measured by the secondary school enrolment ratio affects positively FDI inflows in 20 developed economies in the period 1975-1997.

Focusing on European countries, Majocchi & Presutti (2009) fail to find an effect of the percentage of the workforce with secondary and tertiary education, or of the number of research institutions, on inward FDI in Italian regions in 2004. Rodriguez & Pallas (2008) estimate the effect of human capital on inflows of FDI at regional level in Spain. Their panel estimation which covers the period 1993-2002 suggests that the percentage of employees who have completed secondary education (or over) affects regional FDI positively, but the results are not robust across specifications. In this analysis, the difference between labour productivity and cost per employee is also found to have a positive effect on FDI inflows.

Regarding CEE countries, education policy is crucial (Picciotto, 2003); highly skilled workers are those who attract inward FDI with the best development potential. Again few papers concentrate on the role of human capital as a determinant of foreign activities in the region, and when doing so, the results are pretty ambiguous. Talpos & Enache (2010) found that the percentage of population with tertiary education is positively correlated with inward FDI in CEE countries and foreign investors value the most the level and quality of human capital stock. Strat (2015) found that there is a significant relationship between the educational system and inflows of FDI for a sample of five new EU members from Eastern Europe. On the other hand, Igošina (2015), by comparing determinants of FDI inflows in EU-15 and new member states from 2000-2008, found no significant impact of enrollment in tertiary education on inward FDI in both sub-regions. No significant results were also reached by Majocchi & Strange (2007) and Broadman & Recanatini (2001) for CEE countries. Furthermore, Serwicka et al. (2014), discriminating between EU-15 and CEE countries, found that secondary and tertiary education is significant in the first group but insignificant in the latter. Finally, there are a number of works obtaining negative effects. Serbu (2005) examined three CEECs (Hungary, Slovakia and Romania) in the period 1997-2000 and found that the economically active population with tertiary education exerts a negative effect on the stocks of FDI they receive. In another panel study of six CEECs for the period 1996-2000, Görg & Greeneway (2002) find a negative effect of tertiary level enrolment rate on the stocks of FDI received from the UK.

Focusing in the US, evidence concerning the relationship human capital-FDI come from studies at state, industry, and firm level which use a randomly different human capital measures. Nachum (2000), in a cross section analysis for US states for the period 1987-1992, finds that the share of population enrolled in tertiary education has a positive effect on the number of foreign investors in professional and financial services. Axarloglou (2005) investigates the determinants of annual inward FDI in 20 manufacturing industries in 10 US states using panel data for the period 1974-1994. Controlling for unit labour costs he founds that a state's per capita spending on higher education positively affects the level of FDI inflows it receives. At firm level, Woodward (1992) uses a logit model to estimate the probability of US counties being chosen by Japanese investing firms for the period 1980 to 2000 in manufacturing sector and finds that the median year of schooling in the population aged 25 and over increases a county's probability of being chosen as a location.

The evidence from developing economies tend to suggest that human capital has a positive influence on the level of inward FDI. Noorbakhsh et al. (2001), employ a panel estimation to investigate the impact of human capital on FDI flows into 36 developing economies in the period 1980-1994. Human capital is being measured by secondary school enrolment ratios as well as two stock variables: the number of accumulated years of secondary education present in the working age population and number of accumulated years of secondary and tertiary education in the working age population. The results of this study suggest that, all three measures of human capital are significant determinants of net FDI inflows as a percentage of GDP. In accordance with the findings of Noorbakhsh et al. (2001) human capital measured by average years of schooling has also been found to positively affect FDI into developing economies in the studies by Jaumotte (2004), Faini (2004) and Desbores & Azémar (2008). Also using a panel estimation, Checci et al. (2007) focusing in 63 developing countries for the period 1985-2000 find that inward FDI is positively influenced by the share of population who have attained secondary education while the percentage of population with tertiary education does not appear to affect inward FDI. Nunnenkamp (2002) focuses on FDI using microeconomic data as well as indicators he develops from data obtained through three surveys (1992, 1996 and 1999) of institutions of 28 developing countries. Simple correlations suggest that the per capita FDI stock is only significantly correlated with average years of schooling in the

population in 1999 but not earlier. His results are consistent with the conclusion of Noorbakhsh et al. (2001) that human capital has become more important in more recent years. When correlations of this variable with FDI inflows per capita are estimated, however, they are significant in all four periods.

Other panel studies covering samples of developing economies either do not find any evidence regarding the positive influence of human capital on FDI inflows, or find evidence of a negative relationship. For example, in an earlier study covering the period 1975-1988, Narula (1996) finds an insignificant effect of enrolment rates in tertiary education on inward FDI. These results may suggest that tertiary education attainment in particular does not attract FDI to developing economies. In the case of Narula (1996) though, the lack of a positive effect could be due to the (relatively) early period which this study covers, to the extent that human capital has become a (more) important FDI determinant over time. Majeed & Ahmad (2008) also find an insignificant effect of human capital measured by illiteracy rates of the population on FDI inflows in 23 developing countries covering the period 1970-2004. Mina (2007) on the other hand, is the only panel study (1980-2002) that finds a negative effect of a human capital measure on FDI inflows in developing economies. One reason for this may be the choice of the human capital variable adopted by this study.

The evidence from single-developing country studies is even less conclusive. Two studies using cross-section data and secondary education human capital measures in Vietnam, Pham (2001) and Nguyen & Nguyen (2007), both find human capital to significantly affect FDI at regional level. Pham (2001) find the percentage of population enrolled in secondary education to positively affect the level of committed, as well as implemented, FDI inflows in Vietnamese regions. Similarly, Nguyen & Nguyen (2007) find the number of high school graduates in a region to positively affect both FDI in 2006 and cumulative FDI in the period 1988-2006 as measured by value of inflows as well as by the number of projects (in a negative binomial estimation). Ismail & Yussof (2003), on the other hand, find no effect of the number of professionals and technical workers in time-series estimations of FDI inflows in Thailand and the Philippines between 1985 and 1999, controlling for the average wage in manufacturing. Moreover, this measure is found to negatively affect Malaysian FDI during this period, while also in a time-series estimation, Tsen (2005) finds that another human capital measure, specifically federal government expenditure

on education as a percentage of GDP, has a positive effect on the value of foreign investment in the country's manufacturing industry.

Finally, some studies from developing economies follow an innovative approach in measuring human capital. Deichmann et al. (2003) use the student-teacher ratio as an (inverse) measure of education quality. In a logit estimation aiming to explain the decision of 293 foreign firms who invested in Turkey in 1995, and find that the student-teacher ratio (representing lower quality) has a negative effect on inward FDI. Mody et al. (1999) on the other hand develop a measure of human capital which is not explicitly related to educational attainment. In their 1993 survey, they ask 173 Japanese firms who are engaged in FDI to rate different qualities, including labour costs and labour quality, in seven Asian countries. These variables are then used to explain the firms' prior as well as future investment in these countries. The cross-section analysis of this data suggests that firms' perceived labour quality in Asian countries is a significant determinant of the both their current shares of investment and their declared likelihood of expected investment in these 107 countries in the next three years, but this is not the case with their perceptions of labour cost. While this study's reliance solely on subjective perceptions and lack of explicit control for educational attainment may be considered a weakness, its results challenge the appropriateness of the conventional usage of formal educational attainment as a measure for human capital in relation to FDI.

1.4 Conclusions

This chapter has provided a critical review of different theories which have been developed to explain FDI. It also provided an extent literature review of how human capital shapes inward FDI depending on countries sample and time period. The review has identified a considerable number of potential determinants of inward FDI and it has shown that human capital is not taken into account by most of these theories. Particular emphasis is placed on Dunning's eclectic paradigm and institutional theory where this thesis is placed on. Further, the few studies that do recognise human capital do not to provide arguments as to why it may attract FDI and use randomly varying measures in order to capture it. Finally, it was argued that there may be reverse causation between FDI and human capital relationship, an issue which should be treated with caution in the empirical analyses conducted in this research.

Apart from human capital, little attention has been devoted on gender disparities in terms of education and whether foreign investors prefer these disparities or not. We pay particular attention on educational gender disparities as part of institutional quality. Finally, we focus on females' education and even more so on females education in science fields to detect their impact on inward FDI. Nowadays, more and more females are gaining significant positions and have achieved professional success despite the difficulties of working in international organizational contexts. Taking into account that educated persons are needed in board positions, females' education is considered a quite important matter for investigation.

Chapter 2. Human capital, skills and competencies: varying effects on inward FDI in the EU context

"Education is the most powerful weapon which you can use to change the world" (Nelson Mandela).

2.1 Introduction

Relevant literature highlights the significance of human capital for economic progress (Barro & Lee, 2001; Dunning & Lundan, 2008) affecting growth not only directly but also indirectly through its interaction with other factors (Gennaioli et al., 2013). At the same time human capital is acknowledged as a particularly significant factor for inward FDI (Iwai & Thompson, 2012; Villaverde & Maza, 2014). While human capital holds a prominent role and has been the subject of much research in economics literature (Carkovic & Levine, 2005; Roaf et al., 2014), we find relatively rare inclusion of the host country's human capital as a relevant factor in International Business (IB) studies addressing decisions of foreign investors in the empirical forefront. What is more, even when human capital is accounted for in a foreign direct investment (FDI) study, this is not accompanied by an explicit theoretical framework.

The primary objective of this paper is to fill the above gap in the FDI literature by providing an extensive investigation of the effect of different types of human capital and skills measures on inward FDI in the European Union (EU). On this ground, the analysis is set within Dunning's (1988) OLI paradigm. The OLI framework is used widely as a theoretical framework given the significant role it assigns to location-bound characteristics that multinational enterprises (MNEs) seek to utilize in a host country in conjunction with their firm-specific (ownership) advantages (Dunning, 1993).

In the empirical forefront, studies use different measures of human capital and most of them concentrate only on the quantity aspect of human capital, i.e. years of schooling or enrolment ratios (Barro, 2001; Krueger & Lindahl, 2001; Schatz, 2003; Joshua, 2015). Yet, measures of human capital based on attainment and enrolment data only are not sufficient to explain cross-country differences; quality differences can also be

of high importance (Choi, 2015). A major challenge nowadays is rapid scientific progress and technological change, which are often accompanied by a change in economic structures and job profiles. Countries have developed schooling systems which differ substantially in their focus on the job transition; some pay more attention to general education while others on vocational. As countries evolve and become more competitive with greater reliance on technology, the demand for higher levels of education, both in terms of basic skills through formal education and training and specific technical skills becomes stronger. The EU places particular emphasis on equipping people with skills enabling them to get good jobs and face the key challenges posed by globalization and intensified competition. Hence, Vocational Education and Training (VET) in the EU aims at connecting skills development and labor markets and upgrading and updating skills.

On the above grounds, the present work aspires to contribute to the discussion of human capital and FDI inflows in several ways. Firstly, it uses an extended list of traditional used but also newly developed measures available in order to assimilate their relative significance to foreign investors. Under these lens, we also construct some new measures of human capital that may be perceived as important according to literature discussion. Second, this work is placed within Dunning's OLI paradigm in contrast to existing studies that lack any theoretical context. Thirdly, the study focuses on the EU where there is an ongoing agenda and implementation programs towards advancing skills and training, differentiating between general and vocational education effects on foreign investors. Finally, by differentiating between Western and Eastern EU members, this paper makes inferences about the status between the two in terms of human capital attractiveness to inward FDI. Our aim is not to explain the FDI pattern and differences between the two regions; we instead focus on the effect of different measures of human capital, skills and competencies to foreign direct investors and potential differences between the two regions in terms of significance of these measures.

The rest of the paper is organized as follows: the next section summarizes the theoretical and empirical literature on human capital as a determinant of inward FDI. The sample, the econometric model and data analysis are presented in section three.

Section four presents econometric results from FDI panel regressions. Some concluding remarks are offered in the final section.

2.2 Theoretical background, literature review, human capital issues

2.2.1 Theoretical background and literature review

Dunning (1979) put forward the eclectic or OLI paradigm which is proved to be a holistic approach in explaining MNE activities (Stoian & Filippaios, 2008) and the subsequent growth of operations (Tolentino, 2001) despite the criticisms of its generality (Cantwell & Narula, 2001; Dunning, 2001). According to the OLI paradigm, FDI is explained by three sets of advantages: ownership (O), location (L) and internalization advantages (I)[1]. Studies in recent decades shifted their interest in location determinants for increasing FDI inflows (Dunning, 2000), especially due to globalization and the transition process in Central and Eastern EU countries (CEE). Though human capital is a valuable location factor, the original OLI paradigm did not give any particular attention to that. Later, Dunning & Lundan (2008) included the availability and, by implication, cost of highly-motivated semi-skilled labour in MNEs' location decisions.

Technological change has led to a shift from resource based towards more capital-intensive activities, and later to more knowledge and skill intensive activities (Dunning & Narula, 2000; Bevan et al., 2004; Dunning, 2004). Foreign investors' capabilities are a function of their own investments in formal and informal R&D, both at home and abroad, as well as their engagement with the knowledge infrastructure in locations (Narula & Kodiyat, 2016). Consequently, the available knowledge base of a nation such as scientific infrastructure and educational qualifications of the labor force, the presence of good universities and the availability of skilled workers, are considered main location determinants of inward FDI (Narula & Bellak, 2009).

Moreover, globalization is accelerating the diffusion of technology and creates new occupations which replace others. Within each occupation, required skills and competencies are evolving. In this line, the EU, in response to global developments, has set a series of specific policy measures to make EU "the most competitive and

[1]Internalization advantages explain and address why a firm chooses to engage in FDI instead of licensing foreign firms to use their proprietary assets (Dunning, 1993).

dynamic knowledge-based economy of the world, capable of sustainable growth with more and better jobs" known as the Lisbon Strategy (EC, 2000, para. 5). This agenda involves training and educating the workforce in order to acquire skills and competencies necessary to compete internationally by focusing on areas like science and technology (EC, 2000; Leydesdorff, 2010). To this end, the EU has recently developed vocational vs. general education programs. Some countries focus on vocational education to develop specific job-related skills, i.e., prepare students to work in specific occupations; others focus on general education that provides students with broad knowledge and contributes to the foundation for further learning.

The experience from Western countries has shown that historically, two main institutional solutions have emerged in terms of education design (Müller & Wolbers, 2003). Western EU countries, like Germany and Austria, have emphasised vocational education programs at the secondary level seeking to prepare young people for skilled work positions in industry and services. On the other hand, typical of the Anglo-American tradition, the expansion of tertiary education has occurred largely through privatization and marketization of education, to enable higher education access on a mass scale (Gebel & Noelke, 2011). CEE countries have developed comparable approaches to EU15 countries of either secondary or tertiary vocational education systems (Kogan et al., 2012). Indeed, vocational school shares vary considerably around the world (van de Muelen Rodgers & Boyer, 2006) and particularly around EU. In Belgium and the UK more than half of all students enrolled in secondary school are on the vocational track. The education system in CEE consisted of a combination of general and vocational tracks. Typically, there was a general track involving more academically oriented education, lower level vocational schools, as well as technical schools (Biavaschi et al., 2012). Since the start of the transition, the general trends have been the move of vocational education to schools, the decline in enrolment in vocational and technical schooling, often counterbalanced by the expansion of general secondary schools and tertiary education (Saar, Unt and Kogan 2008). The overall trend in the transition countries is the shift from the vocational training system typical of Germany and neighboring mature economies towards a more Anglo- Saxon system, characterized by a clear distinction between education and work, important elements of the dual system remain in the region, especially in Central Europe (for example Czech Republic, Hungary, Romania, Slovenia)

(Biavaschi et al., 2012). In regards to quality of skills, a PISA study reports that the results of the Czech Republic are better than those of many countries in the EU15.

Following the above trends, international test scores are becoming increasingly employed as a measure of education achievement. Good foundation skills, like reading, mathematics and science, which are important for later learning and indeed 'learning to learn', are growing in importance (Innovation Union Competitiveness Report, 2013). Yet, few papers use international test score measures to account for skills (Altinok & Murseli, 2007; Hanushek & Woessman, 2008; Islam, 2014; Castelló-Climent & Hidalgo-Cabrillanna, 2012); the ones that include such measures are concentrated on growth and confirm that quality of human capital is a significant growth enhancing factor. The FDI literature lacks such analyses. Choi (2015) is the only exception studying the influence of such skills on primary and secondary school students' achievement in math and science for bilateral affiliate sales between the US and 32 countries; he concludes that the quality of human capital affects FDI even after accounting for the role of factor endowments, trade costs, investment costs, country size and income effects. Within the EU-27 Perugini et al., (2008) identifies the relevance of alternative types of human capital; yet, his work is on innovation output and productivity We instead investigate the effects of alternative human capital measures on inward FDI within the EU.

In general, evidence from developed countries appears to almost uniformly support the hypothesis that relatively high levels of human capital is a significant location advantage attracting foreign investors (Nicoletti et al., 2003; Ghosh et al., 2012; Serwicka et al., 2014; Dorozynska & Dorozynski, 2015). Though education policy in CEE countries is crucial (Picciotto, 2003), few papers concentrate on the role of human capital as a determinant of foreign activities in the region, and when doing so, the results are ambiguous. Positive results were obtained by Talpos & Enache (2010) and Strat (2015), while no significant impact was obtained by Igošina (2015), Majocchi & Strange (2007) and Broadman & Recanatini (2001). We also find negative effects in Serbu (2005) and Görg & Greeneway (2002). Finally, Serwicka et al. (2014), discriminating between EU15 and CEE countries, found that secondary and tertiary education is significant in the first group but insignificant in the latter. To the best of our knowledge, no study today has incorporated an extensive list of alternative human capital measures, let alone discriminate between quantity and

quality measures and vocational vs. general education with respect to their attractiveness to foreign investors in the region.

CEE countries lack attractiveness to foreign investors compared to EU-Western counterparts and hardly succeed in joining the FDI winners group in Europe[2] (Ernst & Young's European Attractiveness Survey, 2010). The main concern of CEE countries after the collapse of Communism has been to develop strategies for increasing their living standards and attracting foreign investment to the level of the EU15 ones. While all EU15 countries belong to the high-income category operating with higher value-added activities, CEE member states are economies concentrated in sectors with significantly lower wages (Kalotay, 2004). In this context, this study aspires to complement existing IB literature by discriminating among human capital and skills relevance between the two regions; thus, allowing for useful policy inferences in the wider EU region but also in regard to particular EU locations as well as insightful managerial implications.

2.2.2 Particular issues on human capital and skills

The literature addressing human capital distinguishes between stock (referring to the population residing in a country) and flow (referring to annual enrolments) measures; it seems that the former are more appropriate measures than the latter because they provide information on the total amount of formal education that is available for employment (Kalaitzidakis et al., 2001; Islam, 2014). Furthermore, there is a distinction between quantity and quality measures of human capital and there is a debate on which one is more important (Islam, 2014). The duration of formal schooling measured as the average years of schooling in different levels of education is considered, according to the literature (Hanushek & Woessmann, 2010), as the most common measurement for the capital stock. It is clearly a stock and quantity measure (Islam, 2014) and reflects the accumulated educational investment embodied in current labor force. The main disadvantage of this is that one year of schooling is assumed to generate the same increase in productivity regardless of the studying field (Woessmann, 2006). School attainment has been also widely used as a quantity

[2]United Kingdom, France, Germany and Spain remain the top investment destinations (Paul et al., 2014).

measure of human capital (Islam, 2014); it is considered a reasonable proxy for the human capital (Barro & Lee, 2012).

Although enrolment and attainment measures indicate exposure to learning, they don't capture the quality of these learning environments (Barro & Lee, 2001). To capture actual competencies and skills, new measures have been developed such as the international test scores in math, science and reading called PISA. The main advantage of these indicators is that they measure effective competencies by testing what people actually know and are related to both the quantity and quality of schooling.

Finally, Becker (1964) points out that human capital is categorized into general and specific. General human capital is defined by generic knowledge and skills, not specific to a task or a company, usually accumulated through working experience and education; specific is usually accumulated through education and training on knowledge specific to a firm/task (Groen, 2006; Alan et al., 2008). Consequently, the distinction between general and vocational education in different levels (namely secondary, upper secondary, tertiary) is of high relevance nowadays in order to make more precise inferences, especially under the VET programs in the EU context.

Based on the above, the measurement of human capital is quite difficult; some papers use quantity while others quality measures (Psacharopoulos & Schlotter, 2010). In this paper, we use both quantity and quality measures as well both stock and flow measures for comparison purposes and robustness. For a categorization of quantity vs. quantity measures and flows vs. stock variables and which of them have been used before in related literature, please see Table 1 in Appendix.

2.3 Sample, estimation models and methods

2.3.1 Sample

Our sample consists of the European Union countries disaggregated between Western and CEE EU countries from 1995-2012 or 2000-2012 for both sub-regions based on data availability. The more developed Western EU countries have received more inward FDI than transition economies (World Bank, 2014). While these two sub-regions belong both to the EU, they are far from homogeneous both in terms of

economic development and the size of inward FDI. Consequently, it would be advisable to examine them separately and draw policy implications towards market equalization and competitive improvement of the whole region. Countries included in the sample may be found in Table 2 in Appendix.

2.3.2 Models and variables

In our models we include the most widely accepted FDI determinants incorporated in related literature[3] in order to be able to focus on our main interest, that of human capital, skills and qualifications.

The empirical investigation for this paper is based on the following equation:

$$lnFDI_{it} = \alpha_i + \beta_1 HC_{it} + \beta_2 CV_{it} + \eta_{it} + v_{it} \qquad (1.1)$$

where the dependent variable is a measure of inward FDI flows in the EU countries. *HC* is a measure of human capital and skills; *CV* stands for the control variables; η is a common fixed effect term, v is a white-noise term, i represents the recipient FDI country and t represents time and accounts for the unobservable time-invariant individual specific effect not included in the regression. More specifically, the dependent variable is annual inward FDI[4] obtained from the United Nations Cooperation on Trade and Development (UNCTAD). We employ the logarithm of FDI inflows to adjust for the skewed nature of the data (Demekas et al., 2007).

2.3.2.1 Measures of human capital and skills

A government's resource allocation in education policies may signal its commitment to advancing education and skills. To capture this, we include education expenditures as a percent of GDP (*GE_T*) and of the overall public spending, *Expeduc* (Checchi et al., 2007; Ismail, 2009). Miyamoto (2003) suggests that many countries under invest

[3] From the long list of significant FDI determinants, we present only these that were found to be robust in most regressions. For example, we have also checked for inflation rate, political stability, patents, investment freedom etc., nevertheless, no robust results were obtained from these, hence we excluded them from final estimations.

[4] FDI data either come as flow or as stock where flows are the current transactions taking place in a certain period *t*, while FDI stocks are the accumulation of past flows (Wacker, 2013). In this paper, we include FDI flows rather than stocks and it is most widely used in related studies. However, for robustness purposes, we also estimated all regressions with the FDI stocks as well; results remained fairly stable.

in their human capital, which does not make them attractive to MNEs. In 2010, the EU-11 countries registered higher government expenditures in education as percent in their total government expenditures (12.48%) contrary to their Western counterparts (11.43%); the reverse applies for government expenditures as a share in GDP (5% versus 5.9%). Hence, we examine whether these policies affect foreign investors.

Based on the flow vs. stock measures of human capital discussed earlier, this study also employs stock measures; that is, we incorporate average years of total schooling (*avgtotal*) attained by the population aged 15 and above as well as average years of schooling in secondary (*avgsectotal*) and tertiary education (*avgtertotal*)[5] in order to capture the duration of formal schooling (e.g. Nunnenkamp & Spatz, 2002; Ghosh et al., 2012; Karimi et al., 2013). We also test for the proportion of total population with completed secondary and tertiary education (*complsectotal* and *compltertotal* respectively) (Noorbakhsh et al., 2001; Schatz, 2003; Li & Liu, 2005) in order to capture different durations of analogous school cycles. Further, we develop a new measure as the sum of the percentage of population with completed both secondary and tertiary education (*complsectert*) to account for the entire pool of population with medium and higher education (Kalaitzidakis et. al, 2001; Tuan et al., 2009). This is the first time that such a measure is examined in the FDI literature.

Miyamoto (2003) and Waldkirsch (2011) place emphasis on the labor force rather than population education, suggesting that FDI is more inclined to locate in countries where the labor force is highly skilled. Empirical studies use the share of labor force with secondary (*LF_sec*) or tertiary education (*LF_tert*) in total labor force (Dinga, 2011; Tang, 2015). We also employ the respective measures in this analysis.

We also follow more recent studies on economic growth that have used international test scores to capture the quality of education (Hanushek & Kimko, 2000; Hanushek & Woessmann, 2008). We use the PISA measures, which assess young people's ability to apply their knowledge and skills to real-life problems and situations rather than how well they learned a specific curriculum and are applied to 15 year olds. We include the mean

[5]We also explored the same measures for the population aged 25+ and the results were quite the same.

performance in fields both separately and as an overall PISA score (*PISA_math, PISA_science, PISA_read, PISAall)*[6].

Further, we use measures of general vs. vocational education. We apply the International Standard Classification of Education (ISCED), which is the standard framework used to categorize and report cross-nationally comparable education statistics. This is the first study to our knowledge that explores generic vs. vocational educated labor force with respect to FDI. The ISCED 2011 version includes eight levels of education; we concentrate only on secondary, upper secondary and first stage of tertiary education since early childhood, primary and lower secondary education are very early stages. Bachelor and master levels or any equivalent level could also be used but data were quite limited. Secondary education provides the minimum level of basic knowledge; upper secondary level is more advanced and contributes to the transition to tertiary level which is an even more advanced level. To proxy the abilities of labor force based on general or vocational programs, we construct new variables using the total number of students enrolled in general or vocational programs in these different levels as provided by ISCED and dividing with total labor force (*enrsecvoc*, *enrupsecvoc*, *enrtertvoc*, *enrgensec*, *enrugensec*, *entertgen* respectively*)*.

Average years of schooling, completion and attainment ratios are available in five year intervals in Barro and Lee (2013). Following standard procedures, we calculated the intervening years using linear interpolation (Chen, 2004; Apergis, 2009; Shirotori et al., 2010). Also, PISA data are available in three year periods (from 2000 to 2012). We replicated the interpolation here as well.

All human capital data, their descriptive statistics and sources may be found analytically in Table 3 in Appendix A.

2.3.2.2 Control variables

We incorporate in our regressions the most commonly used control variables that are consistently reported as important determinants of inward FDI and are robust in our

[6]We also tried to incorporate TIMSS (another international scores measure) as a quality human capital indicator but there were many missing values and this reduced a lot our sample size.

estimations. The relationship between inward FDI with market size is well accepted; larger markets indicate larger demand, more diverse labor markets, or economies of scale in production (Calvo & Sanchez-Robles, 2003; Bevan & Estrin, 2004; Carstensen & Tubal, 2004; Busse & Hefeker, 2007); we use the logarithm of constant GDP (*logGDPcon*).

We also include the openness of an economy which is measured by exports and imports as a percent of GDP (*trade*) in order to capture international competitiveness and dynamism (Busse and Nunnenkamp, 2009; Caetano & Galego, 2009). Gross fixed capital formation (*GFCF*)[7] is used as a proxy for domestic investment in many previous studies as well as the availability of infrastructure; (Asiedu, 2004; Olubanjo et al., 2010; Kariuki, 2015). The relationship between gross fixed capital formation and inward FDI is most of the times positive indicating a complementary effect between domestic and foreign investments (Oladipo, 2010) though this relationship is not always significant. Finally, we use the real lending interest rate (*interest_rate)* defined as the bank rate that usually meets the short and medium-term financing needs of the private sector[8]. If the cost of borrowing in the host country is higher than in the home country, home country firms can have a cost advantage over host country rivals, and are in a better position to enter the host country market via FDI. Grosse and Trevino (1996) confirm the positive relationship between FDI and real lending interest rate in the host country. However, if foreign investors avail the finance facilities in the host country, the effect would be negative (Bevan & Estrin, 2004; Majeed & Ahmad, 2008).

Further, we include research and development expenditures (*R&D)* as a percent of GDP to account for knowledge generation[9]. Increasing investments in research area ensure the development of public and private sectors and improve the living conditions of the population (Pece et al., 2015). We also incorporate a dummy variable to capture the recent financial crisis (*crisis)*; it takes the value of 1 through

[7]Gross fixed capital formation (formerly gross domestic fixed investment) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings.

[8] Due to the absence of the commercial banking system for the CEE countries in the period 1980-1990 results for all countries are presented from 1995 and onwards due to data availability.

[9] We have also used patents as a knowledge output; they seemed to be not robust to alternative specifications.

2008-2012 and 0 otherwise (Dornean et al., 2012). Recent studies have also highlighted the essential role played by institutional factors in creating a more investment friendly climate (Nasir & Hassan, 2011). Acemoglou & Robinson (2005) argue that human capital is more valuable in countries with greater institutional quality. We include business freedom (*business_freedom)* in our models which is defined as the ability to create, operate, and close an enterprise quickly and easily. Burdensome, redundant regulatory rules are the most harmful barriers to business freedom. Finally, we incorporate a wage variable to capture labor cost (*compensation)*; Chakrabarti (2001) claims that wage as an indicator of labor cost has been the most questionable of all the potential determinants of inward FDI. We include the compensation of employees as a proxy for wages[10]. All control variables and their sources may be found in Table 3 of Appendix.

2.3.3 Methods and robustness

The model is estimated both for Western and CEE countries. We estimated our models with different methods for robustness purposes. Though we have also estimated our models with fixed effects estimation, we present the Arellano-Bond (1991) difference system generalized method of moments (GMM) estimator. Estimation results with FE and five year averages are presented in Tables 1A-10A and 1B-10B respectively, in the Appendix A. GMM estimator addresses the problem of autocorrelation of the residuals and deals with the fact that some of the control variables may be potentially endogenous (Bond, 2002). In fact, human capital indicators and the size of the market may not be exogenous (Akin & Vlad, 2011; Gittens & Pilgrim, 2013). The consistency of the Arellano-Bond GMM estimator requires a lack of second-order serial correlation in the residuals of the differenced specification. The most common test of the instruments is Sargan's (1958) test for over-identifying restrictions which we have carried out here.[11] Due to short data in PISA scores, we carried out 2SLS estimation.

[10]We also used average annual wages as an additional proxy of wages but the results remained almost the same and data were more limited compared to compensation data.

[11]For further robustness checks, we also estimated the model using data averaged over five-year periods; except for PISA and general and vocational indicators which are averaged over three-year periods due to data availability, a method used to deal with effects of business cycles. The model estimated produces results that are only numerically a little different but almost identical regarding significance to the ones we have obtained with the annual data. Results are presented on Appendix A of the present thesis.

For robustness purposes, we have also estimated our models with 5-year and 3-year averages to sweep out potential business cycle effects that may distort the outcome. Results were the same and are presented on Appendix A in the present thesis.

Moreover, CEE countries are not uniform and there is significant variation within the region in terms of institutional quality, business climate, population size etc. (KKR, Global Institute Report, 2014). According to World Bank classifications (2012), Bulgaria and Romania belong to upper-middle income countries while the rest of CEE countries are high income states. In order to test the validity of our results we have also estimated our models without these two countries. We have also excluded Croatia, which entered the EU only recently (2013); results remained the same.

2.4 Empirical results

Tables 1-5 present results for all human capital and skills measures both for Western and CEE EU countries. Table 1 presents results in terms of education expenditures. Government expenditures on upper secondary education as a percent of total government expenditures is a consistently significant pull FDI factor for Western EU countries. Our results show an interesting outcome: while variables accounting for education expenditures as a percent of GDP are not important for Western EU countries, it appears that foreign investors pay attention to education expenditures as a percent of total government spending; especially for upper secondary education in this region, which facilitates the transfer to higher academic levels. This is an indication that investors are concerned about the structure of government expenses which depicts its policy orientation. For the CEE countries we find that government expenditures both on secondary and tertiary education are negatively associated with inward FDI. Government expenditures in any field are generally considered an inflow to the education procedure. In particular, education expenditures represent money spent on education; yet, this does not guarantee that it is used properly, i.e., expenditures do not necessarily translate to higher human capital. This might indicate a mistrust of foreign investors regarding the suitable use of funds in education in these countries. Consequently, results might indicate internal and external inefficiency. Internal efficiency is the ability of the education system to use the education sector inputs to provide education services of high quality; external efficiency captures the

notion of producing skilled labor that matches the demand in labor market (World Bank, 2015).

[Insert Table 1 about here]

Table 2 present results for attainment and completion ratios of population in different levels of schooling as well as average years of schooling for both regions. Beginning with EU15, we observe that tertiary education is consistently statistically significant in all our regressions in attracting FDI for both attainment and completion measures as well as average years of schooling. Interestingly, secondary education does not emerge as a significant factor. This might seem odd in the first place, given our results above on the government expenditures. Nevertheless, these two variables are not comparable; expenditures represent inputs in the education procedure while attainment and completion ratios as well as average years of schooling stand for outcome measures that are directly observable by investors in the labor market. What is more, these measures do not discriminate between lower and upper secondary levels as is the case for government expenditures. It conforms with the fact that foreign investors are interested in government expenditures structure especially for upper secondary education, given that the latter facilitates transfer to the tertiary level, i.e. students attaining and completing higher education. This result conforms to related studies positing that the EU15 countries are highly developed and FDI in the region is predominantly knowledge-seeking (Serwicka et al., 2014; Igošina, 2015). The above outcome is also replicated with regards to education of labor force (Table 3). We observe that labor force with tertiary education is important for MNEs in order to invest in EU15 countries. In general, a Western European country is an attractive location to foreign investors given its highly educated population and labor force. Our findings are also consistent with the results reported by Nicoletti et al., (2003), and Ghosh et al., (2012), who found that a better educated labor force motivates inward FDI.

In CEE countries, tertiary education also seems to be important in attracting foreign investors. What this testifies is that while in some CEE EU countries traditional industrial specialization based on labor intensive industries is still dominant, there is a trend towards new industries, requiring greater labor skills and being technologically intensive (Crespo & Fontoura, 2004). Indeed, there is some evidence in the literature

that these countries combine advanced education with competitive production costs and relatively low wages (Kornecki, 2006). Furthermore, even traditional industries need some minimum level of education and skills nowadays in order to be able to cope with the emerging technological frontiers. All CEE countries have witnessed educational expansion at the tertiary level, which in some countries has grown at a speed hardly ever observed in Western society (Kogan, 2008). Nevertheless, the level of tertiary education is not uniform between the two samples; hence tertiary education in CEE countries is of lower quality than that of EU15 (Jganjgava, 2012). We find a probably confusing result regarding secondary education though. Attainment and completion ratios in secondary education emerge as deterrents to FDI inflows, while average years of secondary education come out as pull FDI factors. Obviously, the differential effects rest on what these variables measure, and this is exactly why it is necessary to examine various and alternative measures in order to get the full picture as is the motivation of this paper. Based on our discussion in related literature, average years of schooling are stock variables whereas attainment and completion ratios are flow variables. A number of authors point to the superiority of the former in terms of a human capital base of a country because they provide information on the total amount of formal education that is available for employment (Kalaitzidakis et al., 2001; Islam, 2014) and not just flows of education that may fluctuate from one year to another. The fact that attainment and completion ratios turn out negatively significant then, might indicate the fact that investors do not trust these measures or perceive them as misleading in this region; they rather care about the actual pool of available skills at secondary level for employment in these countries.

Further, Table 3 displays results for education qualification of the labor force. Labor force with secondary education in CEE countries emerges as a deterrent to foreign investors as was the case for attainment and completion ratios above. Though labor force with respective skills is directly observable in labor markets, this result might indicate the fact that secondary educated labor force is not being matched with the appropriate jobs and cannot use its skills effectively, thus implying again the external inefficiency of the education system, also suggested above.

[Insert Tables 2 and 3 about here]

Table 4 illustrates results for skills in science, mathematics and reading. In the EU15, it is evident that mean performance in science is positive and significant. We assume that EU15 countries because of their performance and development level attract more FDI inflows due to existing advanced qualifications. These countries require more educated workers with the ability to respond flexibly to complex problems and produce new knowledge. In fact, studies focusing on the importance of cognitive skills, measured by international achievement tests, find that these quality measures are strongly positively related to growth (Hanushek & Kimko, 2000). In CEE countries, we obtain right opposite results: negative and statistically significant effects in all parameters. That is to say, the more specialized and skilled in particular sciences the labor force is, the less attractive the country is to foreign investors. Given our prior discussion, MNEs in these countries seek educated labor force but obviously they are not interested in foundation skills like math, science and reading. In fact, placing emphasis on such skills, might again imply an external inefficiency in the sense that more foreign investors require educated laborers for their operations but not specialized in these sciences. Another explanation may be the poor quality of such specialisation skills in CEE countries. Even if some CEE countries excel in this respect, they do not match Western counterparts, i.e., high scientific skills may deter foreign investors if these qualifications do not match the demands of MNEs. According to some estimates, up to one-third of people in employment are either under or overqualified for the work they do, and skills mismatches are increasing. Highly educated people in many CEE countries cannot find good jobs or any jobs at all (EBRD, 2013).

[Insert Table 4 about here]

Table 5 demonstrates results for general vs. vocational education for both groups of countries. Beginning with EU15, we observe that students enrolled in upper secondary and short cycle tertiary vocational education[12] (ISCED 5B) emerge as highly important in attracting FDI. This result corroborates EU that has long recognized the need for a skilled workforce by placing emphasis on vocational

[12] Programs at upper secondary level are designed to complete secondary education in preparation for tertiary education or provide skills relevant to employment, or both. Students enter upper secondary level between ages 14 and 16. Programs at short cycle tertiary education (ISCED 5) provide participants with professional knowledge, skills and competencies. These programs either prepare students to enter into labor market or provide a pathway to other tertiary education programs by providing broad skills and knowledge.

education (European Commission, 2012) which equips labor force with necessary qualifications in certain professions depending on the needs of the economy and of the technological changes (VET programs). In CEE countries vocational education in secondary and upper secondary is significant. These results are in line with prior evidence given the orientation of foreign investors in the region to more traditional industries. Placing emphasis on upper secondary vocational education would be a good suggestion to policymakers towards reducing skill-job mismatches, facilitate the transition to work and attract more foreign investments.

While research indicates that vocational and general education tend to be equally effective in generating all types of benefits (Bartlett, 2009) we demonstrate that vocational education seems to contribute more to the attractiveness of inward FDI than formal education in the region as suggested by Bhaumik & Dimova (2013). A major consequence of the CEE countries transformation was the growing unpopularity of lower vocational schools (Kogan et al., 2008). But given the traditionally more important role of vocational education for industrial employment, particularly CEE EU countries made attempts to revive employer involvement in vocational education and training (Kogan et al., 2012) which seems to be important as a location decision factor of MNEs. The trade-off between expanded tertiary education and a pronounced vocational sector at the secondary level is also confirmed for these countries (Kogan et al., 2012). Comparing these latter results with those regarding labor force with secondary and upper secondary education earlier in this section (Table 3), one may infer that foreign investors are particularly interested in job related skills of the labor force at the secondary level and not general qualifications of workers. Also, this result may be compared to attainment and completion ratios at the secondary level which we also obtained above. Again, attainment and completion ratios regard those people having attained or completed secondary education as a share in total population of 15 years and above. These measures, while showing the population's involvement in secondary education, they don't necessarily connect with labour supply in a country.

[Insert Table 5 about here]

All in all, we observe two major effects: one relating to the significance of varying types of human capital and qualifications and one concerning differential effects

between the two EU regions. Given the plethora of tables and results, and for illustration purposes, we gather together all human capital measures in a table, depicting their signs and significance in our estimations. This is an easy way to trace our discussion of results. Table 6 summarizes our results.

[Insert Table 6 about here]

Discussion of control variables

About control variables, market size, openness, GFCF and interest rate seem to be consistent with related literature, i.e. the estimated coefficients of these variables show relatively persistent results with assumed signs in different regressions both for Western and CEE members.

[Insert Tables 1-5 about here]

Regarding the rest of control variables, we obtain quite differentiated results between Western and CEE EU. Business freedom emerges positive and, in most cases, significant for the EU15 but we obtain the reverse effect for the CEE members. While odd in the first place, the reason for such an outcome may be related to the fact that some new member states present significantly lower levels in this indicator, since they started to adapt their institutions in the 1990's (Caetano & Galego, 2009). Ajide (2014) also found that business freedom deters foreign investors in 12 ECOWAS[13]countries; arguing that unfettered business freedom should be regulated by ensuring that business take-off satisfies the business procedural guidelines. In the case of the CEE countries, most investments are driven from a cost perspective angle and the fact that they offer new markets and potential gateway even more to the East (e.g. Russia). Caetano and Galego (2009) also obtained a negative relationship for these countries, however not significant. It is suggested that institutional problems may be enhancing business in the region, if foreign investors can take advantage of the system through briberies (Shleifer & Vishny, 1993).

[13]Economic Community of West African States.

Though registering higher rates of corruption and non-transparency (Gamberoni et al., 2016; Guasti & Dobovsek, 2011; Sprout, 2002), these countries receive FDI inflows due to cost effectiveness (Carstensen & Tubal, 2004; CEE Investment Report, 2016). Wages do not emerge significant for EU15, while they appear negatively correlated, as expected, for CEE countries, in most cases.

R&D exerts also a different sign between the two groups. While R&D is important for foreign investors in the EU15, for the CEE markets it is negative and significant in most cases. Considering motivations of a traditional nature, i.e. efficiency or market seeking (Filippaios & Kottaridi, 2013) as is the case for CEE countries (Christie, 2003; Kersan-Škabić & Orlic, 2007) it is only natural to expect that FDI motivations are far different than the creation and expenditures on innovation. As the CEE Investment Report (2016) indicates, this region receives FDI due to cost effectiveness. Hence, this result is in line with all our previous findings regarding skills in this region (all measures indicating high specialization skills of human capital turn out negative).

Finally, our crisis dummy exerts a negative and significant sign for the Western EU members. In the CEE region, the crisis dummy is not significant in most cases whilst in some cases it is positive and significant. The extent of the financial crisis back in 2008 in the United States had a substantial negative effect on Western EU members that were mostly hit by economic turbulence. Our result is in line with Carp (2015) who argued that some of the CEE countries have proven more resilient to current fragilities. Despite the economic turbulence, these countries showed signs of recovery from the global economic crisis after 2010 (Roaf et al., 2014). When the crisis hit, West European banks did not withdraw all funding from their CEE subsidiaries overnight or let them go bankrupt, as many had feared (Barysch, 2009; Roaf et al., 2014). Additionally, the rapidly assembled 'Vienna initiative' – a club consisting of pan-European banks, the regulators of the countries in which they operate and international organizations such as the EU and the World Bank – helped to prevent a run for the exit that could have resulted in financial meltdown. Taken altogether, i.e. the Vienna Initiative and the fast recovery of these countries after 2010, justifies our result regarding the insignificant effect of the economic crisis dummy variable.

Therefore, while traditional location variables like market size, openness, infrastructure and interest rates show consistent and same results in both regions, the rest of our control variables differ between these sub-regions reflecting the different incentives for the location of MNEs between Western and CEE EU members.

2.5 Conclusions

The level and nature of location advantages influence the extent of inward FDI associated with a specific host (Narula, 1994). Much attention has been devoted to human capital and skills as main factors creating location advantages (Roaf et al., 2014); different studies though until now employ different and random varying measures of human capital and when doing so, they lack any theoretical basis. At the same time, there is a paucity of studies examining newly constructed indices capturing human capital, skills and competencies, identifying between general and vocational education or between quantity and quality measures.

The primary objective of this paper is to fill this gap in the FDI literature by providing a theoretical basis and an empirical analysis of the role of the multidimensional aspect of human capital in the location of MNEs within the EU. Theoretically, the analysis is developed within Dunning's (1988) OLI paradigm stressing the particular role of human capital as a location factor following the extension of the paradigm as posed by Dunning & Lundan (2008).

Taking into account the distinction between quality and quantity measures of human capital, we observe differences in their significance both within the EU15 and the CEE countries. Consequently, using only quantity measures as has been the case in related literature, is a partial analysis and does not provide a comprehensive picture. In this respect, our empirical results are influential and may have a range of policy implications. The same holds for general vs. vocational education.

All in all, we find that investors are concerned about the structure of government expenses which depicts its policy orientation in EU15. For CEE countries, foreign investors seem not to trust governments regarding appropriate use of funds in education, i.e. there may exist internal and external inefficiency in education. Hence, a priority for the latter, would be to earn foreign investors' trust by making more efficient use of allocated funds in education. Dedicating a larger share of government

expenditures to education then, would signal their dedication to skills advancement and would allure more and higher value added foreign activities.

Also, more advanced qualifications and more scientific related skills are significant for Western countries as well as more advanced job-related skills such as tertiary vocational education. In CEE countries, results pinpoint towards internal and external inefficiency again. Specifically, this means that the education system cannot use effectively and efficiently education inputs to provide education services of high quality. Also, it may also be the case that produced skilled labor does not match labor demand. In this context, a useful policy suggestion would be to re-evaluate their education system in order to make more efficient use of inputs. Another policy implication would be to re-organise the education system to meet the needs of investors.

The above is in line with further results indicating that, in this region, vocational education rather than theoretically oriented programs is relevant for inward FDI. A better educated workforce in vocational courses can create a more attractive investment climate where new technologies can be adopted more rapidly and easily. A further policy suggestion then would be to strengthen vocational training which will enable them to reap the benefits of technological spillovers from foreign activities.

Benchmarking education policy is of paramount importance within the EU. Results suggest that the quantity and quality of education are not all that matter when building an effective stock of human capital if skills mismatches are in place. Governments should concentrate on sound education frameworks and demonstrate their commitment to that. They also need to recognize the relevance of specific skills, particularly at vocational levels. A higher proportion of educated people does not necessarily lead to faster economic growth if the skills acquired during schooling do not match employers' needs. Better communication and cooperation between the private sector and all levels of education would be beneficial and should thus be encouraged.

The above are particularly essential for CEE countries in order to close the gap with their Western counterparts. By strengthening their human capital basis, they will be able to attract higher value added activities which would in turn strengthen further

their educated labor force pool and create a virtuous human capital – FDI cycle. The opposite involves their lagging behind which would result in attracting industries seeking for market demand for their saturated products and cost effectiveness.

2.5.1 Managerial Implications

Our findings may have several managerial implications for MNEs which consider investing within the EU. Particularly, this study identifies specific education and skills that are of importance to foreign investors. Different levels of education and skills seem to foster or hinder location decisions. Managers need to be aware of the impact of education policies when investing in a host country as this alters their options and influences their cost functions. If education reforms take place, multinationals will need to re-evaluate their location strategies toward host countries that match their needs. Considering countries with particular skills and qualifications when making their location choice may be an important strategy that helps deal with exogenous and endogenous uncertainty arising from not well-known economic environments (Cuypers & Martin, 2010). At the same time, as CEE countries advance their vocational and tertiary education, our results indicate that they can reap higher FDI. Consequently, managers should be alert of reforms taking place in the region, which, in conjunction with attractive cost conditions, may constitute highly beneficial locations even for higher value-added activities. The change in MNE investment behaviour as a response to engaging with host countries with better and well-structured education systems, can be explained by the need to minimize costs but not at the expense of quality.

In addition, managers of domestic companies could put pressure on domestic authorities for skill upgrading and educational reforms so that they can also reap positive externalities from greater waves of foreign affiliates.

2.5.2 Limitations

As is the case in all studies, this work entails some limitations. One limitation is that the analysis does not discriminate among industries. We acknowledge that an industry analysis would be further enlightening and induce more specific policy implications, but this is beyond the scope of this work, let alone our access is limited to this kind of

data. A second limitation involves more regional analysis, i.e., discriminate even further within the EU15 and the CEE regions given that both regions consist of more and less advanced economies. Again, this goes beyond the scope of this work which would then be very long for anyone to be able to follow results. Despite these limitations, this study opens the floor to related literature to further investigate the relevance of education policy and human capital basis of countries to foreign investors within a particular theoretical context as well as extending research at industry and regional level.

ESTIMATION TABLES

Estimation Method GMM

Table 1.Government expenditure on education as % of GDP and as % of total government expenditures (TGE) – Western countries (EU15) and CEE Countries– Time period: 1995-2012

VARIABLES	(1) GE educ %GDP	(2) GE sec %GDP	(3) GE tert %GDP	(4) Expeduc %TGE	(5) Expseceduc %TGE	(6) Expsecupeduc %TGE	(7) Exptertеduc %TGE	(1) GE educ %GDP	(2) GE sec %GDP	(3) GE tert %GDP	(4) Expeduc %TGE	(5) Expseceduc %TGE	(6) Expsecupeduc %TGE	(7) Exptertеduc %TGE
	Western EU Countries							CEE Countries						
logGDPcon	1.167***	1.190***	1.110***	1.003***	1.106***	1.399***	0.838***	0.891***	0.791***	0.996***	1.011***	1.002***	1.075***	1.003***
	(0.102)	(0.171)	(0.149)	(0.143)	(0.192)	(0.221)	(0.172)	(0.0594)	(0.0714)	(0.0580)	(0.0519)	(0.0633)	(0.0791)	(0.0545)
interest_rate	-0.0473	-0.0509	-0.00327	0.0642	0.0224	-0.162**	0.0504	-0.0287***	-0.0314**	-0.0220**	-0.0235***	-0.0198	-0.0110	-0.0195**
	(0.0335)	(0.0470)	(0.0342)	(0.0396)	(0.0531)	(0.0803)	(0.0401)	(0.00705)	(0.0135)	(0.00888)	(0.00703)	(0.0146)	(0.0160)	(0.00853)
trade	0.0172***	0.0180***	0.0173***	0.0193***	0.0197***	0.0233***	0.0198***	0.00648***	0.00763***	0.00778***	0.00420**	0.00572***	0.0132***	0.00530***
	(0.00199)	(0.00277)	(0.00208)	(0.00221)	(0.00296)	(0.00479)	(0.00217)	(0.00195)	(0.00231)	(0.00198)	(0.00189)	(0.00220)	(0.00318)	(0.00200)
GFCF	0.0600*	0.0898	0.0385	-0.0781	0.0182	0.115	0.0988*	0.0312***	0.0478***	0.0546***	0.0788***	0.0737***	0.0650***	0.0679***
	(0.0364)	(0.0570)	(0.0443)	(0.0572)	(0.0730)	(0.0889)	(0.0558)	(0.0110)	(0.0121)	(0.0110)	(0.0110)	(0.0125)	(0.0141)	(0.0118)
Compensation	0.0768	0.0226	0.0772	0.174**	0.0886	0.0187	0.169**	0.0393	0.00503	-0.0132	-0.0999***	-0.101***	-0.143***	-0.0734**
	(0.0477)	(0.0744)	(0.0558)	(0.0678)	(0.0911)	(0.104)	(0.0669)	(0.0243)	(0.0293)	(0.0263)	(0.0306)	(0.0340)	(0.0469)	(0.0301)
R&D	0.179	0.190	0.371***	0.276**	0.304**	0.260	0.401***	-0.519***	-0.112	-0.474***	-0.108	0.0444	-0.645**	-0.0499
	(0.113)	(0.169)	(0.138)	(0.117)	(0.155)	(0.165)	(0.125)	(0.140)	(0.173)	(0.153)	(0.150)	(0.180)	(0.279)	(0.181)
crisis	-0.600***	-1.119***	-0.662***	-0.628***	-0.927***	-1.205***	-0.758***	0.0380	-0.196	0.193*	0.162	0.0189	0.212	0.152
	(0.208)	(0.274)	(0.212)	(0.244)	(0.318)	(0.373)	(0.227)	(0.114)	(0.143)	(0.113)	(0.111)	(0.129)	(0.141)	(0.121)
business_freedom	0.0320***	0.0463***	0.0394***	0.0316***	0.0362**	0.0189	0.0390***	-0.00289	-0.00580	-0.00902	-0.0281***	-0.0227***	-0.0298***	-0.0216***
	(0.00814)	(0.0118)	(0.00891)	(0.0111)	(0.0146)	(0.0193)	(0.00974)	(0.00651)	(0.00775)	(0.00663)	(0.00703)	(0.00769)	(0.00895)	(0.00754)
GE_T	0.0641							-0.194***						
	(0.0890)							(0.0712)						
GE_sec		0.440							-0.869***					
		(0.285)							(0.160)					
GE_tert			-0.291							-0.509				
			(0.294)							(0.314)				
Expeduc				0.0131							-0.0348**			
				(0.0708)							(0.0146)			
Expsec					0.235							-0.174***		
					(0.177)							(0.0574)		
Expupsec						0.875***							-0.0152	
						(0.296)							(0.145)	
Expter							-0.267							-0.134*
							(0.174)							(0.0799)
Constant	-28.38***	-30.84***	-26.75***	-22.63***	-27.87***	-36.31***	-17.50***	-14.35***	-11.31***	-17.39***	-16.20***	-16.03***	-17.97***	-16.71***
	(3.575)	(6.046)	(5.152)	(5.199)	(6.804)	(8.217)	(5.937)	(1.648)	(2.029)	(1.574)	(1.420)	(1.686)	(1.924)	(1.457)
Wald test	305.12	134.36	229.82	237.37	133.47	89.57	240.32	418.05	351.41	387.35	466.93	358.47	316.16	415.97
Sargan test	101.70	82.55	83.40	80.69	75.42	59.08	71.68	219.21	132.64	178.22	192.44	159.52	137.79	192.48
Observations	95	85	84	80	80	65	79	120	96	114	98	85	75	96
No of Countries	14	14	14	13	13	11	13	11	10	11	9	8	7	9

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively.

Table 2. Attainment, Completion ratios and Average Years of Schooling based on level of education – Time period: 1995-2010

VARIABLES	(1) Total Sec	(2) Total Tert	(3) Completed Sec	(4) Completed Tert	(5) Completed Sec&Ter	(6) Avg Years	(7) Avg Secondary	(8) Avg Tert	(1) Total Sec	(2) Total Tert	(3) Completed Sec	(4) Completed Tert	(5) Completed Sec&Ter	(6) Avg Years	(7) Avg Secondary	(8) Avg Tert
	Western EU Countries								CEE Countries							
logGDPcon	1.265***	1.298***	1.214***	1.302***	1.200***	1.185***	1.186***	1.302***	1.050***	1.367***	1.122***	1.344***	0.970***	0.960***	1.323***	1.384***
	(0.0915)	(0.0862)	(0.0838)	(0.0858)	(0.0816)	(0.0867)	(0.0919)	(0.0864)	(0.0576)	(0.0708)	(0.0817)	(0.0730)	(0.0719)	(0.0701)	(0.0905)	(0.0714)
interest_rate	-0.0303	-0.0170	-0.0313	-0.0402	-0.0379	-0.0316	-0.0464*	-0.0275	-0.0259***	-0.0102	-0.0355***	-0.0225***	-0.0263***	-0.0278***	-0.0246***	-0.0136*
	(0.0280)	(0.0278)	(0.0286)	(0.0270)	(0.0283)	(0.0283)	(0.0275)	(0.0271)	(0.00702)	(0.00754)	(0.00717)	(0.00705)	(0.00758)	(0.00708)	(0.00733)	(0.00734)
trade	0.0215***	0.0150***	0.0201***	0.0152***	0.0191***	0.0187***	0.0190***	0.0146***	0.00904***	0.00260	0.00640***	-0.000665	0.00498**	0.00442*	0.00543***	0.00101
	(0.00237)	(0.00225)	(0.00208)	(0.00243)	(0.00224)	(0.00235)	(0.00206)	(0.00233)	(0.00210)	(0.00203)	(0.00198)	(0.00217)	(0.00209)	(0.00228)	(0.00199)	(0.00209)
GFCF	0.0552	0.0878***	0.0687**	0.100***	0.0725**	0.0675**	0.0778**	0.0946***	0.0558***	0.0699***	0.0479***	0.0790***	0.0492***	0.0415***	0.0447***	0.0756***
	(0.0351)	(0.0325)	(0.0330)	(0.0325)	(0.0327)	(0.0330)	(0.0330)	(0.0325)	(0.00999)	(0.0103)	(0.00981)	(0.0108)	(0.00992)	(0.0103)	(0.00988)	(0.0106)
Compensation	0.0598	0.0267	0.0476	0.0158	0.0408	0.0453	0.0191	0.0200	0.0951***	0.0361	0.0246	-0.0192	0.0203	0.0341	-0.00561	0.0154
	(0.0425)	(0.0394)	(0.0418)	(0.0397)	(0.0415)	(0.0401)	(0.0430)	(0.0393)	(0.0264)	(0.0232)	(0.0228)	(0.0239)	(0.0232)	(0.0238)	(0.0247)	(0.0231)
R&D	0.312***	0.0898	0.336***	0.265***	0.295***	0.298***	0.260***	0.159*	-0.524***	-0.787***	-0.748***	-0.860***	-1.035***	-1.042***	-0.973***	-0.837***
	(0.0811)	(0.0992)	(0.0870)	(0.0821)	(0.0879)	(0.0805)	(0.0982)	(0.0903)	(0.156)	(0.147)	(0.167)	(0.148)	(0.175)	(0.202)	(0.150)	(0.147)
crisis	-0.229	-0.339	-0.194	-0.350	-0.297	-0.283	-0.361	-0.357	0.217*	-0.0269	0.253**	0.108	0.184	0.198*	0.0167	0.00940
	(0.244)	(0.236)	(0.257)	(0.236)	(0.256)	(0.241)	(0.253)	(0.236)	(0.113)	(0.119)	(0.114)	(0.116)	(0.118)	(0.116)	(0.124)	(0.118)
business_freedom	0.0153*	0.00740	0.0186**	0.0140*	0.0202**	0.0197**	0.0197**	0.00954	-0.00260	-0.0191***	-0.00968*	-0.0210***	-0.0169***	-0.0125**	-0.0168***	-0.0202***
	(0.00848)	(0.00881)	(0.00848)	(0.00824)	(0.00826)	(0.00811)	(0.00814)	(0.00856)	(0.00534)	(0.00529)	(0.00528)	(0.00542)	(0.00569)	(0.00533)	(0.00555)	(0.00536)
totalsec	-0.0113								-0.0305***							
	(0.00876)								(0.00616)							
totaltert		0.0835***								0.104***						
		(0.0204)								(0.0140)						
complsectotal			-0.00746								-0.0120					
			(0.00753)								(0.00848)					
compltertotal				0.0872***								0.133***				
				(0.0252)								(0.0194)				
complsectert					0.00177								0.0180*			
					(0.00714)								(0.00953)			
avgtotal						0.0412								0.169		
						(0.0923)								(0.111)		
avgsectotal							0.135								0.473***	
							(0.153)								(0.117)	
avgtertotal								2.374***								3.199***
								(0.579)								(0.421)
Constant	-29.23***	-31.25***	-28.57***	-31.64***	-28.43***	-28.26***	-28.27***	-31.49***	-18.50***	-28.09***	-20.00***	-26.33***	-17.07***	-17.80***	-26.24***	-28.19***
	(2.999)	(3.029)	(2.931)	(3.005)	(2.867)	(3.030)	(2.957)	(3.031)	(1.474)	(1.935)	(1.904)	(1.895)	(1.664)	(1.444)	(2.445)	(1.917)
Wald test	359.02	385.43	362.82	392.82	374.83	338.85	384.20	388.72	472.20	540.56	493.32	501.26	484.42	466.60	488.88	539.02
Sargan test	120.62	114.47	119.93	114.70	119.79	117.47	117.82	114.89	211.88	170.66	233.91	186.09	226.52	230.63	187.30	172.74
Observations	116	116	116	116	116	116	116	116	123	123	123	123	123	123	123	123
No of Countries	14	14	14	14	14	14	14	14	11	11	11	11	11	11	11	11

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively.

Table 3. Labor force with secondary and tertiary level of education, Western countries (EU-15) and CEE countries– Time period 1995-2012

VARIABLES	(1) Labor Force Secondary	(2) Labor Force Tertiary	(1) Labor Force Secondary	(2) Labor Force Tertiary
	Western EU Countries		CEE Countries	
logGDPcon	1.273***	1.199***	1.118***	1.085***
	(0.105)	(0.1000)	(0.0736)	(0.0714)
interest_rate	-0.0313	-0.0360	-0.0339***	-0.0235***
	(0.0352)	(0.0327)	(0.00747)	(0.00728)
trade	0.0195***	0.0136***	0.00764***	0.00693***
	(0.00228)	(0.00247)	(0.00189)	(0.00193)
GFCF	0.101**	0.116***	0.0466***	0.0440***
	(0.0409)	(0.0392)	(0.00992)	(0.00995)
Compensation	0.0306	0.0108	0.0151	0.0320
	(0.0514)	(0.0478)	(0.0247)	(0.0242)
R&D	0.497***	0.0922	-0.637***	-0.648***
	(0.123)	(0.112)	(0.128)	(0.129)
crisis	-0.796***	-0.931***	0.154	0.0993
	(0.251)	(0.246)	(0.109)	(0.112)
business_freedom	0.0332***	0.0155	-0.00932*	-0.0120**
	(0.00986)	(0.0104)	(0.00548)	(0.00556)
LF_sec	-0.0164*		-0.0193***	
	(0.00987)		(0.00742)	
LF_tert		0.0715***		0.0242***
		(0.0149)		(0.00937)
Constant	-31.62***	-29.57***	-19.35***	-20.15***
	(3.646)	(3.515)	(1.610)	(1.907)
Wald test	250.18	274.77	442.74	441.66
Sargan test	130.13	123.74	226.12	213.65
Observations	119	119	134	134
Number of Country	14	14	11	11
EU	15	15	11	11

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively.

Table 4. PISA math, science, reading and overall score – Western countries (EU-15) and CEE countries - Estimation with 2SLS/RE – Time period: 2000-2012.

VARIABLES	(1) PISA maths	(2) PISA science	(3) PISA reading	(4) PISA All	(1) PISA maths	(2) PISA science	(3) PISA reading	(4) PISA All
	Western EU Countries				CEE Countries			
logGDPcon	1.207***	1.194***	1.101***	1.182***	0.893***	0.842***	0.855***	0.860***
	(0.236)	(0.235)	(0.239)	(0.234)	(0.134)	(0.134)	(0.129)	(0.132)
interest_rate	-0.0428	-0.0670	-0.0787	-0.0634	-0.0274***	-0.0207**	-0.0198**	-0.0231***
	(0.0662)	(0.0735)	(0.0732)	(0.0702)	(0.00854)	(0.00841)	(0.00821)	(0.00828)
trade	0.0185***	0.0168***	0.0177***	0.0181***	0.0109**	0.0105**	0.0101**	0.0105**
	(0.00511)	(0.00440)	(0.00447)	(0.00470)	(0.00425)	(0.00448)	(0.00447)	(0.00436)
GFCF	0.0433	0.0465	0.0442	0.0431	0.0415	0.0448	0.0430	0.0424
	(0.0890)	(0.0885)	(0.0878)	(0.0884)	(0.0278)	(0.0287)	(0.0279)	(0.0280)
Compensation	-0.342	-0.346	-0.294	-0.338	-0.0162	-0.0220*	-0.0311**	-0.0236**
	(0.320)	(0.319)	(0.316)	(0.318)	(0.0114)	(0.0122)	(0.0128)	(0.0119)
crisis	-3.477***	-3.509***	-3.756***	-3.588***	0.441	0.536	0.387	0.485
	(0.725)	(0.729)	(0.771)	(0.740)	(0.420)	(0.466)	(0.428)	(0.439)
R&D	0.283	0.250	0.342	0.311	-0.0816	-0.00493	0.145	0.0135
	(0.239)	(0.216)	(0.238)	(0.237)	(0.253)	(0.286)	(0.248)	(0.261)
business_freedom	0.0562***	0.0596***	0.0625***	0.0599***	-0.00713	-0.0114	-0.0114	-0.00997
	(0.0194)	(0.0202)	(0.0202)	(0.0199)	(0.0143)	(0.0161)	(0.0169)	(0.0157)
PISA_math	-0.00742				-0.0178***			
	(0.00793)				(0.00512)			
PISA_science		0.00951*				-0.0157***		
		(0.00947)				(0.00573)		
PISA_read			0.0172				-0.0151***	
			(0.0128)				(0.00466)	
PISAall				-0.0121				-0.0168***
				(0.0105)				(0.00512)
Constant	-22.22**	-20.72*	-15.08	-19.37*	-6.336*	-5.330	-5.259	-5.242
	(10.80)	(11.17)	(12.62)	(11.41)	(3.428)	(4.145)	(4.079)	(3.866)
Observations	69	69	69	69	35	35	35	35
Number of Country	12	12	12	12	11	11	11	11
EU	15	15	15	15	11	**11**	11	11

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively.

Table 5.Vocational and General Education based on level of education – Western countries (EU15) and CEE Countries – Time period: 2000-2012

VARIABLES	(1) Secondary Vocational	(2) Upper secondary Vocational	(3) Tertiary Vocational	(4) Secondary General	(5) Upper Secondary General	(6) Tertiary General	(1) Secondary Vocational	(2) Upper secondary Vocational	(3) Tertiary Vocational	(4) Secondary General	(5) Upper Secondary General	(6) Tertiary General
	Western EU Countries						CEE Countries					
logGDPcon	1.335***	1.189***	1.858***	1.322***	1.271***	1.429***	0.846***	0.890***	1.097***	1.040***	1.098***	1.025***
	(0.142)	(0.228)	(0.216)	(0.136)	(0.185)	(0.241)	(0.0617)	(0.0678)	(0.0777)	(0.0599)	(0.0665)	(0.0635)
interest_rate	-0.0699*	-0.0576	-0.212***	-0.0507	-0.00424	0.0422	-0.0241***	-0.0146*	-0.0277***	-0.0249***	-0.0244***	-0.0305***
	(0.0395)	(0.0533)	(0.0578)	(0.0366)	(0.0501)	(0.0508)	(0.00695)	(0.00776)	(0.00824)	(0.00690)	(0.00765)	(0.00842)
Trade	0.0168***	0.0182***	0.0216***	0.0200***	0.0216***	0.0211***	0.0197***	0.0205***	0.00791***	0.00809***	0.00576***	0.00543***
	(0.00293)	(0.00341)	(0.00370)	(0.00259)	(0.00296)	(0.00372)	(0.00267)	(0.00294)	(0.00251)	(0.00184)	(0.00203)	(0.00208)
GFCF	0.143***	0.0906	0.354***	0.107**	0.0517	0.101	0.0309***	0.0478***	0.0673***	0.0427***	0.0680***	0.0565***
	(0.0520)	(0.0745)	(0.0773)	(0.0513)	(0.0688)	(0.0908)	(0.00991)	(0.0107)	(0.0123)	(0.00989)	(0.0108)	(0.0114)
Compensation	-0.0564	0.0325	0.929**	-0.00290	0.0445	0.309	-0.0147	-0.0444	-0.0522*	0.00290	-0.0622*	-0.0252
	(0.0712)	(0.166)	(0.414)	(0.0648)	(0.152)	(0.384)	(0.0253)	(0.0276)	(0.0316)	(0.0291)	(0.0323)	(0.0304)
R&D	0.453***	0.220	0.812***	0.368***	0.295**	0.335	-0.808***	-0.827***	-0.764***	-0.550***	-0.473***	-0.768***
	(0.149)	(0.232)	(0.186)	(0.118)	(0.148)	(0.231)	(0.133)	(0.138)	(0.156)	(0.131)	(0.136)	(0.140)
Crisis	-0.848***	-1.189***	-0.941***	-0.909***	-1.110***	-0.441	0.0885	0.0874	0.542***	0.259**	0.378***	0.282**
	(0.276)	(0.326)	(0.316)	(0.262)	(0.299)	(0.278)	(0.108)	(0.116)	(0.155)	(0.111)	(0.116)	(0.126)
business_freedom	0.0417***	0.0611***	0.0433***	0.0366***	0.0481***	0.0261**	-0.0111**	-0.000902	-0.0253***	-0.0154***	-0.0237***	-0.0150**
	(0.0118)	(0.0145)	(0.0132)	(0.0108)	(0.0128)	(0.0129)	(0.00528)	(0.00677)	(0.00774)	(0.00542)	(0.00699)	(0.00736)
Enrsecvoc	-1.059						19.41***					
	(1.115)						(3.129)					
Enrupsecvoc		1.560*						24.75***				
		(1.905)						(4.006)				
Enrtertvoc			188.1***						11.00			
			(36.02)						(65.22)			
Enrgensec				0.0343						2.027*		
				(0.301)						(1.063)		
Enrupgensec					2.469						8.970***	
					(1.757)						(2.813)	
Enrtertgen						0.649						-22.24
						(7.816)						(14.20)
Constant	-34.16***	-31.22***	-64.09***	-33.41***	-32.53***	-39.06***	-15.21***	-17.58***	-19.00***	-18.55***	-19.46***	-17.43***
	(4.635)	(7.404)	(10.45)	(4.566)	(6.416)	(11.32)	(1.521)	(1.672)	(2.062)	(1.540)	(1.704)	(1.672)
Wald test	201.33	123.10	173.41	195.16	122.50	114.42	477.94	426.02	293.35	460.06	385.23	350.21
Sargan test	101.70	77.11	109.05	110.18	78.30	45.88	220.14	159.18	158.68	244.96	170.88	163.98
Observations	98	77	47	107	86	65	132	123	97	132	123	109
Number of Country	14	13	9	14	14	11	11	11	11	11	11	11

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively.

Table 6. Summary Results

HC measures	EU15	CEE
Government expenditure on education as % of GDP (%)	+	-***
Government expenditure on secondary education as % of GDP (%)	+	-***
Government expenditure on tertiary education as % of GDP (%)	-	-
Expenditure on education as % of total government expenditure (%)	+	-**
Expenditure on secondary education as % of total government expenditure (%)	+	-***
Expenditure on upper secondary education as % of total government expenditure (%)	+***	-
Expenditure on tertiary education as % of total government expenditure (%)	-	-*
Total secondary education, total 15+	-	-***
Total tertiary education, total 15+	+***	+***
Completed secondary education total, 15+	-	-
Completed tertiary education total, 15+	+***	+***
Completed secondary and tertiary education, total 15+	+	+*
Average years of total schooling, 15+	+	+
Average years of secondary education total, 15+	+	+***
Average years of tertiary education total, 15+	+***	+***
Labor force with secondary education (% of total)	-*	-***
Labor force with tertiary education (% of total)	+***	+***
PISA: Mean performance on the mathematics scale	-	-***
PISA: Mean performance on the reading scale	+	-***
PISA: Mean performance on the science scale	+*	-***
PISA: Mean performance on the	-	-***

math, reading and science scale		
Enrolment in secondary vocational education/labor force	-	+***
Enrolment in upper secondary vocational education/labor force	+*	+***
Enrolment in tertiary vocational/labor force	+***	+
Enrolment in secondary general education/labor force	+	+*
Enrolment in upper secondary general education/labor force	+	+***
Enrolment in tertiary general/labor force	+	-

Chapter 3. FDI and Human Capital: Gender Effects and Education Spillovers in European Union

"Until we get equality in education, we won't have an equal society (Sonia Sotomayor)"

3.1 Introduction

Human capital, education and skills represent a major determinant for the multinational enterprises (MNEs) to invest in the European Union states and are considered the leading resources of those firms that want to remain and/or to become globally competitive (Kedia et al, 2012). Although the relationship between human capital and inward FDI has been widely discussed (Nicoletti et al., 2003; Axarloglou, 2005; Agiomirgianakis et al., 2006), little attention has been devoted on the role of gender differences in terms of different types and levels of education on FDI inflows. We thus, take this as an invitation to contribute to this literature by analyzing the effect of gender educational disparities on FDI inflows in EU countries.

In the 21st century, there has been a significant progress towards gender equality in developed countries (Europa, 2014). While this can lead to better opportunities for females, it still remains an abstract goal. Gender bias and discrimination may reduce economic growth (Dollar & Gatti, 1999; Klasen, 2002) and discourage workers with appropriate qualifications from entering in a suitable job. What is more, sex-based education disparity means less educated females with less skills and competencies (European Commission, 2009) while disadvantages in education translate into lack of access to skills and limited opportunities in labor market. Lower human capital levels may lead to lower output (Busse & Spielmann, 2003) and therefore to lower inward FDI. On the other hand, gender related-education disparity may affect the competitiveness of a country by lowering females' wages and therefore creating a more friendly-FDI environment (Braunstein, 2002). Thus, investors may be interest in gender education disparities in order to exploit highly educated females at a lower cost.

Though there exists partial evidence on the links between gender inequality and trade (Seguino, 1997; Busse & Spielmann, 2006), the role of gender differences in terms of education in FDI attraction has been ignored so far with few exceptions (Busse & Nunnenkamp, 2009; Brzozowski, 2013; Blanton & Blanton, 2015). Consequently,

there is room for investigating whether foreign investors care about gender educational disparities; policymakers should take into account if equal benefits between males and females in terms of education increase the effectiveness of activities and create a friendly FDI environment.

As noted by Hillman (2005), aspects of globalization (like forced labor) that adversely affect females, reflect the inadequacies of domestic institutions and policies of governments rather than being inevitable attributes of globalization. Social norms are also involved: for example, the social norm may be for parents to take advantage of the labor of their children (Katav-Herz, 2003). Persistent discriminatory social institutions restrict the economic and social role of females around the world. Although institutions vary within and across countries, and are constantly evolving, they are embedded in relational hierarchies of gender, class and other fault lines, which define identities and distribute power[14]. These institutional rules constraint the ability of countries to challenge gender-biased institutional norms. Putting social institutions at the core of the policy response can open new and sustainable vistas to promote gender equality in national and international development agendas. Discriminatory social institutions have attracted increased attention from the development community in appreciation of their role in explaining gender inequalities. Based on the above, in the present paper we assume that gender inequality reflects the existence of institutional problems in a country.

In this paper we test for the isolated effects of gender education disparities on inward FDI. Our analysis is carried discriminating between the EU15[15] and the CEE EU members in order to detect any potential variations and hence be able to lay down policy recommendations towards market equalization and competitiveness improvement of the whole region. Specifically, we take one step further by extending the analysis using various gender educational disparity measures of human capital in the attractiveness of MNEs. In this context, we extend existing literature in several ways. Firstly, we confirm that education as a central component of a country's institutional profile plays an important role as a location factor for MNEs. Secondly,

[14] http://worldbank.mrooms.net/file.php/349/references/rao-kelleher.pdf

[15] EU-15 countries are the EU member countries before the largest enlargement of the EU on May 1st 2004, while EU-11 (or CEE) countries comprise new EU member countries of the EU after 2004 apart from Malta and Cyprus.

we provide analytical evidence of gender related education disparities effects on inward FDI, by using an extensive list of traditional and new measures of human capital and skills. Thirdly, we place emphasis on gender related skills and competencies within the new education agenda worldwide incorporating new data based on recently adopted education policy between general and vocational education. Fourthly, we explain the theoretical framework on which the present analysis is based, something that until now according to our knowledge has not done before.

The rest of the paper is organized as follows: the next section outlines the theoretical basis of investigation and briefly discusses the empirical literature of human capital with respect to gender as a determinant of inward FDI. Data analysis and the econometric model are presented in section three. Section four presents econometric results from FDI panel regressions. We conclude by discussing the policy implications of our study, note some limitations and provide concluding remarks.

3.2 Theoretical Background and Literature Review

Various theoretical models have tried to explain the location decisions of foreign investors (Faeth, 2009). Dunning (1981) developed the eclectic paradigm to explain why MNEs undertake FDI and stated that three conditions must be present simultaneously for FDI to take place. The firm must possess an ownership (O) and an internalization (I) advantage[16] while the foreign (host) market must offer a location (L) advantage. The latter includes the presence of human capital in the foreign country among other factors. In 1993, Dunning combined the OLI parameters with an extension of Behrman's (1972) taxonomy of MNE's internalizational activities. MNE's activities are classified into four types, namely resource seeking, market seeking, efficiency seeking and strategic asset seeking[17]. Of the above, efficiency seeking FDI is asserted to be more responsive to differentials in labor productivity, of which one of the significant determinants is human capital.

[16]Internalization advantages influence how a firm chooses to operate in a foreign country, selecting among different entry modes like FDI, exports, licensing or joint venture.

[17]The resource-seeking type is mainly to acquire specific resources at a lower cost than it would cost at home. Market-seeking type aims to sustain existing markets and exploit new ones. Efficiency-seeking investment is mainly to restructure and rationalize existing investments in order to optimize the allocation of their international economic activities. For the strategic asset-seeking firms, they seek long-term strategic goals; which enhances their international competitiveness by acquiring the assets of foreign firms.

The FDI literature illustrates that the importance of location advantages has increased[18], with the emphasis changing from natural and cost-related input endowments to knowledge-based competencies. Over the recent decades, the composition and significance of competitiveness-enhancing assets have changed (Dunning & Lundan, 2008b), from pure production-capability related assets such as technology to more institutionally related assets such as human capital (Hao et al., 2011). As the available tangible resources and intangible capabilities have become more knowledge-intensive and relationally based (Dunning & Lundan, 2008b), these have largely led to the development of institutional-related theories for MNEs. Thus, Dunning & Lundan (2008) extended the determinants of inward FDI by including policy-induced effects generated by institutions. Their work combines institutional analysis with international business studies and incorporates institutions into the OLI paradigm, emphasizing the role of various institutions in shaping OLI. Based on the extension, we incorporate institutional effects captured by gender education disparities as an important location factor. In other words, the present study is developed under this theoretical framework where gender related education disparities as part of institutional quality are seen as providing location specific cost and advantages to potential foreign investors.

Institutions are considered an important factor explaining development outcomes; they guide human behavior and shape human interaction (North, 1990). Although social institutions influence managerial actions through a variety of processes, previous research and theory often begins with the assumption that institutions fit neatly into a typology, with each type having a unique process of affecting outcomes. Perhaps the most well-known of these typologies is Scott's (1995) cognitive, normative, and regulative "pillars" of institutional structure. Borrowing from Scott's institutional approach, Kostova (1997) applied the pillars at the country level to produce a three-dimensional country institutional profile, consisting of a country's governmental policies (regulative dimension), widely shared social knowledge (cognitive dimension), and value systems (normative dimension).

[18] Studies in recent decades started to be more focused on the location determinants for increasing FDI inflows (Dunning, 2000), especially due to intensified globalization and the transition process of newer European Union member countries.

Although formal rights may be established, females in many countries do not have equal access to inheritance, they cannot own land or property, suffer from domestic violence, and need to be accompanied by a male member of the family when leaving the house (OECD, 2016). Discriminatory social institutions underlie across all stages of females' life, reducing their access to fairness, rights and empowerment opportunities and undermining their decision-making authority over their life choices. As underlying drivers of gender inequalities, discriminatory social institutions retain gender gaps in development areas, such as education, and prevent progress towards social transformation in terms of rights that benefits both females and males.[19] We conceive these discriminatory social institutions as formal and informal laws, social norms and values that shape or restrict the decisions and choices of females. They have gained a prominence as a useful analytical framework to illuminate gender disparities.

Because institutions are important for foreign investors, there are widely used in the related literature as determinants of inward FDI. What is more democratic institutions existed long before gender equality, but today, this article argues, growing emphasis on gender equality is an important factor in the process of democratization. Furthermore, as we will demonstrate, support for gender equality is not just a consequence of democratization. It is part of a broad cultural change that is transforming many aspects of industrialized societies and supporting the spread of democratic institutions. Gender relations are systems that shape and/or constrain behaviour of individuals as well as of institutions (UNDP, 2012). Thus, in the present paper, we place emphasis on gender inequality as a particular institutional aspect given the significance of education on its own.

As we already stated, education has a leading role in promoting economic growth (Cooray & Potrafke, 2011) and it is considered a human right for both males and females. Gender roles continue to influence crucial individual decisions (e.g. on education, on fertility, on family etc.) which in turn have an impact on the economy and society. It is in everyone's interest to offer genuine choices equally for both sexes. Distinguishing thus education by gender, educated females on the one hand promote growth and human capital (Schultz, 1994; Dollar & Gatti, 1999) just like males, while

[19] www.genderindex.org

on the other hand there is a further advantage due to the positive influence of mothers on the education and health of their children (Schultz, 2002; Doepke & Tertilt, 2009). As females' education is believed to promote the quantity and quality of education of their children (through the support and general environment educated mothers can provide their children), this positive externality is likely to exist. Hence, according to the theoretical literature, gender educational disparity reduces the average amount of human capital and hampers economic growth by excluding high qualified females (Dollar & Gatti, 1999). To elaborate more, increased females' education reduces fertility levels and enhances the education of the next generation (King et al., 2008). In this respect, another reason that education of females is important for development is the transmission through mothers. Females' education is equally significant as males' in promoting growth and gender equality is an aspect which deserves further attention.

Gender equality, being a fundamental right and a condition for lasting economic growth (Europa, 2014), constitutes an element of the multi-dimensional concept of human development which is much broader than that allowed by income alone. High gender inequality means that some individuals are systematically deprived of their rights and can lead to lower growth because skills of some people remain unused. Gender inequality is not only a pressing moral and social issue but also a critical economic challenge. If females, who account for half the world's working-age population, do not achieve their full economic potential, the global economy will suffer. It has recently become a key focus for many development policies. On the one hand, gender equality matters intrinsically, because the ability to live the life of one's own choosing and be spared from absolute deprivation is a basic human right and should be equal for everyone; on the other hand it matters instrumentally, because it contributes to economic efficiency and other basic development outcomes (World Development Report, 2012). The Human Development Report defines it as a process of enlarging people's choices and underscores the critical importance of three aspects: long and healthy life, level of education and decent standard of living (UNDP, 2010). It is one of the founding principles of EU and a building block of its future. Equality between males and females contributes to jobs, growth and fairness; gender inequality has serious cost implications and affects negatively human and economic

development by creating more poverty, less economic growth and lower level living standards (World Bank, 2003).

As a consequence, reducing persistent gender inequalities is necessary not only for reasons of fairness and equity but also out of economic necessity (OECD, 2011). Developed countries have succeeded in providing universal primary education (UNESCO, 2012) which has been accessible and nearly universal in developing countries as well. We will place emphasis in secondary, upper secondary and tertiary level of education. In developed, and particularly in OECD and high income countries, where education is compulsory up to the age of 15-16, males are more likely to drop out before completing secondary education. As a result, females are increasingly better educated than males in OECD countries (OECD, 2012). Until now, despite progress towards gender diversity, European countries still have a long way to go to reach parity (https://www.mckinsey.com/global-themes/gender-equality/reinventing-the-workplace-for-greater-gender-diversity)

Turning to the empirical part, most papers have investigated the effect of gender dimension on economic growth either by using separate effects or gender educational gaps (Barro & Lee, 1994; Engelbrecht, 1998; Dollar & Gatti, 1999; Kalaitzidakis et al., 2001; Klasen, 2002; Klasen & Lamanna, 2009; Karoui & Feki, 2015). Some studies have argued that gender educational disparity might increase economic growth (Barro & Lee, 1994), while recent studies suggest the opposite (Klasen, 2002; Klasen & Lamanna, 2009) arguing that the results of Barro & Lee (1994) do not stand up to closer econometric scrutiny. Specifically, they claim that gender-based inequalities in education are detrimental to economy growth and limit a country's benefit from the externalities of female education, which includes reduced fertility levels, child mortality levels and increased human capital formation of the next generation. While gender human capital stock may exhibit differential effects on economic growth (Kalaitzidakis et al., 2001; Klasen & Lamanna, 2009), the results regarding FDI attraction are pretty scarce.

In particular, while the link between gender inequality and inward FDI has been attracting partial attention in literature (Busse & Nunnenkamp 2009; Coleman, 2010; Brzozowski, 2013; Blanton & Blanton, 2015), the role of gender inequality in terms of education considering different levels and types in attracting inward FDI has not

been explored. During the last decades, it is widely accepted that improving the status of females all over the world is one of the most critical levers of economic development (Coleman, 2010). MNEs may take advantage of the gender disparity in host countries to maximize their profit on a pool of low-skilled female labor force (Mai Hoai & Duy Tung BUI, 2016). From this perspective, discrimination against women is another way in which a state may increase its competitiveness. Given their "secondary status in the labor market, which is seen as a natural consequence of their capacity to bear children" (Elson & Pearson, 1981, p. 93), as well as the endemic undervaluing of skills usually deemed as "women's work," such as sewing and the assembly of small parts, firms may pay women lower wages than their male counterparts for comparable work (Braunstein, 2006; Elson, 1996). Arguably, average wages will decline if less educated females enter the labor force in the host country[20] and MNEs may be increasingly inclined to exploit unqualified, cheap female labor. They face mounting cost pressure and increasingly refer to vertical types of FDI, which involve the relocation of labor-intensive parts of the value chain to lower-cost locations. Certain industries are characterized by gender fragmentation where female labor force is overcrowded and as a result females' average wage is lowered to deal with the increasing unemployment (Braunstein, 2006). Birdsall & Sabot (1991) also observed a structured undervaluation of female's conventional work like assembling parts. Therefore, females get lower wages in comparison to men for the same job. Further, despite decades of awareness, females remain discriminated against in many organizations, leading to a perpetuation of unequal pay and severe under-representation in senior management positions (Elvira & Graham, 2002; Hoobler et al., 2009; Belliveau, 2012). Other studies have found that wage discrimination may help countries compete more effectively in the global economy which may lead at a wider gender earnings gap (Seguino, 2000a, 2010; Busse & Spielman, 2006). According to other studies, increased female's empowerment and status in a higher-skilled labor pool may be more attractive to foreign investors (Coleman 2010; Busse & Nunnenkamp, 2009). Certain industries require a skilled labor force. In other words, while some industries exploit low skilled females like the clothing industry (Berik, 2009; Seguino, 2010), others demand skilled females. In this

[20] As discussed in Kucera (2002), wages tend to decline when some groups of workers are paid less than others for similarly work due to existing discrimination.

point of view, low-skill work force corresponds to low productivity. Per unit labor cost is thus higher in region with pronounced education inequality.

Along those lines, Kucera (2002) was an exception including gender-specific education variables as determinants of inward FDI in a sample of 127 countries, but he did not find significant evidence suggesting that education-related gender disparity resulted in higher FDI inflows. But his results are not robust; he found that the positive effect of female educational attainment on inward FDI is statistically significant only when high income host countries are included in the sample and the coefficient even changes its sign once the regressions are run with regional dummies. Blanton & Blanton (2015) showed that the reduction of gender connected educational gaps is related to increased investment in low-skilled manufacturing industries, which is an area that contains a good deal of vertical investment. Busse & Nunnenkamp (2009) used also gender educational disparity in order to explain bilateral FDI flows from 28 sources to 77 host economies during the period 1978-2004 and showed that the average number of years of schooling of both sexes taken together in the population aged 25 and above, as well as the mean years of schooling of both sexes at all levels of education separately, are strongly and positively associated with FDI flows; the size of the coefficient was higher at the secondary and tertiary level compared to primary. Recently, Brzozowski (2013) assessed the weight of human capital and gender equality in explaining the bilateral FDI inflows to 11 Central European economies. The paper investigated the differences in educational attainment and health between males and females and found that if FDI is mostly low-cost seeking oriented, gender inequality in health and access to education may create a pool of low-pay workers that can be profitably exploited unless the level of productivity is not seriously hindered by gender disparities. Taken as a whole, the relationship between gender related education inequality and FDI inflows is doubtful and deserves more explanation.

Apart from different levels of education, countries differ substantially in their schooling systems and the orientation of their education programmes. Some focus on vocational education, which develops specific job-related skills and prepares and facilitates the transition from school to work, while others focus on theoretically oriented programmes, which provide students with broad knowledge and skills.

Krueger & Kumar (2004a; 2004b) argued that the slower growth of European economies may be due to the greater reliance of Europe on vocational education as opposed to general. The key to improving competitiveness lies in raising human capital capabilities by making appropriate investments in human capital through higher education and training programmes that can enhance their ability to generate and manage new technologies. In most countries there exists a higher share of male secondary school students enrolled in vocational schools as opposed to the share of female students (OECD, 2012). Females have strong academic aspirations and expectations in terms of high-status employment but there are systematic gender differences in career aspirations in occupational areas at both tertiary level and in vocational training (OECD, 2012).

A key target of all educational systems is to equip people with a wide range of skills and competencies because most countries need a skilled labor force to enhance economic growth and thus become more competitive. In other words, in order to achieve sustainable growth and investment, the potential and talented pool of females need to be used more extensively. The increasingly diverse and interconnected population is posing new and demanding challenges both to individuals and society systems. School systems are rethinking the skills students will need for success and the most appropriate educational systems for children (OECD, 2001). Advanced economies, like the EU ones, and innovative industries require more educated workers with the ability to respond efficiently to complex problems and produce innovative knowledge. In order to ensure the matching of skills (supply and demand) and the attractiveness of inward FDI, policymakers need to develop skills that are relevant and ensure the delivery of high levels of competencies and a sufficient quantity of skilled workers. Human capital is considered a multi-dimensional aspect and therefore the inclusion of different measures with respect to gender related education may detect the relative importance of different types and levels of education, skills and competencies to foreign investors.

Based on the above grounds, in the present paper, we use gender disparity variables that relate to various types and levels of education as well as skills and programmes orientation in order to detect which one creates a sound environment for foreign investors in EU sub-regions.

3.3 Sample, Estimation Models, Data And Methods

3.3.1 Sample

The sample consists of the European Union countries disaggregated between core and non-core EU countries[21] for different time periods depending each time on the availability of data from the longest 1995-2012 to the shortest is 2000-2012 for both sub-regions. These two sub-regions differ between them; Western countries are in the high income category while EU-11 are economies with significantly lower wages; the more to the East, the lower is the income (Igošina, 2015). In general, the more developed Western EU countries have received much larger inward FDI than transition economies (World Bank, 2014a), yet more than half of the FDI jobs were created in non-core EU countries which are reaping the benefits of an affordable and capable labor force and its cost base remains competitive compared with the core EU countries. Therefore, while these two sub-regions constitute EU are far from being homogeneous both in terms of economic development and the size of inward FDI and it is worth to examine them separately.

3.3.2 Estimation models

In our models we include the most widely accepted FDI determinants incorporated in related literature[22] in order to be able to focus on our main interest, that of gender education disparities and their effect on inward FDI[23].

The empirical investigation for this paper is based on the following equation:

$$INFDI_{it} = a_i + a_k X_{it} + a_m Z_{it} + \mu_i + \nu_{it} \qquad (1.1)$$

where i represents the recipient FDI country and t represents time, accounts for the unobservable time-invariant individual specific effect not included in the regression; X_{it} represents the levels and types of gender disparity education and skills; Z_{it} stands for the standard variables that are considered as determinants of FDI; μ_i stands for a

[21] Apart from Malta and Cyprus.

[22] From the long list of significant FDI determinants, we present only these that were found to be robust in most regressions. For example, we have also checked for inflation rate, political stability, patents, investment freedom etc., nevertheless, no robust results were obtained from these, hence we excluded them from final estimations.

[23] Our goal in this paper is not to set alternative models of FDI, but to focus on the facets of gender educational disparities. Thus, we concentrate on the most widely accepted and commonly used determinants of FDI.

time-invariant individual specific effect and v_i denotes the stochastic remainder disturbances, assumed to be IID (0, σ^2_v). Our time span covers different time periods given the type of gender human capital measure examined and ranges from the longest period of 1995-2010 to the shortest one of 2000-2012.

Specifically, the dependent variable, collected from the UNCTAD's (2005) World Investment Report, is the natural log of inward FDI (millions of US$) that flows into a country in the subsequent year of the panel year corresponding to the independent variables.[24]

3.3.2.1 Measures of gender related-human capital and skills inequalities

We use various measures to capture the complicated and multidimensional aspect of human capital with respect to gender while in each estimation we also apply the respective human capital measure to capture the human capital base of the regions. Specifically, one could use both stock and flow measures when measuring educational attainment. Stock measures reflect the pool of human capital residing in a country while flow measures reflect the contributions of incoming cohorts to the stock of human capital. Therefore, it seems that the former are a more appropriate measure compared to the latter because they provide information on the total amount of formal education that is available for employment (Le et al., 2005; Islam, 2014).

In the present paper, we use the percentage of population (aged 15 and over)[25] that has completed secondary and tertiary education taken from Barro & Lee database (Noorbakhsh et al., 2001; Schatz, 2003; Li & Liu, 2005; Woessmann, 2003; Islam, 2014) to account for different durations of analogous school cycles and because differences in educational attainment and trends are not completed captured by the evolution of years of education (Thévenon & Del Pero, 2015). We focus only on secondary and tertiary level of education because there has been significant progress in closing gender gap in primary education and these levels of education are more likely than primary education to determine ability to participate in the paid economy (http://www.undp.org, Chapter 5, Gender Inequality). We use the difference between

[24] In the present paper we use the logarithm of FDI inflows to adjust for the skewed nature of the data (Demekas et al., 2007).
[25] Similarly, we also used the same indicators for the population aged +25 and over and the results were quite similar. For brevity, we focus and present only the results for population aged 15+ and over.

male and female scores in order to examine at which level of education gender inequality matters most for the host countries' attractiveness to inbound FDI. Concentrating on population that has completed tertiary education (*Figure 1)* we observe that nowadays in Western EU members countries females remain a minority compared to males while the reverse applies for CEE countries where females outperform males.

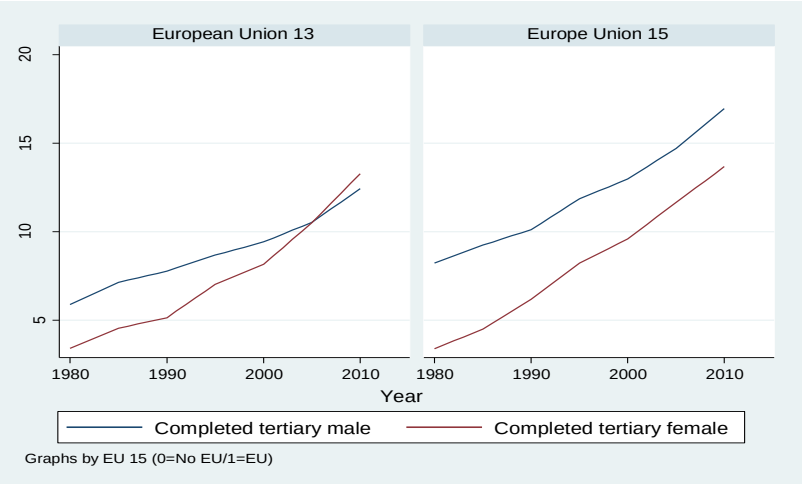

Figure 1: Males – Females tertiary level completion (1980-2010)

Additionally, we use the share of labor force with secondary education or tertiary education to capture more specifically the education and skills of the available pool of workers (Nunnenkamp & Spatz, 2002; Tang, 2015) by taking the difference between males and females. It is a useful measure since it includes people who are currently employed and people who are unemployed but seeking work as well as first-time job-seeker and attained or completed secondary or tertiary education as the highest level by the total number of labor force. It provides awareness into skill levels of labor force and is used to draw inferences about how changes in employment demand and education policy affect foreign investors. Concerning the whole region in 2012, males' labor force with secondary education exceeded females' (52.08% vs 47.22%) while females labor force with tertiary education exceeded males' (34.39% vs 25.85%).

Finally, according to Becker (1964) human capital is categorized into general and specific (vocational). General human capital is to be defined by generic knowledge and skill, not specific to a task or a company, usually accumulated through working experiences and education while specific is usually accumulated through education and training on knowledge specific to a firm/task (Groen, 2006; Alan at al., 2008).

Therefore, the distinction between general and vocational education in different levels (namely secondary, and tertiary) is necessary in order to detect which type of education contributes more to the attractiveness of MNEs. We measure gender inequality in these types as the difference between males and females enrolled in these types of education as a percentage of total labor force.[26] To account for the orientation of countries' education programmes we follow the classification of ISCED, the standard framework used to categorize and report cross-nationally comparable education statistics; in this way we are able to distinguish between students enrolled in general and vocational programmes in secondary, upper secondary and tertiary education[27] discriminated by gender. The need to measure the skills acquired through different types of education has been acknowledged (Tether, 2005; Toner, 2010) and it is a first step linking generic or vocational educated labor force with foreign investments. In EU in 2013, close to half (48.3%) of upper secondary school pupils followed vocational education with the share of males being 53.4% against females, 43% (Europa, 2015). From *Figure 2*, focusing on secondary and upper secondary level it is obvious that females outperform males in theoretically oriented programmes in both sub-regions and in EU as total while the opposite applies for technically oriented programmes where males dominate compared to females. In our regressions, we employ differences between males and females enrolled in theoretically or technically oriented programmes as a percentage of total labor force.

[26]We should note that for all our gender related education measures we also employed the ratio of males to females instead of the difference between males and females. Results remained almost the same.

[27]Early childhood, primary and lower secondary are very early stages of education and in EU countries these levels are pretty high and gender gaps are eliminated. Therefore we concentrate on secondary, upper secondary and tertiary level which capture the biggest share of population. While we could also use bachelor and master or equivalent level available data were quite limited.

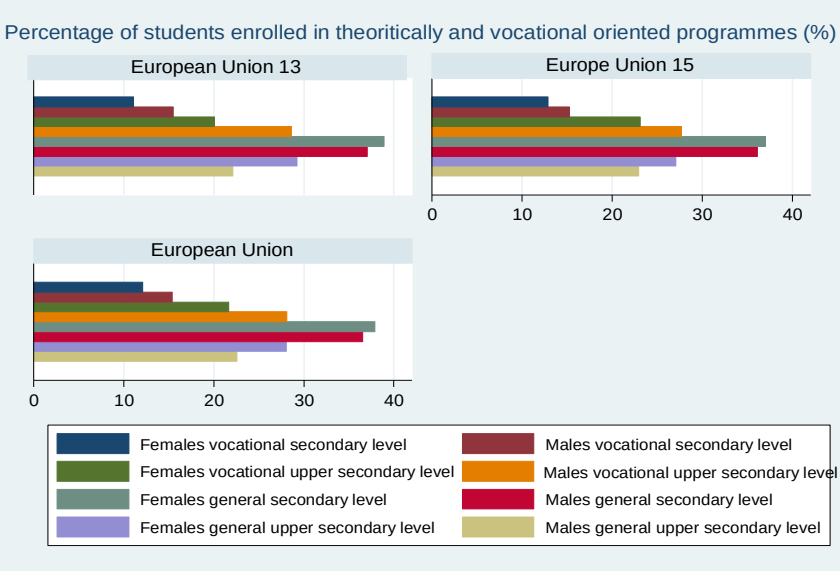

Fig. 2: Percentage of students enrolled in general and vocational programmes (%) by gender (2000-2012)

For a full list of our incorporated gender related human capital and democracy measures, please refer to Table 1 in the Appendix B of the present thesis which depicts the summary statistics and the description of all measures.

3.3.2.2 Independent Variables

The analysis of the link between MNEs location choices and gender educational disparities requires taking into account other relevant characteristics of the host economies. Firstly, as we mentioned above, we applied the respective human capital measure to capture the human capital base of the country. What is more, according to the related literature, we incorporate the most commonly used control variables that are considered important determinants of inward FDI. The latter include the size of a market (Bevan & Estrin, 2004; Carstensen & Tubal, 2004; Johnson, 2006; Busse & Hefeker, 2007; Brzozowski, 2013) measured by the logarithm of GDP to account for the size of an economy, the openness of an economy measured by trade as % of GDP (Busse & Nunnenkamp, 2009; Caetano & Calego, 2009; Hunady & Orviska, 2014), the lending interest rate (Grosse & Trevino, 1996; Bevan & Estrin, 2004; Aizenman & Noy, 2005; Majeed & Ahmad, 2008) and the gross fixed capital formation (Asiedu, 2006; Olubanjo et al., 2010; Kariuki, 2015).

In addition to the aforementioned control variables, for the validity of our model we also include research and development expenditures (as % of GDP) which are crucial

for enhancing competitiveness and growth (Pece et al., 2015) and it is used as a proxy for innovatory capability. The effect though of this variable especially in CEE countries is ambiguous because on the one hand foreign investors are attracted by economies that can create new knowledge; on the other hand this variable can capture the building of host firms' advantages, which could lead in acute competition or even higher labor costs (Filippaios & Kottaridi, 2013). We also embody a dummy variable in order to capture financial crisis that EU countries went through which takes the value of 1 from 2008-2012 and 0 otherwise (Dornean et al., 2012; Hunady and Orviska, 2014). Recent studies have highlighted the essential role that institutional factors play in creating a more investment climate (Nasir & Hassan, 2011); it is regarded that human capital is significant more valuable in countries with greater institutional quality (Acemoglou & Robinson, 2005). Hence, we also employ business freedom defined as the ability to create, operate, and close an enterprise quickly and easily (Heritage Foundation). Naturally, higher business freedom creates more incentives for investment, which means that a positive relationship is expected with inward FDI (Pyeman et al., 2015). Contrary, Caetano & Galego (2009) found a negative but not significant relationship in CEE countries while Ajide (2014) found a negative and significant relationship between them in twelve ECOWAS[28] countries. We also expect a negative relationship between wages and inbound FDI, since the greater the increase in overall cost of labor, the lower the incentive for foreign investors (labor becomes more expensive and increases the total cost of investment). However, there is no consensus among the studies that have explored the role of wage in attracting FDI inflows: results range from higher host country wages discouraging FDI inflows to having no significant effect or even a positive association.[29] In the present paper we employ compensation per employee[30] taken from World Bank database.

[28]Economic Community of West African States.

[29]Charkrabarti (2001) claim that wage as an indicator of labor cost has been the most questionable of all the potential determinants of inward FDI. Schneider & Frey (1985), Culem (1988), and Shamsuddin (1994) demonstrate that higher wages discourage FDI whereas in ODI (1997), it is stated that relative labor costs are statistically significant, particularly for foreign investment in labor-intensive industries and for export-oriented subsidiaries.

[30]We used compensation of employees (in current LCU) from World Bank database. Then, the resulting estimates are deflated by national Consumer Price Indices (CPI) and the data are then converted into a common currency unit using US$ current exchange rates and are divided by total employment in order to capture compensation per employee.

Finally, political risks and institutions are important factors of a sound investment climate. These factors have direct influence on the conduct of business as they bring non-economic costs to the investors like bribery and time (Kinoshita & Campos, 2003). The mean of measurement of democracy have been the POLITY IV democracy index which takes values between 0 (representing no democracy – full autocracy) and 10 (representing full democracy).

All control variables and their sources are depicted in Table 1 of Appendix B.

3.3.3 Methodology and Model Specification

The model is estimated both for core and non-core EU members in order to be able to discern any contingent variations within the EU depending each time on the availability of data concerning time span. We estimated our models with different methods for robustness purposes. First we used simple OLS since we refer to EU and the region is quasi homogeneous[31]. However, even within the EU there still exist important variations in terms of institutional backgrounds and economic development. Therefore, we carried out the same estimations using fixed or random effects based on Hausman's test (Greene, 2002). The panel data analysis with country fixed effects approach allows us to distinguish more systematically between the effects of policy changes and other less variable elements of the investment climate on inward FDI over time.[32] To take into account problems arising from heteroskedastic residuals, the robust standard error technique is used where necessary to obtain corrected estimates. All regressions include time trend (year dummies) to control for time variation from changes in external economic environment common across sample countries. In cases where we've had missing observations[33], we used linear interpolation based on prior practice (Apergis, 2009; Shirotori et al., 2010).

With respect to panel analysis, the present paper involves the application of the system GMM estimator which is introduced by Arellano and Bover (1995) and Blundell and Bond (1998). The system GMM comprises two sets of moment

[31] We also checked our models for potential multicollinearity with the Variance Inflation Factor (VIF) in accordance with theory that a VIF value of less than 5 does not indicate such problems (Judge et al., 1982) and we concluded that multicollinearity does not pose a problem in this dataset.

[32] Results are presented in Tables 2-5 of Appendix B.

[33] Barro and Lee measures are available every 5 years. Hence, for these measures we replicated the interpolation method.

conditions. The first one consists of first differences of the dataset which is instrumented using the level series of the corresponding variables lagged two periods and beyond. The second one comprises the original level series of the dataset which is instrumented using the lagged first differences of the corresponding variables. This estimator addresses the problem of autocorrelation of the residuals and deals with the fact that some of the control variables are endogenous. It makes the endogenous variables pre-determined, and therefore, not correlated with the error term. Until now we have assumed that both control variables and human capital indicators are all exogenous which in case of the size of the market and the human capital measures this may be questionable due to potential reverse causality between them (Mughal & Vechiu, 2009; Akin & Vlad, 2011; Gittens & Pilgrim, 2013; Karimi et al., 2013). Hence, we apply an instrumental variables estimation technique to sweep out the potential correlation problems. The consistency of the Arellano-Bond GMM estimator requires a lack of second-order serial correlation in the residuals of the differenced specification. The most common test of the instruments is Sargan's (1958) test for over-identifying restrictions.

3.4 Empirical Results

Following the model specification and the introduction of the variables we now turn to the empirical results. For brevity we report directly the GMM estimations (Tables 1-3)[34].

Concentrating to the scope of our study, that of gender education disparities, and beginning with the Western EU countries, results (*Table 2)* suggest that gender inequality in individual secondary and tertiary education strongly discourages inward FDI. In general, this indicates that higher educational attainment in Western EU countries encourages inward FDI (Tang, 2015) as we would expect and that the reduction of gender related educational gaps in secondary and tertiary level contributes positively to the attractiveness of MNEs. Blanton & Blanton (2015) and Busse & Nunnenkamp (2009) also concluded that gender related education equality is related to increased inward foreign investments. Regarding educated labor force, it is obvious that labor force inequality in secondary level seems to facilitate inward FDI

[34] Estimation results with FE are presented at the Appendix B (Tables 2-4).

(*Table 1*) while at this point we should note the females' labor force with tertiary level of education facilitates inward FDI.

Foreign investors are more interested in males' labor force with secondary education and females' with tertiary level of education in order to place their investments which could be evidence of the alternative professional directions of the two sexes. Indeed, males and females jobs differ significantly and these differences evolve with economic development; females are more likely to work in jobs with flexible working arrangements and part-time jobs in order to combine work with family responsibilities (European Foundation for the Improvement of Living and Working Conditions, 2008; World Development Report, 2012). In EU countries, despite some convergence in terms of employment between males and females, where females have made great strides in the workplace, inequalities persist and they still remain underrepresented in labor market interventions (European Foundation for the Improvement of Living and Working Conditions, 2008). Kalaitzidakis et al. (2001) argued that in high human capital countries, like EU ones, the negative effect of females education maybe due to discriminatory practices in labor markets.

In terms of gender disparity in schooling systems, i.e., general vs. vocational education (*Table 3)* for Western EU countries it is obvious that gender inequality in secondary and tertiary vocational education deters foreign investors from investing in these countries. As for general education, inequality in different levels exerts a negative impact on inward FDI but it is not significant. Therefore, in order to create a friendly FDI environment in these countries, it is of high importance to improve and enhance females' engagement in vocational education where until now males outperform females in these levels (OECD, 2011). Hollander & Yee Mar (2009) argued that vocational education is becoming more and more important giving specific knowledge for the world of work while as we see policymakers should enhance females engagement in these schooling systems. Males are more likely to obtain vocational education because it provides them more business skills, and hence it increases the possibilities of becoming successful entrepreneurs.

While the above results hold for the core EU countries, we now turn on the non-core EU countries in order to discern potential differences among them. These countries differ in economic and development level compared to Western ones, and therefore it

is of high importance to detect potential differences between them. Beginning with gender labor force with secondary or tertiary education (*Table* 1) we can argue that gender labor force equality in tertiary education facilitates inward FDI in CEE countries while in secondary education deters foreign investors as in the Western ones. Hence, foreign investors when investing in these countries are more interested in males labor force with secondary education compared to females while they desire gender equality in labor force with tertiary level. These countries need also highly educated labor force, especially males with secondary education, in order to attract inward FDI (Picciotto, 2003; Talpos & Enache, 2010) combined with cost effectiveness and low wages (which is obvious from the negative and sometimes significant sign of wages) and equality at the tertiary level. The fact that males workforce is more significant may be due to discriminatory practices or different jobs orientation (Kalaitzidakis et al., 2001) and foreign investors may take advantage of this gender disparity in order to maximize their profits (Hoai & Tung BUI, 2016). Gender educational disparity seems to deter foreign investors especially in secondary academic level. Particularly, completion ratios in secondary education have a negative and significant impact (*Table 2)*. Our results are in line with Busse & Nunnenkamp (2009) and Blanton & Blanton (2015) who showed that gender inequality deters foreign investments while gender inequality in terms of education at tertiary level seems to be insignificant.

Finally, as we already noted, European education systems introduce different streams right after primary school, namely general or theoretically oriented programmes and vocational or technically oriented programmes. Therefore, as for the distinction between technical and theoretically oriented programmes, it is clear that gender inequality in vocational secondary contributes positively to the attractiveness of MNEs while gender equality in general secondary level creates a favorable environment for FDI inflows (*Table 3*). Job-related skills are vital for an economy to compete and grow in an era of technological changes and economic integration where vocational education is becoming more and more important because it refers to the acquisition of knowledge and skills for the world of work (Hollander & Yee Mar, 2009). In CEE EU countries, males' vocational education is more significant than females and foreign investors value it most while gender equality in theoretically oriented programmes in secondary level seems to be important. Policymakers should

find a balance between theoretically and technically oriented programs and focus on the types that are more important for the attractiveness of new technologies and innovations.

Discussion of control variables

About control variables, market size, openness, GFCF and interest rate seem to be consistent with related literature, i.e. the estimated coefficients of these variables show relatively persistent results with assumed signs in different regressions both for Western and CEE members. Concerning democracy, in both sub-regions, we find that there is a positive relationship between democracy and inward FDI (Harms & Ursprung, 2002; Jakobsen & de Soysa, 2006).

[Insert Tables 1-3 about here]

Regarding the rest of control variables, we obtain quite differentiated results between Western and CEE EU. Business freedom emerges positive and, in most cases, significant for the EU15 but we obtain the reverse effect for the CEE members. While odd in the first place, the reason for such an outcome may be related to the fact that some new member states present significantly lower levels in this indicator, since they started to adapt their institutions in the 1990's (Caetano & Galego, 2009). Ajide (2014) also found that business freedom deters foreign investors in 12 ECOWAS[35]countries; arguing that unfettered business freedom should be regulated by ensuring that business take-off satisfies the business procedural guidelines. In the case of the CEE EU, most investments are driven from a cost perspective angle and the fact that they offer new markets and potential gateway even more to the East (e.g. Russia). Caetano & Galego (2009) also obtained a negative relationship for these countries, however not significant. It is suggested that institutional problems may be enhancing business in the region, if foreign investors can take advantage of the system through briberies (Shleifer & Vishny, 1993).

Though registering higher rates of corruption and non-transparency (Gamberoni et al., 2016; Guasti & Dobovsek, 2011; Sprout, 2002), these countries attract FDI due to cost effectiveness (Carstensen & Tubal, 2004; CEE Investment Report, 2016). Wages

[35]Economic Community of West African States.

do not emerge significant for EU15, while they appear negatively correlated, as expected, for CEE EU countries, in most cases.

R&D exerts also a different sign between the two groups. While R&D is important for foreign investors in the EU15, for the CEE markets it is negative and significant in most cases. Considering motivations of a traditional nature, i.e. efficiency or market seeking (Filippaios & Kottaridi, 2013) as is the case for CEE countries (Christie, 2003; Kersan-Škabić & Orlic, 2007) it is only natural to expect that FDI motivations are far different than the creation and expenditures on innovation. As the CEE Investment Report (2016) indicates, this region receives FDI due to cost effectiveness. Hence, this result is in line with all our previous findings regarding skills in this region (all measures indicating high specialization skills of human capital turn out negative).

Finally, our crisis dummy exerts a negative and significant sign for the Western EU members. In the CEE EU region, the crisis dummy is not significant in most cases whilst in some cases it is positive and significant. The extent of the financial crisis back in 2008 in the United States had a substantial negative effect on Western EU members that were mostly hit by economic turbulence. Our result is in line with Carp (2015) who argued that some of the CEE countries have proven more resilient to current fragilities. Despite the economic turbulence, these countries showed signs of recovery from the global economic crisis after 2010 (Roaf et al., 2014). When the crisis hit, West European banks did not withdraw all funding from their CEE subsidiaries overnight or let them go bankrupt, as many had feared (Barysch, 2009; Roaf et al., 2014). Additionally, the rapidly assembled 'Vienna initiative' – a club consisting of pan-European banks, the regulators of the countries in which they operate and international organizations such as the EU and the World Bank – helped to prevent a run for the exit that could have resulted in financial meltdown. Taken altogether, i.e. the Vienna Initiative and the fast recovery of these countries after 2010, justifies our result regarding the insignificant effect of the economic crisis dummy variable.

Therefore, while traditional location variables like market size, openness, infrastructure and interest rates show consistent and same results in both regions, the

rest of our control variables differ between these sub-regions reflecting the different incentives for the location of MNEs between Western and CEE EU members.

3.5 Conclusions

The level and nature of human capital as a location advantage influence the extent of inward FDI. While some papers address the impact of human capital on inward FDI, the role of gender inequality has been ignored so far with few exceptions. At the same time, there is a paucity of studies examining newly constructed indices capturing gender inequality in terms of gender related human capital. As gender inequalities reflect the instutional problems of a country, it is quite important to study them carefully, and detect if foreign investors prefer these inequalities or not.

By distinguishing between EU-15 and CEE EU countries we reach many important conclusions. Beginning with the Western EU members, gender related education equality in secondary and tertiary level is related to increased inward foreign investments. Regarding educated labor force, it is obvious that labor force inequality in secondary level seems to facilitate inward FDI. MNEs are more interested in males' labor force with secondary education and in females' with third level of education in order to place their investments which could be evidence of the alternative professional directions of the two sexes. In general, education shows the level of capital and growth of a country. It is obvious that MNEs are showing a growing interest for educated females especially in third level of education and their importance has been recently realized. But, when we focus on labor market, foreign investors seem to be also interested in males with secondary level of education. This may be due to the different professional professional directions of the two sexes. Specifically, it may be related potentially to male oriented jobs in manufacturing or construction or any sector that demands out of office work. Concerning vocational education, MNEs are also interested in equality at secondary and tertiary level which indicated the need to increase females' participation in these fields. Females remain underrepresented in vocational fields, something that has to be changed.

On the other hand, turning into CEE EU member states, we notice that foreign investors in these countries are interested in inequality regarding labor force with secondary level of education. These countries need highly educated labor force,

especially males with secondary education, in order to attract inward FDI (Picciotto, 2003; Talpos & Enache, 2010) combined with cost effectiveness and low wages (which is obvious from the negative and sometimes significant sign of wages) (*Table 1*). The fact that males workforce is more significant may be due to discriminatory practices or different jobs orientation (Kalaitzidakis et al., 2001) and foreign investors may take advantage of this gender disparity in order to maximize their profits (Hoai and Tung BUI, 2016). Gender educational disparity seems to deter foreign investors especially in secondary academic level where completion and enrolment ratios in secondary education have a negative and significant impact (*Table 2*). As for the distinction between technical and theoretically oriented programmes, it is clear that gender inequality in vocational secondary contributes positively to the attractiveness of MNEs while gender equality in general secondary level creates a favorable environment for FDI inflows (*Table 3*). Job-related skills are vital for an economy to compete and grow in an era of technological changes and economic integration where vocational education is becoming more and more important because it refers to the acquisition of knowledge and skills for the world of work (Hollander & Yee Mar, 2009). In CEE EU countries, males' vocational education is more significant than females and foreign investors value it most while gender equality in theoretically oriented programmes in secondary level seems to be important. Policymakers should find a balance between theoretically and technically oriented programs and focus on the types that are more important for the attractiveness of new technologies and innovations while in general education it is rather captured as a development index of the countries by investors.

3.5.1 Managerial implications

Our findings may have several managerial implications for MNEs when consider investing within the EU. Specifically, in the present study we identify if gender disparities with respect to different levels and types of education and skills are of high importance to foreign investors. Managers need to be aware of the impact of education policies when investing in a host country as this influences their cost functions. If education reforms take place, multinationals will need to re-evaluate their location strategies toward host countries that match their needs. Considering countries with gender education equalities or disparities may be an important strategy

for foreign investors. Consequently, managers should be alert of policies taking place in the region regarding education equality, which, in conjunction with democracy may constitute highly beneficial locations even for higher value-added activities.

The change in MNE investment behaviour as a response to engaging with host countries with better and well-structured education systems, can be explained by the need to minimize costs but not at the expense of quality. In addition, managers of domestic companies could put pressure on domestic authorities for gender equality or disparity related to education so that they can also reap positive externalities from greater waves of foreign affiliates.

3.5.2 Limitations

As is the case in other studies, this paper entails some limitations. One limitation is that the analysis does not discriminate across sectors. While a sector analysis would be more enlightening and induce more policy implications, this is not only beyond of our study but also we have limited access to this kind of data. Despite this limitation this work opens the floor to related literature to further investigate the relevance of gender education inequalities to foreign investors in sector and regional level. Apart from gender inequalities in terms of education, we also observe inequalities in other domains, too, like economic or political or social inequalities, but these are beyond the scope of this study.

ESTIMATION TABLES

Estimation Method GMM

Table 1. Labor force with secondary and tertiary level of education, Western (EU-15) and CEE countries – Time period 1995-2012

VARIABLES	(1) Labor Force Secondary	(2) Labor Force Tertiary	(3) Labor Force Secondary	(4) Labor Force Tertiary
logGDPcon	1.278***	1.237***	1.042***	1.159***
	(0.108)	(0.119)	(0.0841)	(0.0862)
IR	-0.0161	-0.0271	-0.0342***	-0.0195**
	(0.0380)	(0.0359)	(0.00800)	(0.00759)
Trade	0.0213***	0.0139***	0.00615***	0.00740***
	(0.00239)	(0.00258)	(0.00195)	(0.00202)
GFCF	0.0982**	0.116***	0.0536***	0.0630***
	(0.0415)	(0.0403)	(0.0103)	(0.0106)
logcompen_cap	0.0409	0.00900	0.0349	0.0158
	(0.0521)	(0.0481)	(0.0253)	(0.0240)
R&D	0.321**	0.126	-0.733***	-0.557***
	(0.151)	(0.122)	(0.130)	(0.132)
Crisis	-0.694***	-0.936***	0.0882	0.151
	(0.255)	(0.248)	(0.124)	(0.115)
business_freedom	0.0226**	0.0161	-0.0110*	-0.0197***
	(0.0112)	(0.0107)	(0.00601)	(0.00605)
Democ	0.230	0.133	0.0337**	0.132*
	(0.218)	(0.218)	(0.0986)	(0.0875)
labor_force_with_secondary_educa	-0.0129		0.000916	
	(0.0102)		(0.0102)	
labor_force_secgender	0.0509**		0.0644***	
	(0.0199)		(0.0245)	
labor_force_with_tertiary_educat		0.0695***		-0.0251
		(0.0154)		(0.0166)
labor_force_tertgender		-0.0188*		-0.0803***
		(0.0194)		(0.0221)
Constant	-33.31***	-32.12***	-19.48***	-22.76***
	(5.052)	(5.544)	(1.651)	(2.009)
Observations	119	119	134	134
Number of Country	14	14	11	11
	Western EU	Western EU	CEE	CEE

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2. Attainment, Completion ratios and Average Years of Schooling based on level of education – Time period: 1995-2010 – Western EU and CEE countries

VARIABLES	(1) Completed Sec 15	(2) Completed Tert 15	(3) Completed Sec 15	(4) Completed Tert 15
logGDPcon	1.290***	1.222***	1.000***	1.215***
	(0.0880)	(0.102)	(0.0948)	(0.0860)
IR	-0.0141	-0.0493	-0.0218***	-0.0186**
	(0.0303)	(0.0316)	(0.00768)	(0.00736)
trade	0.0184***	0.0127***	0.00258	0.00148
	(0.00216)	(0.00285)	(0.00212)	(0.00227)
GFCF	0.0944***	0.0999***	0.0722***	0.0865***
	(0.0341)	(0.0337)	(0.0109)	(0.0113)
logcompen_cap	0.0450	0.0128	0.0206	-0.0195
	(0.0422)	(0.0413)	(0.0256)	(0.0251)
R&D	0.381***	0.235***	-0.713***	-0.933***
	(0.0891)	(0.0842)	(0.179)	(0.150)
crisis	-0.155	-0.410	0.437***	0.207*
	(0.259)	(0.251)	(0.121)	(0.121)
business_freedom	0.0176**	0.0149*	-0.0326***	-0.0269***
	(0.00873)	(0.00879)	(0.00697)	(0.00595)
democ	0.0747	0.0684	0.406***	0.233**
	(0.172)	(0.186)	(0.0862)	(0.0906)
icomplsectotal15	-0.00307		-0.0142*	
	(0.00758)		(0.00878)	
compl_sec_gender	-0.0661***		-0.0390***	
	(0.0178)		(0.0129)	
icompltertotal15		0.114***		0.0997***
		(0.0316)		(0.0318)
compl_tert_gender		-0.0117**		-0.0316
		(0.0223)		(0.0486)
Constant	-31.75***	-28.84***	-18.75***	-24.67***
	(4.081)	(4.498)	(1.977)	(1.942)
Observations	116	116	123	123
Number of Country	14	14	11	11
EU	Western EU	Western EU	CEE	CEE

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3.Vocational and General Education based on level of education – Western countries (EU15) and CEE – Time period: 2000-2012

VARIABLES	(1) Secondary Vocational	(2) Tertiary Vocational	(3) Secondary General	(4) Tertiary General	(1) Secondary Vocational	(2) Tertiary Vocational	(3) Secondary General	(4) Tertiary General
logGDPcon	1.447***	1.833***	1.348***	1.422***	0.740***	1.217***	0.843***	0.948***
	(0.161)	(0.247)	(0.149)	(0.235)	(0.0697)	(0.0978)	(0.0688)	(0.0872)
IR	-0.0184	-0.235***	-0.0465	0.0236	-0.0100	-0.0312***	-0.0148**	-0.0303***
	(0.0490)	(0.0651)	(0.0401)	(0.0630)	(0.00744)	(0.00872)	(0.00725)	(0.00929)
trade	0.0186***	0.0220***	0.0202***	0.0202***	0.0164***	0.00756***	0.0120***	0.00545**
	(0.00315)	(0.00389)	(0.00268)	(0.00369)	(0.00272)	(0.00251)	(0.00215)	(0.00220)
GFCF	0.149***	0.331***	0.111**	0.0846	0.0630***	0.0700***	0.0630***	0.0660***
	(0.0545)	(0.0910)	(0.0540)	(0.0897)	(0.0113)	(0.0125)	(0.0107)	(0.0127)
logcompen_cap	-0.00527	0.994**	0.00170	0.194	-0.0247	-0.0482	0.0301	-0.0291
	(0.0747)	(0.476)	(0.0651)	(0.444)	(0.0257)	(0.0315)	(0.0296)	(0.0307)
R&D	0.460***	0.809***	0.349***	0.305	-0.719***	-0.820***	-0.668***	-0.711***
	(0.157)	(0.195)	(0.129)	(0.225)	(0.141)	(0.173)	(0.132)	(0.152)
crisis	-0.747***	-1.043***	-0.919***	-0.531*	0.293**	0.515***	0.373***	0.380***
	(0.286)	(0.343)	(0.267)	(0.283)	(0.116)	(0.161)	(0.119)	(0.139)
business_freedom	0.0416***	0.0367**	0.0368***	0.0223	-0.0264***	-0.0218**	-0.0283***	-0.0130
	(0.0120)	(0.0158)	(0.0112)	(0.0143)	(0.00610)	(0.0085)	(0.0061)	(0.0085)
democ	0.0929**	0.233	0.0476	0.336	0.403***	0.00417**	0.413***	0.0816
	(0.250)	(0.298)	(0.240)	(0.314)	(0.0881)	(0.119)	(0.0868)	(0.143)
enrsecvoclab	-0.326				12.96***			
	(1.198)				(3.492)			
voc_sec_gender	-15.13**				58.80***			
	(6.770)				(13.14)			
enr5Blab		146.4**				-841.8*		
		(130.0)				(478.7)		
tert_vocgender		-91.35				-1,043*		
		(292.9)				(597.0)		
enrgenseclab			-0.0175				0.663	
			(0.308)				(1.086)	
gen_sec_gender			-7.139				-112.9***	
			(8.306)				(17.32)	
enr5Alab				-17.12				89.93
				(44.18)				(56.28)
tert_gengender				-33.96				196.1*
				(84.32)				(97.55)
Constant	-39.21***	-60.66***	-34.75***	-33.44***	-16.04***	-22.09***	-17.99***	-15.24***
	(7.082)	(11.63)	(6.640)	(11.66)	(1.532)	(2.154)	(1.537)	(2.027)
Observations	98	96	107	95	132	91	132	109
Number of Country	14	14	14	14	11	11	11	11
EU	Western EU	Western EU	Western EU	Western EU	CEE	CEE	CEE	CEE

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Chapter 4. How Do Female Education and Culture Shape Inward FDI?

"When you invest in a girl's education, she feeds herself, her children, her community and her nation (Prime Minister, Ema Solberg of Norway)"

4.1 Introduction

Within the rapid globalization of business activities around the world, multinational enterprises (MNEs) are becoming increasingly important for both providing and shaping services to countries, and for contributing to the overall economic growth (Dunning, 1993). Human capital is considered a crucial explanation for cross-national differences in innovation activity (Dahkli, 2003; Wang, 2013). Recently though, attention has been devoted on the importance of education in subjects such as science, technology, engineering and math (STEM) for the promotion of innovation activity (Montgomery & Fernandez-Cardenas, 2018; Hossain & Robinson, 2012) where females present a low level of participation in these science fields. To our knowledge, empirical evidence for this link is scarce, despite the emphasis made in the literature by policymakers on the choice of study at the tertiary level. In the present paper we explore high skills and particularly high skills of females as a separate driving force for foreign investors. We combine female's high education with the overall cultural environment, describing social norms with the informal institutional theory since the relationship of education and occupational choice depends on the cultural context.

While foreign investors' decisions to place their investments have been mainly motivated by economic factors, a propitious institutional environment has become increasingly important for FDI decisions in developed countries since the 1990s (Dunning, 1998). Particularly, institutions contribute to define the business and investment environment of a country, and thus can create favourable conditions for attracting multinational enterprises (MNEs). Besides institutional factors, host country characteristics also play an important role in attracting foreign investors, as undertaking FDI means engaging with foreign cultures.

Institutions are considered an important factor explaining innovation, entrepreneurship and development (Sobel, 2008; Tebaldi & Elmslie, 2013); they

guide human behavior, shape human interaction and are the rules of the game in societies (North, 1990). They are systems of established and embedded social rules that structure social interactions (Hodgson, 2006; Adkisson, 2010). Both formal and informal institutions share this property (Redmond, 2005). As such, culture, democracy, religion and females' education can be seen as part of institutions (Hofstede, 2007; Singh, 2007).

When seeking to understand the factors that influence and promote entrepreneurship and innovation, the role of gender is gaining increasing importance. While in the past so few females held international positions (Alder, 1999), nowadays more and more females are present and successful in international and board positions and have achieved professional success despite the difficulties of working in international organizational contexts. The share of females' employment in large firms has increased in the United States and the EU and this has started to be reflected in the gender composition of executive boards. For the past decades, females have made considerable inroads into domains traditionally dominated by males. Growing concerns about gender equality have led to a large number of regulations over the world that aim to increase female representation on corporate boards. According to Green and Homroy (2018) the effect of female representation on board committees is economically more meaningful. A key point of contention is the upward trend in females' participation in labor force (Black & John, 2000) and the fact that they are gaining more and more proportion of executive positions. Highly educated persons are needed in board positions, thus females' education is considered a quite important matter for investigation.

Europe presents a lack of females at the most senior levels and on executive boards, a steady decline in the representation rates of females as career levels rise within organizations, and a persistent gender pay gap (Mercer, 2016). Across Wall Street, dominates the view that males should have no dinners with females' colleagues, they do not want to sit next to them on flights or book hotel rooms on the same floor with them and they avoid fact to face meetings. In fact, most believe that just hiring a woman these days is "an unknown risk" (Bloomberg, 2018). Thus, across Wall Street,

males are adopting controversial strategies for the *#MeToo era*[36] and, in the process, making life even harder for females. In finance, for example, the top jobs are dominated by males (*Figure 1*). Thus, females continue to be under-represented in senior positions in many fields despite the fact that they make up nearly half of the workforce and more than half of new university graduates in the EU. There is an increasing body of research showing that gender diversity pays off and that there is a positive correlation between women in leadership and business performance (European Commission, 2010). Taking into account all the above females come at the forefront of the debate and it is worth investigating if their skills attract MNEs.

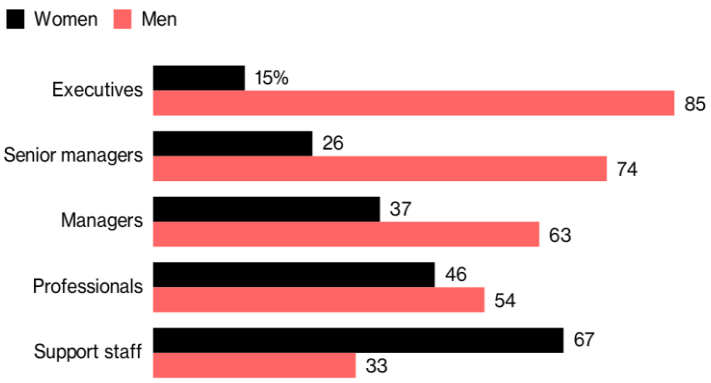

Figure 1: The Mentorship Imbalance, The top jobs in finance.

Source: When Women Thrive, Mercer, October 2016.

Education is a conspicuous positive influence on economic growth and FDI. Given policymakers' assertions that females represent a large pool of innovation potential (Nager, 2016; Compers, 2017), the role of gender has received substantial attention in recent innovation research. Educating females is doubly advantageous; as with males, increased human capital of females directly increases incomes and economic growth while there is a further benefit due to the positive influence of mothers on the education and health of their children (Schultz, 2002; Doepke & Tertilt, 2009). Education of females is thus significant for development because of the human capital transmission through mothers.

In particular, educating females increases human capital and growth (Dollar & Gatti, 1999; Klasen, 2002; Knowles et al., 2002). In our view, general educational

[36] The Me Too movement (or #MeToo movement), with many local and international alternative names, is a movement against sexual harassment and sexual assault. #MeToo spread virally in October 2017 as a hashtag on social media in an attempt to demonstrate the widespread prevalence of sexual assault and harassment, especially in the workplace (https://metoomvmt.org/)

attainment can provide only part of the explanation for the gender gap in innovation activity because greater educational attainment does not translate into better labor outcomes for females (Dili & Westerhuis, 2018). The choice of study can be important for understanding the gender gap, especially in innovation. While females have been entering STEM fields in increasing numbers, there still remain large disparities in specific sub-fields. Some of the barriers to greater female participation and innovation in STEM fields particularly engineering and computer science are socio-cultural factors, such as negative stereotypes and workplace biases. To enhance innovation, the European Commission (2013) argues that females should be more encouraged to pursue STEM subjects. We argue that closing the gender gap in science education at the country level is beneficial for innovation activity because it stimulates a more gender-egalitarian environment.

Thus, apart from education as a general concept, the broad educational fields of STEM have received growing attention in European policy discourses during the past decade. Governments of developed countries have placed emphasis on improving the quality of STEM which reflects the critical importance of STEM disciplines for modern labor markets. Knowledge-based economies are highly dependent on the quality and quantity of STEM graduates. STEM skills are generally associated with advanced technical skills, which are considered as strong drivers for technology and knowledge-driven growth and productivity gains in high-tech sectors and are critical to innovation and in creating a competitive edge in knowledge-intensive economies. The lack of STEM-skilled labour will be one of the main obstacles to economic growth in the coming years (Business Europe, 2011). Concerns about the supply of STEM skills rely on two basic facts: the proportion of students going into STEM is not increasing at the European level and the underrepresentation of females still persists.

Encouraging university students to choose a program in a STEM field has been a defining outcome of national innovation strategies a long time ago. The focus on STEM can be related to how graduates would contribute to a country's competitiveness and economic growth. Given the scope and the nature of their labor market activities, STEM graduates are considered key inputs of the national innovation system. STEM degrees though, still remain male dominated although

females have made significant progress in university participation. Thus, because females are largely underrepresented in STEM fields, increasing the share of female graduates in these fields can help overcome the skills shortage in STEM fields. This has received attention as an important contributor of innovation (Dili & Westerhuis, 2018) but little evidence exists on the relationship between females education and innovation activity. The scope of this paper is to examine if MNEs are interested in these females' skills in order to place their investments.

The relationship between human capital and an individual's occupational choice depends on the institutional and cultural context (Estrin et al., 2016). A cultural shift needs to be adapted within organizations that reverses' gender stereotypes. Those companies that champion diversity are more likely to flourish in an era where innovation is key to survival (Guberna, 2016). The role of cultural differences, which is often regarded an interfering factor in global economic integration, has been the subject of many scientific articles (Shenkar, 2001). In the international business literature, there is a widely accepted consensus that cultural similarity and better culture does affect trade flows among countries (Melitz, 2008; Felbermayr & Toubal, 2010) and location decisions of FDI because sharing similar culture helps managers to build up trust (Guiso et al., 2009). Gender identities, relations and education are important aspects of culture because they shape the way daily life is lived in the wider workplace and the community (OECD, 2000).

This paper contributes to several strands of literature. Firstly, we explore high skills of females as a separate driving force for foreign investors. Secondly, it is the first paper according to our knowledge that develops a conceptual framework where the role of female skills is part of the overall social norms – culture context of a country, hence might be an important determining factor. Thirdly, it shows how the presence of tertiary graduates and tertiary graduates in STEM fields shape FDI inflows. Fourthly, it shows the role of females' tertiary education graduates and even more so the role of female STEM labor force in FDI inflows attraction within specific economic, cultural and institutional environment. Finally, we take into account not only the isolated effects of females' education, culture and democracy but also their interrelation.

The rest of the article is organized as follows. Section 4.2 presents the theoretical background and the extant empirical literature on educational and cultural

determinants of FDI. Section 4.3 presents the data analysis and model specification, and Section 4.4 presents the results. Section 4.5 concludes and offers some policy implications.

4.2 Theoretical background and literature review

Institutions are considered an important factor explaining innovation and can be divided into formal and informal ones (Redmond, 2005). Formal and informal institutions necessarily interact, coexist and continuously reinforce each other. Specifically, formal institutions need informal backing to be effective. This is because not every detail and possibility can be codified and it would be inefficient to do so (North, 1990). By designing appropriate formal institutions, governments can enhance gender equality while decision makers need to be aware of the specific institutional set-up and adapt their policies to be effective (Sen, 2007).

Formal institutions refer to explicit rules in a society such as laws, regulations, and protection of property rights (Dunning & Lundan, 2008; Meyer et al., 2009). They have to be explicitly established by an authority or an organization/individual. They are susceptible to change over time and can anticipate the desirable behavior of individuals and organizations from general and simple exchanges (e.g. through laws) to specific and complex ones (e.g. by a contract or a judicial resolution). Informal institutions, on the other hand, can be defined as those constraints that people in a society impose upon themselves to give a structure to their relations with others (North, 1990). As constraints, they structure human interaction, and can be formal (written rules, laws) or informal norms (customs, conventions, and other social norms). These rules are transmitted from one generation to another by teaching and imitation (Boyd and Richerson, 1995) and are considered part of the heritage that we call culture (Norton, 1990). Tradition, religion, language, customs, values and trust-based relationships are some examples of informal institutions (Dunning & Lundan, 2008). Unlike formal institutions, informal institutions have their source in the values of a society and are difficult to change over time (North, 1990). In this context, culture and religion used in the present paper as well as females' education are considered part of informal institutions (Singh, 2007; Peng et al., 2008) while democracy is seen as part of formal institutions and we examine its effect on inward FDI.

New institutional economics (NIE) has secured impressive achievements in academia and policy circles. A basic insight from new institutional economics (Williamson, 2000) is that higher order informal and embedded institutions, such as culture, change only gradually but have a big influence on how the lower order institutions, such as constitutions, laws and regulation affect our daily lives. To assume that institutions are embedded in culture or that culture defines informal institutions (Redding, 2005; Hofstede 2007) is to say that a specific behavior can be attributed to cultural as well as institutional factors.

The informal institutional framework constitutes all the customs, standards, beliefs, etc. practiced in a given culture. Williamson (2000) qualifies the informal one by embeddedness and claims that the latter largely influences the decision-making process of the investors. Within the framework of the theory of the institutional change, the work of North (1990, 2003) postulates that the mental models of the decision maker and the whole of the factors allowing their construction (institutions, beliefs) are a key element to understand the decisions taken at a given time and in a given context. Recently, several researches highlight the cultural determinants of the economic performances of the nations, in particular, the significant role of cultural diversity within the frame work of discovering opportunities for the entrepreneurs' profits (Guis et al., 2009). In this paper culture is used and seen as part of informal institutions which drives foreign investments and is considered an important reflection of a country's informal institutions (North, 1990; Peng et al., 2008).

The research on the effects of political and social forces on economic activity has received growing attention in recent years. Inglehart & Baker (2000) argue that explanations for economic growth should go further to include national cultures. In this regard, culture may influence personal traits such as willingness to work hard or willingness to take risks or attitude toward uncertainty or attitude toward wealth accumulation. Culture is considered one influencing factor for innovation performance in EU countries because these countries differ significantly by their social norms, morals, values, traditions and behaviors which may also affect the innovative capacity of a society. Until now, scientists have used different instruments in order to capture culture; Values Orientation Theory (Kluckhohn & Strodtbeck, 1961), Trompenaars & Hampden-Turner (Trompenaars & Hampden-Turner, 2004),

GLOBE (House, et al., 2004), European Social Survey (Kaasa, 2009) and Hofstede's Cultural Dimensions Theory (Rinne, et al, 2012; Syed & Malik, 2014; Prim et al., 2017). In the present paper, we employ national culture as measured by Hofstede.

Apart from culture, as we mentioned before, we take into consideration not only the broad social norms environment but also religion, another part of informal institutions. Scholars dating back to Smith (1776) and Weber (1904) have argued that religion plays a fundamental role in shaping economic activities. Barro and McCleary (2003) argue that religion is an important dimension of culture and, based on a sample of 59 countries, found that church attendance and religious beliefs affect economic growth. In addition, Mehanna (2003) examined the role of religion on international trade and found a significant impact. Researchers suggest a significant relationship between a nation's culture and its level of innovativeness (Kaasa & Vadi, 2010; Ofori-Dankwa, 2013; Kaasa, 2013; Khan & Cox, 2017). Research shows that religious beliefs impact economic attitude and growth. Religion has often been investigated as a potential driver of economic growth and behavior. It is argued that more religiously diverse countries should be more open-minded, more innovative and less risk-averse (Hergueux, 2011). Individuals accustomed to religious diversity should be more willing to explore and engage in potentially beneficial economic exchanges opportunities, because of their increased open-mindedness and capacity to understand and integrate competing world views and managerial practices. The institutionally developed countries are also the ones that are the more likely to extract the benefits, if any, that arise from hosting a high number of religious communities. Indeed, a high level of religious diversity in weak institutions countries can foster tensions in community relations rather than open-mindedness and innovation (Hergueux, 2011). For example, Barro & McCleary (2003) conclude that religious pluralism has a positive impact on economic growth, which in turn is significantly affected by FDI. Benabou et al. (2015) found that religiosity is almost uniformly and very significantly associated to less favorable views of innovation. Nelsen and Guth (2000) identified religion as an important factor in shaping EU attitudes in a study on the gender gap in attitudes towards integration. By examining the role of gender to attitudes towards integration they found that religion is important in shaping EU attitudes. Dolansky & Alon (2008) find a positive relationship between religious diversity in host countries and Japanese FDI, whereas Hergueux (2012) finds that

both religious diversity and religious similarity are associated with an increase in FDI at the country pair level concluding that the promoting effect of religious diversity is higher than that of religious similarity, and that religious similarity fosters FDI relatively more in countries with relatively low-quality institutions, while the reverse holds for religious diversity. To elaborate more, some studies analyzed the impact of different religious groups on institutions and economic growth. La Porta et al. (1997) argue that countries with hierarchical religions such as Catholicism and Orthodox have less efficient judiciaries, greater corruption, lower-quality bureaucracies, higher rates of tax evasion, lower rates of participation in civic activities and professional associations, a lower level of importance of large firms in the economy, inferior infrastructures, and higher inflation; however, they do not find a robust relationship between hierarchy dominant religions and economic growth. Guiso et al. (2003) conclude that Protestants are more positively associated with attitudes conducive to economic growth and free markets, while Muslims are negatively associated and strongly against competition. However, Noland (2005) finds no empirical support for the allegation that Islam is inimical to economic growth. Nunziata & Rocco (2014) found that religious background has a significant effect on the individual propensity for entrepreneurs with Protestantism increasing the probability to be an entrepreneur by around 5 percentage points with respect to Catholism.

Turning on formal institutions, we account for democracy, on the grounds of more open-minded societies and freedom. Harms & Ursprung (2002) find that multinational enterprises are more likely to be attracted to host countries with democratic structures, whereas autocracies are associated with greater risk of policy reversals and therefore attract less FDI. Similar results are reported by Jensen (2003). Kolstad & Villanger (2008) find that democracy increases FDI in services, though it has a significant impact for developing countries only. Li & Resnick (2003), on the other hand, show that democracy and FDI into 53 developing and transitional countries are negatively related when the level of property rights protection is controlled for. It is argued that with democratization comes more religious freedom, open-minded culture and gender equality (Htun & Weldon, 2010; Cooray & Potrafke, 2011). Democracy is expected to promote gender equality, including in particular education (Cooray & Potrafke, 2011). The more democratic a country is, the more developed its civil society and the more open the government to autonomous organizing. Females groups, especially working

class females' movements will have greater influence. Yet, democracy unleashes complex processes. At the same time that it empowers some women's groups, it may also strengthen religious groups opposed to change because more democratic regimes have more religious freedom potentially (Htun & Weldon, 2010).

Related literature draws much attention to the importance of host country policies and institutions that create locational advantages, such as skills, human capital, etc. (OECD, 2001) given that MNEs search for such advantages to better harness their ownership advantage (Rasciute & Downward, 2017). Moreover, technological change has led to a shift from resource based towards more capital-intensive activities, and later to more knowledge and skill intensive activities (Dunning & Narula, 2000; Bevan et al., 2004). Thus, the available knowledge base of a nation is considered main location determinant of inward FDI (Narula & Bellak, 2009; Hall, 2011) and is placed at the core of international competition.

Previous research suggests that the local stock of human capital creates positive externalities within local labor markets and plays an important role in regional economic development. However, there is still considerable uncertainty over what types of human capital are most important. Both national and local policymakers have called for efforts to increase the stock of college graduates in STEM fields (Winters, 2013), but data availability has thus far prevented researchers from directly connecting STEM education to human capital externalities. Generally, encouraging university students to choose a programme in STEM has long been a defining outcome of national innovation strategies. In the present paper, we focus on human capital by using population with completed tertiary level of education while placing particular emphasis on graduates with STEM skills.

The focus on STEM can be related to how they would contribute to a country's competitiveness and economic prosperity. Given the scope and nature of their labor market activities STEM graduates are considered key inputs of the national innovation system. What is more, STEM education helps to bridge the ethnic and gender gaps found in math and science fields. Initiatives have been established to increase the role of females and minorities in STEM-related fields. In order to compete in a global economy STEM education and careers must be a national priority. STEM education creates critical thinkers and enables the next generation of

innovators. Innovation leads to new products and processes that sustain our economy. This innovation depends on a solid knowledge base in the STEM areas. STEM is important because it pervades every part of our lives. Technology uptake in the workplace is shifting skills requirements creating a greater need for educated, skilled workers particularly from STEM fields. While nowadays females are more educated, they represent an underutilized talent pool and since talent is scarce, any waste of it may be costly for both the firms and the whole economy. Thus, in the present paper we control for STEM graduates but our main focus is on females with STEM degree.

Over the past few decades, females have made significant advances in university participation, including programme areas that had previously been more populated by men. One area however remains male dominated: STEM degrees. Men still dominate the number of STEM graduates in higher education. In EU-28 less than half (42,4%) of tertiary education graduates in science, maths and computing were females in 2014. The gender gap is especially wide in engineering, manufacturing and construction. Females represented only slightly over a quarter (27.2%) of the EU-28's tertiary education graduates in 2014. This gap is even wider in individual countries: France (25.6%), United Kingdom (22.4%), Finland (21.5%), Germany (19.3%), Switzerland (14.7%). Females are scarce in high-tech sectors. In the European Union (28) females accounted for only 32.5% among those employed in high-tech manufacturing and knowledge-intensive high-tech services in 2015.

Better understanding of the impact of gender on international FDI activity is quite important, due to the growing number of females on boards and in managerial positions. In 2016, the number of females' executives and board members in the Fortune 200 companies reached an all time high. According to Elsaid & Ursel (2011), in addition to education, gender is an important element affecting the workability and financial feasibility of a company. Sila et al. (2016) and Taylor et al. (2015) found that during the most recent economic crisis in Europe, companies with female executives were more efficient than companies with male executives, because they operated in a way that kept more reserves, available to use in a time of economic stress. Although gender diversity in the top management is recognized as a potential driver of firm performance (Krishnan et al., 2005) the lack of females in leadership positions is one of the most persistent features of today's corporate world.

According to ILO (2018) getting more females to grow business is not only critical for equality but also for national development. The gender gap is an issue that continues to pervade industry, particularly the IT and technology industry (Fortune 1000). While females still have limited representation in the Fortune 1000, it looks like that is changing, albeit slowly. Gender diversity is not just a social concern; it creates also a competitive edge to address the global challenges that corporations will face in the near future. More heterogeneous groups have different points of view and knowledge, consider a more comprehensive set of solutions and debate each other's viewpoint more rigorously, leading to higher quality decisions. The UN in 2015 launched the Sustainable Development Goals (SDGs), a set of 17 global goals aimed at transforming our world by 2030. The SDG5 is gender equality and empowering females trying to eliminate all forms of discrimination. Promoting gender equality is key to attract and retain talent, which can improve productivity. Many companies are confronted with reduced productivity as a result of losing talented female staff. This problem worsens when losing women in the ranks leading to executive leadership positions. Solutions to this problem in practice include more flexible work policies, mentoring and more gender engagement (Deloitte, 2018).

Beyond the current financial crisis, long term global trends are reshaping the corporate landscape, and the future turmoil is likely to accelerate some of the changes that corporations need to make to continue to seize the opportunities that arise. Having more females in top management positions can give companies a real competitive edge by spreading these leadership practices within organizations. Female board representation is associated with greater innovative success, and thus enhances firm performance in innovative – intensive industries. Globally, in 2017 according to Deloitte, 15 percent of all board seats are taken by females, presenting an improvement over the 11% reported in 2015 and 9% in 2004. While, the total percentage of females on boards remains low, numbers demonstrate that more females are shifting into the boardroom. Looking at Fortune 500 findings from the Missing Pieces Report, females gained 187 seats between 2012 and 2016, representing a 20.5 increase. According to Financial Times (2017) all segments of Europe's financial services industry have boosted female representation on boards and at senior executive level over the past two years but still fall behind at the executive level. This

points to the growing recognition that having a diverse board is quite important. Thus, the role of females is gaining more and more attention.

Economic development rests heavily upon the effective utilization of talent by corporations. Since talent is scarce (Schuler et al., 2011) any waste of it may be costly, not only to the firms but to the whole economy. Beyond fairness concerns, discriminatory practices and other impediments to talent utilization may be detrimental to economic development. As females represent over the half of the global talent pool they should be at the forefront of economic and social scene, not just out of sense of fairness, but to ensure that the very best minds, males and females, are brought together to address the challenges that society faces (McKinsey & Company's, 2007). MNEs are quite interested and focus on the untapped talent of females. This issue is quite important in Europe, where there exist a gender gap of 25 million jobs – 25 million fewer women than men employed – as one of the main problems, and Italy, where the presence of 8,000,000 housewives pushes the country's female activity rate to bottom position among the EU member states (Rosti & Chelli, 2005).

In CEE countries, females' representation in the labor market has driven economic and business growth (ILO, 2018). A greater participation of females in the labor market, especially in the traditionally male dominated sectors and occupations presents a significant opportunity for business (ILO, 2018). Skills shortages are an ongoing challenge for companies. Technology uptake in the workplace is shifting skills requirements creating a greater need for educated, skilled workers particularly from STEM fields. While females are more educated nowadays, they represent an underutilized talent pool. Females represent the majority of university graduates, but are still under-represented in STEM fields. It is argued that increasing the participation of women in STEM subjects will have a strong positive GDP impact at EU level (http://eige.europa.eu/gender-mainstreaming/policy-areas/economic-and-financial-affairs/economic-benefits-gender-equality/stem). Specifically, females accounted for 39% of university graduates aged 25 to 34 with a STEM degree in 2011, compared with 66% of university graduates in non-STEM programmes (National Household Survey, NHS). Females constitute 52% of the total European population but only one third of business starters and self-employed in the EU

(Eurostat, 2007; OECD, 2016a, b). Given their secondary status in the labor market, which is seen as a natural consequence of their capacity to bear children (Elson & Pearson, 1981), as well as the endemic undervaluing of skills usually deemed as women's work, firms may pay females lower wages than their male counterparts for comparable work (Elson, 1996; Braunstein 2006).

Females' participation in STEM education need to be considered in the context of their overall access and participation in education. While gains in access, socio-economic, cultural and other obstacles still prevent female learners from completing or benefiting fully from good quality education of their choice in many settings. These barriers increase in adolescence, when gender roles for females become more entrenched and gender discrimination more pronounced. Barriers include household and care responsibilities, early marriages and pregnancies, cultural norms, inadequate school sanitation facilities, school-related gender-based violence etc. Nowadays, females role is gaining more and more importance, and MNEs focus on the untapped talent of females.

In the present paper we combine all the above factors classifying them into categories (economic, cultural and institutional, human capital, gender) trying to explore how economic, human capital and cultural variables shape inward FDI by placing particular emphasis on STEM skills not only for the total graduates but mainly for the female ones in a sample of EU countries. Moreover, deviating from the existing literature, we also take into account the joint effect of females' tertiary graduates in STEM fields and national culture on inward FDI.

4.3 Data Analysis, Estimation Models and Methods

4.3.1 Data Analysis

We pursue a panel data analysis in order to test how cultural and gender human capital determinants shape inward FDI. Economic factors like openness, size of a market and taxes also provide the environment to foster the FDI activity (Alam & Ali Shah, 2013; Economou et al., 2016) and must be taken into account when considering FDI studies. Our sample covers a sample of European Union countries over the period 2000-2012 due to data availability. Table 1 in the Appendix C provides the list of countries of our sample.

As dependent variable we use annual inward FDI[37] obtained from the United Nations Cooperation on Trade and Development (UNCTAD). We employ the logarithm of FDI inflows to adjust for the skewed nature of the data (Demekas et al., 2007).

We distinguish our independent variables into four sets, namely economic, human capital, gender education and cultural - institutional variables. The first set (economic variables, EC) includes market size measured by the logarithm of constant GDP (*logGDPcon)*. The correlation of inward FDI with market size is an indication that foreign investors prefer to invest in larger markets to take advantage of larger demand, more diverse labor markets, or economies of scale in production (Calvo & Sanchez-Robles, 2003; Bevan & Estrin, 2004; Johnson, 2006; Busse & Hefeker, 2007). It also includes the openness of an economy which is measured by exports and imports as a percent of GDP (*trade*) in order to capture international competitiveness and dynamism (Busse & Nunnenkamp, 2009; Caetano & Galego, 2009; Hunady & Orviska, 2014). What is more, we also employ real lending interest rate (*interest_rate)* defined as the bank rate that usually meets the short and medium-term financing needs of the private sector[38]. If the cost of borrowing in the host country is higher than in the home country, home country firms can have a cost advantage over host country rivals, and are in a better position to enter the host country market via FDI. Grosse & Trevino (1996) confirm the positive relationship between FDI and real lending interest rate in the host country. However, if foreign investors avail the finance facilities in the host country, the effect would be negative (Bevan & Estrin, 2004; Majeed & Ahmad, 2008). Other authors have found that the relationship between the two is insignificant (Aizmenman & Noy, 2006). Finally, the economic variables include corporate income tax rate (*tax*) taken from OECD Tax database. Mintz & Tsiopoulos (1992), argued that backward-looking tax rates, are usually not the deal-making factors; however, there are two important exceptions. First, extremely high tax rates tend to deter foreign direct investment. Second, to attract investment in labor-intensive industries such as assembly of garments, electronics, and toys which can be made in many satisfactory locations, a highly competitive

[37]FDI data either come as flow or as stock where flows are the current transactions taking place in a certain period *t*, while FDI stocks are the accumulation of past flows (Wacker, 2013). In this paper, we include FDI flows rather than stocks and it is most widely used in related studies. However, for robustness purposes, we also estimated all regressions with the FDI stocks as well; results remained fairly stable.

corporate tax regime is necessary. The reason behind the negative relationship between tax burden and FDI inflows is that the high corporate income taxes reduce the potential profit margin of MNCs, therefore, harm FDI inflows, as the ultimate motivation to make capital investment is to earn profits. These exceptions notwithstanding, it is important to consider effective or forward looking tax rates as they reflect tax incentives such as lower tax base or lack of enforcement by tax authorities (Nicodème, 2001). As taxes are a cost we expect a negative sign on the estimated coefficients.

Turning into the second set, the human capital variables (HC), we focus only on tertiary level of education and especially on the proportion of total population who has completed this level of education (*compltertotal15)* in order to capture different durations of analogous school cycles (Noorbakhsh et al., 2001; Li and Liu, 2005) taken from Barro and Lee database. What is more, the broad educational fields of science, technology, engineering and maths also known STEM have received growing attention in Member State and European policy discourses during the past decade because STEM skills are associated with advanced technical skills, which are seen as strong drivers for technology and knowledge-driven growth and productivity gains in high-tech sectors, including ICT services. We focus on the percentage of students that have university STEM degree (*STEM).* At the EU level, the share of STEM university graduates has remained basically stable in relation to the total number of university graduates between 2006 and 2012: from 22.3% to 22.8%. Yet this average masks relevant variation across countries. The share of STEM graduates has increased in 15 countries, although no clear pattern emerges. The only common and persisting trend is the underrepresentation of females among STEM university graduates: in 2012, graduates in STEM-related subjects account for 12.6% of female graduates as compared with a share of 37.5% among male graduates.

Turning into the gender education variables set (GE) we employ the percentage of females that has completed tertiary level of education (*complterfemtotal15)* for population 15 aged and over taken from Barro and Lee to detect if females' tertiary level of education matters in the eyes of foreign investors. In the present paper we employ female graduates with STEM degree as % of all fields (*STEM_fem)* and we divide STEM degree into four categories: I. Science, Mathematics and Computing

(*smcefemp)*, II. Engineering, Manufacturing and Construction (*smcfemac)*, III. Science, Mathematics and Computing, Engineering, Manufacturing (*emcfemact)* and IV. Construction / Unkown (*othersfact)* taken from EUROSTAT database. It is worth noting that almost 20 percent of the countries under investigation have females' graduates well below the EU mean while the rest of them have above the mean of EU countries.

Finally, we have the fourth set of variables, the cultural and institutional variables (CL). As for institutional variables we employ the democracy index (*democ)* from POLITY IV which takes values between 0 (representing no democracy – full autocracy) and 10 (representing full democracy). Governments are placing additional emphasis on policies that create favorable investment climates for foreign investors. There is a best case scenario in which increased democratization can lead to higher levels of FDI inflows while it is impossible to ignore the possibility of a negative relationship between democracy and FDI. For example, using both cross-section and panel data analysis, Busse (2003) finds that democracy raises FDI inflows in emerging countries. Busse & Hefeker (2007) show that government stability, absence of internal conflict and basic democratic rights are significant determinants of FDI inflows. We use democracy index (*democ)* as a determinant of inward FDI. As for cultural variables, we use national culture (*total_hofstede)* measured from the work done by Hofstede (1980)[39]. Religion is also known to influence social beliefs and aspects (Aldrich and Zimmer, 1986). Thus, we also employ religion (*religion_dum)* as a determinant of inward FDI. We focus on EU where the most common denominations, Catholism and Protestantism account for the largest proportion of all believers in those regions. Religious denominations in Europe are usually inherited from parents; individuals do not typically convert from one Christian denomination to another (Cantoni, 2010). Religion here is measured as a dummy which takes the value 0 for Orthodox's and Catholics and the value 1 for Protestants.

[39] The Hofstede model of national culture consists of six dimensions. The cultural dimensions represent independent preferences for one state of affairs over another that distinguish countries (rather than individuals) from each other. The model consists of the power distance index, the individualism versus collectivism, the masculinity versus femininity, the uncertainty avoidance index, the long term orientation versus short term normative orientation and the indulgence versus restraint (https://www.hofstede-insights.com/models/national-culture/)

All independent variables, their descriptive statistics and sources may be found analytically in Table 2 in Appendix C.

4.3.2 Model Specification and Methodology

We use panel regressions to test the impact of the hypothesized determinants on inward FDI as outlined in Equation 1.1:

$$lnFDI_{it} = \alpha_i + \beta_1 EC_{it} + \beta_2 HC_{it} + \beta_3 GE_{it} + \beta_4 CL_{it} + \eta_{it} + v_{it} \qquad (1.1)$$

where the dependent variable is a measure of inward FDI flows in the EU countries. As we mentioned before, we employ four sets of variables; EC which is the set of economic variables, HC which is the set of total human capital variables, GE which is the set of gender education variables and CL which is the set of cultural variables; η is a common fixed effect term and v is a white-noise term. Moreover, i represents the recipient FDI country and t represents time (depending each time on data availability) and accounts for the unobservable time-invariant individual specific effect not included in the regression. The analysis employs panel estimation and the model is estimated for EU countries for the period 2000-2012 due to data availability. To consider problems arising from heteroskedastic residuals, the robust standard error technique is used to obtain corrected estimates; multicollinearity has been tested with the variance inflation factor (VIF) and in accordance with theory that a VIF value of less than 5 does not indicate such problems (Judge et al., 1982) we concluded that multicollinearity does not pose a problem in this dataset.

In order to account for the panel structure of the data and due to endogeneity problems between the size of a market, human capital and FDI we use an IV estimation panel approach to account for potential bias (Akin & Vlad, 2011; Gittens & Pilgrim, 2013). Instrumental variable (IV) estimation is one powerful technique of dealing with endogeneity. It involves identifying one or more variables that are correlated with the explanatory variable but not with the error term ε_{it}. A good instrument is one that is "correlated with the endogenous regressor for reasons the researcher can verify and explain, but uncorrelated with the outcome variable for reasons beyond its effect on the endogenous regressor (Angrist & Krueger 1999: 8). Applying instrumental variable estimation yields the fixed-effects instrumental

variable (FE-IV) estimator, which attempts to correct for endogeneity while still treating unobserved unit and time effects as fixed. Specifically, to address the possible endogeneity of human capital and the size of a market in the present paper we employ the instrumental variable method and we use the lagged values of explanatory variables to instrument their levels. The IV method allows us to address endogeneity issues related to reverse causality between the variables. We use up to two lags of human capital and size of the market as IV variables.

For robustness purposes, instead of using females' education we have used males, but results seem to be quite different. Results are presented in the Appendix C (Table 3). Finally, we used simultaneously males and females[40] on the same equation to detect differences and also results are presented in the Appendix C (Table 4).

4.4 Empirical Results

4.4.1 Empirical Results

This section presents the results (Table 1). Columns (1) to (3) report the baseline model, the baseline model augmented with total human capital and the baseline model augmented with human capital gender education, respectively. Then, columns 3a-3d divide STEM into four categories: I. Science, Mathematics and Computing (*smcefemp)*, II. Engineering, Manufacturing and Construction (*smcfemac)*, III. Science, Mathematics and Computing, Engineering, Manufacturing (*emcfemact)* and IV. Construction / Unkown (*othersfact)*. Finally, columns (4) and (5) report the same results including the cultural set of determinants including total human capital and gender education variables, accordingly. Robust standard errors are reported in parentheses.

Beginning from Column (1) which depicts all the economic variables we observe that we take the expected signs. Particularly, for the sample of EU countries it is obvious that a larger market size seems to attract more FDI as found elsewhere (Carstensen & Tubal, 2004; Brzozowski, 2013). Openness is also a positive significant determinant of inward FDI in EU countries (Busse & Nunnenkamp, 2009; Caetano & Calego, 2009; Hunady et al., 2014). A higher lending interest rate implies more costly investments; therefore the relationship between interest rate and inward FDI is

[40] Variables have been orthogonalized to avoid multicollinearity problems.

negative but in our case is not statistical significant (Aizenman & Noy, 2005). Finally, while high tax rates deter foreign investors to place their investments in EU countries (Mooij & Ederveen, 2005; Lucke & Eichler, 2016) in our paper taxes are in most cases insignificant.

Column (2) extends the results of Column (1) by including human capital determinants. Particularly, we use population with completed tertiary level of education (aged 15 and over) and tertiary graduates with STEM skills. As it was expected, population with completed tertiary level of education seems to be important in attracting foreign investors. This result conforms to related studies positing that the European Union countries are developed and FDI in this region is predominantly knowledge-seeking (Serwicka et al., 2014; Igošina, 2015). Generally, a European Union country is considered an attractive location to foreign investors given its highly educated population and labor force. Our findings are also consistent with the results reported by Nicoletti et al., (2003), Agiomirgianakis et al., (2006) and Ghosh et al., (2012), who found that a better educated labor force motivates inward FDI. Proceeding to tertiary graduates with STEM skills it is obvious that foreign investors are interested in those skills in order to place their investments. STEM skills are becoming more and more important and MNEs show a high demand for science, technology, engineering and math graduates. Thus, STEM skills are receiving growing attention in European Union member states and are associated with advanced technical skills, which are seen as strong drivers for technology and knowledge-driven growth and productivity gains in high-tech sectors, including ICT services.

Column (3) presents the same results as Column (2) but only for females while Columns (3a) to (3d) divide females' STEM skills into four different categories following Eurostats' classification. It is obvious that MNEs are interested in females' education and especially in tertiary level of education. It is argued that highly educated females on the one hand promote growth and human capital (Schultz, 1994; Dollar & Gatti, 1999), while on the other hand there is a further advantage due to the positive influence of mothers on the education and health of their children (Schultz, 2002; Doepke & Tertilt, 2009). As females' education is believed to promote the quantity and quality of education of their children (through the support and general environment educated mothers can provide their children), this positive externality is

likely to exist. What is more, while females remain a minority in STEM fields we observe that foreign investors are interested in females' tertiary graduates with STEM skills and especially in females with skills in math, science, computing and engineering. Technology-oriented fields are mainly male-dominated, and an effective approach is needed in order to increase the number of females in natural science and technology careers something that has not yet been achieved in EU countries (Mammes, 2004; Klapwijk & Rommes, 2009; Niiranen, 2016). Females are, on average, more successful at school, and tend to achieve higher grades than boys, but they less frequently enter science, engineering or technology paths of study (Endepohls-Ulpe, 2012).

Column (4) extends the results of Column (2) by including cultural and institutional determinants, i.e. national culture, religion and democracy, respectively, while Column (5) extends the results of Column (3). In both Columns we observe the same signs and significances for cultural determinants. Specifically, it is obvious that culture acts as a positive determinant for MNEs by creating a favourable environment for foreign investors. This result conforms with other studies that have argued that the level of cultural diversity within a country is positively linked to a rise in FDI (Alesina et al., 2003). Religion dummy has a positive and significant sign which means that religion has a significant impact on foreign investors and that Protestants increase the attraction of MNEs, a result which is in line with Nunziata and Rocco (2014). There are differences among the religious groups where Protestants are more entrepreneurial than the Catholics. Protestantism due to its work ethics and its emphasis on individualism is more favourable to foreign investors than Catholism (Nunziata & Rocco, 2014). Protestants tend to be more trusting while the Protestant context also increases one's trust regardless of individual religious beliefs. Our results conform with Zelekha et al. (2014) who found that the existence of a Protestant majority in a country has a positive effect (compared with Catholics) on the level of entrepreneurs in that country. A region's Protestant legacy will thus result in a pronounced contemporary culture of trust. Catholicism, on the other hand, might be conducive to an "amoral familism" (Banfield, 1958), i.e. a cultural trait where moral behavior is only exhibited toward the own in-group but not toward people in general. In regions with high percentage of Catholic population, social interactions between strangers will therefore entail less experiences of trustworthiness. Finally, we also

find that there is a positive relationship between democracy and inward FDI (Jakobsen & de Soysa, 2006).

Column (6) depicts the interrelation between culture and females' STEM education while Column (7) depicts the interrelation between democracy and females' STEM education. Culture impacts females' ability to complete schooling and countries that have culture which treats equally males and females are considered to contribute more to the attractiveness of FDI. In this paper we do not only test for the isolated effects of both females' education with STEM skills and national culture on inward FDI, but we also take into consideration that a joint effect on FDI may exist.

The results concerning culture are presented on Column (6) of Table 1, where we use the final extended model including cultural factors and females' education (females with completed tertiary level of education and females' graduates with STEM skills). It is obvious that foreign investors are interested in females' graduates with STEM skills and that science, math, computing and engineering are fields that females need to be educated on. Thus, as we mentioned before, technology-oriented fields are mainly male-dominated, and an effective approach is needed in order to increase the number of females in technology and engineering careers something that has not yet been achieved in EU countries (Mammes, 2004; Klapwijk & Rommes, 2009; Niiranen, 2016). What is more, national culture is also considered a significant determinant in the eyes of foreign investors (Jones culture of trust. Catholicism, on the other hand, might be conducive to an "amoral familism" (Davis, 2000; Strychalska-Rudzewicz, 2016). From Column (6) it is obvious that culture, as being measured by Hofstede (2001), has a significant impact on MNEs investment decisions.

As for the joint effect of females' graduates with STEM skills and culture we observe an interesting outcome. While the main effects of these variables are all positive, their joint effect turns out to be negative and significant[41]. This means that while culture and females' education are significant factors in MNEs investment decisions, when taken together, skills of females are associated to the overall informal institutional

[41] Instead of Females STEM graduates we have also used the subcategories of STEM and the results remained the same; i.e. the interlinkage between females' STEM and culture turned out to be negative and significant.

contact of a country capturing social norms and attitudes, which is well described by prevailing culture. The link between females' skills and culture is reinforced by the interplay of the two, i.e. investors are highly interested in females' skills but this effect is moderated by the overall cultural environment. This is because, as based on our theorizing, gender identities, relations and education are important aspects of culture because they shape the way daily life is lived in the wider workplace and the community (OECD, 2000). Thus, females' education may be considered as part of a country's culture. According to our results, one of them (either females' education or culture) is enough for EU countries in order to become more attractive in the eyes of foreign investors. This is obvious from the significant negative interaction term of culture and females' education (Table 1, Column 6).

The same result is observed on Column (7) which depicts the joint effect of democracy with females' education. From Column (7) it is obvious that while the main effects of democracy and females' STEM education are positive, their interrelation is negative and significant. This means that the link between females' education in STEM fields and democracy is reinforced by the interplay of the two. MNEs are interested in females' science skills but this effect is moderated by the democracy of the country.

Table 1: Estimation Results FDI – Females' Education – Culture (Time period: 2000-2012)

	(1)	(2)	(3)	(3a)	(3b)	(3c)	(3d)	(4)	(5)	(6)	(7)
VARIABLES	Baseline	Total Human Capital	Human Capital Gender	Science, maths, comp, engin, manuf, construc	Science, math, computing	Engineering	Construction /Others	Culture and HC	Culture and Females Educ	Culture# Females Education	Democracy #Females Education
ECONOMIC											
logGDPcon	1.159***	1.087***	1.155***	1.236***	1.093***	1.290***	1.193***	0.713***	0.813***	0.861***	0.914***
	(0.0486)	(0.075)	(0.0772)	(0.0742)	(0.0856)	(0.0954)	(0.0697)	(0.163)	(0.163)	(0.154)	(0.185)
Interest_rate	-0.0015*	-0.038	-0.0368	-0.0227	-0.0298	-0.0194	-0.0360	-0.115*	-0.108*	-0.102*	-0.0785
	(0.00784)	(0.0541)	(0.0525)	(0.0478)	(0.0477)	(0.0486)	(0.0488)	(0.0585)	(0.0573)	(0.0544)	(0.0599)
trade	0.0152***	0.009***	0.011***	0.013***	0.014***	0.0119***	0.013***	0.00164	0.00907	0.00400	0.00381*
	(0.00188)	(0.0033)	(0.0032)	(0.00334)	(0.00332)	(0.00318)	(0.00307)	(0.00525)	(0.00510)	(0.00512)	(0.00595)
tax	-0.071***	-0.0045	-0.0030	-0.00443	-0.00820	-0.00446	-0.0019	0.00546	0.00824	0.00918	-0.0145
	(0.005)	(0.014)	(0.014)	(0.0132)	(0.0127)	(0.0136)	(0.0137)	(0.0159)	(0.0157)	(0.0159)	(0.0155)
HUMAN CAPITAL											
compltertotal15		0.080***						0.105***			
		(0.019)						(0.0211)			
STEM		0.009**						0.023***			
		(0.0205)						(0.00850)			
GENDER (FEMALES)											
icompterfemtotal15			0.077***	0.082***	0.086***	0.0796***	0.081***		0.0938***	0.0723***	0.0893***
			(0.0166)	(0.015)	(0.016)	(0.015)	(0.0154)		(0.0192)	(0.0247)	(0.0190)
STEM_fem			0.015*						0.0309***	0.647**	2.195**
			(0.0197)						(0.00939)	(0.533)	(1.101)
smcefemp				0.0499*							
				(0.028)							
smcfemac					0.112**						
					(0.051)						
emcfemact						0.0623*					
						(0.038)					
othersfact							-0.021**				
							(0.008)				
I**NSTITUTIONS**											

democ								0.518***	0.589***	0.526***	5.811*
								(0.0980)	(0.0940)	(0.107)	(3.150)
CULTURE											
religion_dum								0.309*	0.327*	0.459*	0.421
								(0.328)	(0.325)	(0.372)	(0.323)
total_hofstede								0.069***	0.0653***	0.385**	0.0629***
								(0.0222)	(0.0222)	(0.261)	(0.0226)
total_hofstede#c.STEM										-0.0116**	
										(0.00911)	
Democracy#c.STEM											-0.223**
											(0.111)
Constant	-19.95***	-16.16***	-17.42***	-22.24***	-18.68***	-22.75***	-17.46***	-8.361**	-10.18***	-30.85**	-77.11**
	(1.288)	(2.151)	(2.279)	(2.676)	(1.931)	(3.118)	(2.066)	(3.426)	(3.500)	(15.40)	(34.32)
Observations	276	228	228	228	228	228	228	228	228	228	228
R-squared	0.70	0.65	0.67	0.68	0.66	0.63	0.65	0.54	0.53	0.51	0.41

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

To sum up, from Table 1, it is obvious that from the economic factors, GDP and openness seem to be significant in the eyes of foreign investors and have the expected signs. Taxes seem to be insignificant. Moving on formal institutions and particularly on democracy we observe that it is considered a significant factor in the eyes of foreign investors. As for human capital, graduates with tertiary level of education and tertiary graduates with STEM skills are affecting positively MNEs decisions. To elaborate more, according to our results, females with tertiary level of education and females' tertiary graduates with STEM skills affect positively and significantly foreign investors' decisions. Finally, culture and religion also turned out to be significant factors for inward FDI. It is worth noting that MNEs are interested in tertiary females' graduates and especially in females' graduates in math, science, technology and engineering fields. While until now, females remain underrepresented in those fields, policymakers should pay particular attention and try to increase their percentage and involvement in these fields. Our study proves two important things; that skilled women are a driving FDI factor and that skills of females are associated to the overall informal institutional contact of a country capturing social norms and attitudes, which is well described by prevailing culture.

4.4.2 Robustness Tests

As we mentioned before, for robustness reasons, instead of using females' education we have used only males, but results seem to be quite different. These results are presented in the Appendix C (Table 3) of the present thesis. From Table 3, it is obvious that males' education in science fields does not come up significant in most cases, while males' with tertiary level of education are needed in order to create an attractive location for MNEs. This means that while science fields are mostly male-dominated, foreign investors seem to be more interested in females' participation in these fields, who until now remain under-represented in STEM-related industrial or academic leading positions and boards. Policymakers should enhance females participation in science fields in order to increase FDI attractiveness in these countries.

A similar result is obtained from Table 4 (Appendix C), where we used simultaneously males and females on the same equation to detect differences between them. Again here, it is obvious that females' education in science fields seems to be

significant affecting location decisions of MNEs, while males do not come up significant in these fields.

To sum up, we conclude that foreign investors are interested in females' skills in accordance to the literature which shows that gender diversity pays off and that there is a positive correlation between women in leadership and business performance. Female's education in STEM fields is becoming more and more important and particular attention should be paid to increase female's participation in these fields.

4.4 Conclusions

In the present paper we examine the separate effect of females' education, culture and democracy on inward FDI as well as their joint effect in a sample of EU countries. We mainly focus on females with completed tertiary level of education and on females' graduates with STEM skills, fields which until now are considered male dominated. As far as we know, it is the first paper that places a theoretical background to examine the separate effect of culture and females' education on FDI as well as their joint effect. There was a tendency in the past that described female managers as less self-confident, less emotionally-stable, less analytical, less consistent and having poorer leadership abilities than male managers (Brescoll, 2016). These beliefs contributed a variety of assumptions about female managers and females in high and/or skilled positions, which in turn formed the basis for the negative stereotypes about them. Recent studies though show that females have certain characteristics that make them better leaders and good performers. They seem to be more inclined, good listeners, have more patience, good ability and better management. Taking into account all the above, the role of females is gaining more and more attention.

While in EU countries there are more females in the tertiary level of education in higher education than men (Eurostat, 2015), this is not reflected in the participation rates of women in STEM studies. STEM skills are related to advanced technical skills that are considered powerful drivers for technology and development, especially in high technology sectors. Encouraging university students to choose a program in STEM field has long been a defining outcome of national innovation strategies. The focus on STEM can be related to how they would contribute to a country's competitiveness. The proportion of students going into STEM is not increasing at the

European level and the underrepresentation of females still persists. This is why we focus on females' education and particularly on females' graduates in STEM fields.

Females' education can be considered as a part of a country's culture. According to our results both culture and females' graduates in STEM fields when examined separately are positively significant in the eyes of foreign investors. Policymakers should pay more attention to females' education especially in STEM fields to increase the competitiveness of their countries. As for the joint effect between culture and females' graduates of STEM fields on inward FDI we observe that there is a negatively significant impact which means that only one of them is enough to attract foreign investments. Skills of females are associated to the overall informal institutional contact of a country capturing social norms which is well described by prevailing culture. Thus, investors are interested in females' skills but this effect is moderated by the overall cultural environment.

4.4.1 Managerial Implications

Our findings may have several managerial implications for MNEs when consider investing within the EU. Specifically, in the present study we identify if females' skills in science fields are a driving force for foreign investors. Nowadays, more and more females are in board positions while recent studies show that they have certain characteristics that make them better leaders compared to males. Consequently, managers should be alert of policies taking place in the region regarding females' education in STEM fields. As we showed, skilled females are considered a driving force for foreign investors. Thus, an effective approach and policies are needed in order to increase the percentage of females' graduates in science fields, domains which until now they remain highly under-represented.

4.4.2 Limitations

As is the case in all studies, this work entails some limitations. One limitation is that the analysis does not discriminate among industries. We acknowledge that an industry analysis would be further enlightening and induce more specific policy implications, but this is beyond the scope of this work, let alone our access is limited to this kind of data. One other limitation is that we could control for the different social policies

promoting the participation of females in labor market (months for maternity leave and its compensation, government programs for family welfare, work schedule and working from home, etc.) since they directly affect the decision of studying STEM degrees as recent studies highlight, but this is also beyond the scope of our study and our access to these kind of data is quite limited.

Despite these limitations, this study opens the floor to related literature to further investigate the relevance of culture and females' education to foreign investors within a particular theoretical context as well as extending research at industry and regional level.

Chapter 5. Conclusions

Foreign capital flows, particularly FDI inflows, have been viewed as a main engine for economic growth in the world economy. The consequence of inward FDI is being increasingly accepted as the majority of economies ease up the entry of foreign capital inflows and set up an advanced system to increase their prospective of attracting FDI.

FDI inflows are one of the most important questions currently concerning both developed or developing countries. Recently, IB literature has shown particular interest in exploring the effect of human capital on inward FDI. But despite the growing studies investigating how human capital end education shape FDI inflows, little attention has been devoted on different aspects of human capital, both quantity and quality, and their implication on FDI. What is more, little attention has been also devoted to gender education disparities and to females' education not only in general fields but particularly in science fields. A major purpose of this thesis was to empirically investigate how human capital measured by different ways, gender education disparities and females' education in science fields affect FDI.

The methodology of this thesis is empirical; so that different econometric models have been used to evaluate the effect of human capital on FDI in receiving economies, based on the analysis of data collected from international organizations such as the World Bank, Barro and Lee database, Heritage Foundation, UNCTAD etc. This thesis attempts to find an answer for one main research question, which is whether and how human capital and education affect inward FDI in the host countries and particularly in EU countries. This question is broken down into three different questions related to each empirical chapter as follows: First empirical chapter (Chapter 2) searched how human capital, skills and competencies shape inward FDI by comparing Western and CEE European Union countries. The second empirical chapter (Chapter 3) searched how gender education disparities and democracy shape inward FDI both separately and jointly by comparing Western and CEE European Union countries. The third chapter (Chapter 4) attempted to deepen more heavily in females' education not only in education as a general concept but particularly in science fields where until now females remain underrepresented. Thus in this final chapter we examine how females education in science fields and culture both separately and jointly shape inward FDI in EU countries.

To obtain the purpose and to investigate the argument of this thesis, this thesis was designed to include three empirical chapters as mentioned above, as well as the introduction and the conclusions. The first empirical chapter studied the relationship between human capital and inward FDI. The second empirical chapter studied the relationship between gender education disparities, democracy and inward FDI. The third empirical chapter studied the relationship between females education and culture on inward FDI in EU countries.

5.1 Summary of the Findings

The important findings of this thesis can be summarized in the following:

Empirical Chapter 1: The results of this chapter provide evidence that human capital can positively affect inward FDI. Both quality and quantity measures are important to enhance competitiveness in Western EU countries. On the other hand, we observe that using only quantity measures is a partial analysis and does not provide a comprehensive picture especially in Western EU countries. In this respect, the empirical results are unprecedented and may have a range of policy implications. The same holds for general vs. vocational education.

Particularly, our estimations showed that skills in science (quality of human capital measured by PISA) is important in attracting FDI inflows in EU15 countries while skills in the field of math, science and reading are not an important factor in the CEE countries. This could be a signal for policymakers in Western EU countries to invest in advanced knowledge and good foundation skills in science where demand is pretty high. The Western EU member countries are more developed than the CEE members and foundation skills are needed in order to facilitate inward FDI and to attract high-value added MNEs. What is more, vocational education is growing in importance hence validate the VET programs developed and put into implementation by the European Commission. In particular it is evident that secondary vocational skills are highly connected to FDI inflows in the CEE region, while higher vocational qualifications are required for the Western counterparts. Vocational education has gained greater focus at European level and the aim of the EU is to build up modernized and attractive vocational systems. Matching skills and jobs has become a

high-priority policy concern in EU trying to provide the right skills needed in the labor market and generate new jobs (Global Agenda Council on Employment, 2014).

In the particular CEE region it appears that vocational education rather than theoretically oriented programs are relevant for inward FDI. In these countries, a better educated workforce in vocational courses can create a more attractive climate where new technologies can be adopted more rapidly and easily. Therefore, if they want to upgrade to higher value added FDI and catch up with their Western counterparts, their policy agenda should strengthen their vocational training which will enable them to reap the benefits of technological spillovers from foreign activities.

Education at tertiary level facilitates the absorption of new technologies and policymakers should place emphasis in these levels in both regions. This result though is more straightforward for Western economies; for CEE countries, tertiary education may reflect the overall advancement of the economies given their transformation processes, especially since the 2000. What is more, though most CEE economies are ahead of their emerging market peers at similar levels of development, they lag behind the most advanced economies in the EU (EBRD, 2013). Despite higher records of some countries (e.g. Hungary, the Czech Republic etc.) in education achievements, they do not match their Western counterparts. Hence, tertiary education in the region may rather mirror lower qualifications than the older EU member states.

Further, secondary education of the population and the labour force emerges as a deterrent to foreign investors in CEE countries. This may translate to mismatching of skills acquired during secondary formal schooling and demands of employers or the needs of the economy. According to some estimates skills mismatches are increasing (EBRD, 2013). Another explanation may relate to what happens in the tertiary level. Given that tertiary education in CEE countries might reflect lower qualifications than their Western peers, it is natural to assume that all levels of education lag behind (EBRD, 2013). Hence, secondary education might as well reflect lower secondary education than the older (Western) counterparts. Yet, the more average years in secondary education give opposite results; as the average years of secondary education increase, this is translated to better skills and competencies and are thus important to foreign investors. Policy makers both in the EU and the CEE region,

should thus place emphasis on two directions in this region: towards increasing the average years of completed education (the longer the better) and towards advancing their education levels, both secondary and tertiary.

Empirical Chapter 2: The results of this chapter and by distinguishing between EU15 and CEE EU countries reach many important conclusions regarding gender inequality in terms of education. Beginning with the Western EU members, gender related education equality in secondary and tertiary level is related to increased inward foreign investments. Regarding educated labor force, it is obvious that labor force inequality in secondary level seems to facilitate inward FDI while the opposite is the case for tertiary level. MNEs are more interested in males' labor force with secondary education and in females' in third level in order to place their investments which could be evidence of the alternative professional directions of the two sexes. Concerning vocational education, MNEs are also interested in equality at secondary and tertiary level which indicated the need to increase females' participation in these fields.

On the other hand, turning into CEE EU member states, we notice that foreign investors in these countries are interested in equality regarding labor force with secondary level of education. These countries need highly educated labor force, and particularly males with secondary education, in order to attract inward FDI (Picciotto, 2003; Talpos & Enache, 2010) combined with cost effectiveness and low wages. The fact that males workforce is more significant may be due to discriminatory practices or different jobs orientation (Kalaitzidakis et al., 2001) and foreign investors may take advantage of this gender disparity in order to maximize their profits (Hoai and Tung BUI, 2016). Gender educational disparity seems to deter foreign investors especially in secondary academic level where completion and enrolment ratios in secondary education have a negative and significant impact. As for the distinction between technical and theoretically oriented programmes, it is clear that gender inequality in vocational secondary contributes positively to the attractiveness of MNEs while gender equality in general secondary level creates a favorable environment for FDI inflows. Job-related skills are vital for an economy to compete and grow in an era of technological changes and economic integration where vocational education is becoming more and more important because it refers to the acquisition of knowledge

and skills for the world of work (Hollander and Yee Mar, 2009). In CEE EU countries, males' vocational education is more significant than females and foreign investors value it most while gender equality in theoretically oriented programmes in secondary level seems to be important. Policymakers should find a balance between theoretically and technically oriented programs and focus on the types that are more important for the attractiveness of new technologies and innovations.

Empirical Chapter 3: The results of this chapter suggest that economic factors, and particularly GDP and openness seem to be significant in the eyes of foreign investors and have the expected signs while taxes seem to be insignificant. Moving on formal institutions and particularly on democracy we observe that it is considered a significant factor in the eyes of foreign investors. As for human capital, graduates with tertiary level of education and tertiary graduates with STEM skills are affecting positively MNEs decisions. Females with tertiary level of education and females' tertiary graduates with STEM skills affect positively and significantly foreign investors' decisions. Finally, culture and religion, main parts of informal institutions, also turned out to be significant factors for inward FDI. It is worth noting that MNEs are interested in tertiary females' graduates and especially in females' graduates in math, science, technology and engineering fields. While until now, females remain underrepresented in those fields, policymakers should pay particular attention and try to increase their percentage and involvement in these fields.

Apart from the above we also checked for the joint effect of culture and females' education in science fields and for the interrelation between democracy and females' education. Beginning with culture and females' education, while the main effects of these variables present a positive and significant sign, their joint effect turns out to be negative and significant. This means that while culture and females' education are significant factors in MNEs investment decisions, when taken together, skills of females are associated to the overall informal institutional contact of a country capturing social norms and attitudes, which is well described by prevailing culture. The link between females' skills and culture is reinforced by the interplay of the two, i.e. investors are highly interested in females' skills but this effect is moderated by the overall cultural environment. Thus, females' education may be considered as part of a country's culture. A same result is observed for the joint effect of democracy with

females' education where it is obvious that while the main effects of democracy and females' STEM education are positive, their interrelation is negative and significant. This means that the link between females' education in STEM fields and democracy is reinforced by the interplay of the two. MNEs are interested in females' science skills but this effect is moderated by the democracy of the country.

5.2 Managerial and Policy Implications

We should note that there are a number of managerial and policy implications that can be drawn from the results of this thesis.

Empirical Chapter 1: The findings of Empirical Chapter 1 have several important insights for the management of domestic firms considering establishing an EU affiliate or with existing affiliates in EU countries. Particularly, they contribute to identify the elements of human capital and education that are of importance in Western and CEE EU affiliates. They also help to make clear that while the management of firms considering locating in EU15 and/or CEE takes into account the human capital base of these sub-regions, different levels of education and skills seem to foster their decision. A further implication is that the most important motive for establishing or maintaining an affiliate in the EU is a combination of knowledge seeking motives and other parameters like market size, openness, infrastructure etc.

The most significant implication for management arising from this study is that skilled labor with tertiary level of education is the key driver of choice of the Western EU market in which to establish a foreign affiliate. Tertiary level of education seems to be important for managers in order to decide locating in both sub-regions. Managers of firms are interested in skills and higher vocational education in Western EU countries while in CEE ones secondary vocational education seems to be of paramount interest. Finally we recommend that managers of domestic companies in these economies encourage positive externalities and learn from the affiliates of multinationals to enhance the competitive advantages of their companies and exploit them. Thus, our results are of high importance for managers because they set the frame for labor markets with different qualifications.

Benchmarking education policy is of paramount importance within the EU. Regressions suggest that the quantity and quality of education are not all that matter when building an effective stock of human capital if skills mismatches are in place. Governments should concentrate on sound education frameworks and demonstrate their commitments to that (expenditure on education as a share in their total government expenditure) in order to ensure high skills and competencies. They also need to recognise the relevance of specific skills, particularly at vocational levels. A higher proportion of educated people does not necessarily lead to faster economic growth if the skills acquired during schooling do not match employers' needs. Better communication and cooperation between the private sector and all levels of education would be beneficial and should thus be encouraged. Adequate funding is compelling, constituting a favourable signal to foreign investors.

The above are particularly essential for CEE countries in order to close the gap with their Western counterparts. Providing higher qualifications and competencies, they will be able to attract higher value added activities which in turn would further strengthen their human capital base and create a virtuous human capital – FDI cycle. The opposite involves their lagging behind which attracts saturated industries seeking for market demand for ether products and cost effectiveness.

Empirical Chapter 2: Our findings related to this chapter may have several managerial implications for MNEs when consider investing within the EU. Specifically, in the present study we identify if gender disparities with respect to different levels and types of education and skills are of high importance to foreign investors. Managers need to be aware of the impact of education policies when investing in a host country as this influences their cost functions. If education reforms take place, multinationals will need to re-evaluate their location strategies toward host countries that match their needs. Considering countries with gender education equalities or disparities may be an important strategy for foreign investors. Consequently, managers should be alert of policies taking place in the region regarding education equality, which, in conjunction with democracy may constitute highly beneficial locations even for higher value-added activities.

The change in MNE investment behaviour as a response to engaging with host countries with better and well-structured education systems, can be explained by the

need to minimize costs but not at the expense of quality. In addition, managers of domestic companies could put pressure on domestic authorities for gender equality or disparity related to education so that they can also reap positive externalities from greater waves of foreign affiliates.

Empirical Chapter 3: The findings of Empirical Chapter 3 have several important implications for the management of domestic firms considering establishing an EU affiliate or with existing affiliates in EU countries. Particularly, they contribute to identify if females' education particularly in science fields is of importance in EU affiliates. A further implication is that the most important motive for establishing or maintaining an affiliate in the EU is a combination of knowledge seeking motives and other parameters like market size, openness, etc.

The most significant implication for management arising from this study is that skilled labor with tertiary level of education and even more so tertiary educated females is the key driver of choice of the EU market in which to establish a foreign affiliate. While in the past so few females held international positions (Alder, 1999), nowadays more and more females are present and successful in international and board positions and have achieved professional success despite the difficulties of working in international organizational contexts. Policymakers should pay particular attention in females' education in science fields who promote innovation and seem to attract MNEs. Europe presents a lack of females at the most senior levels and on executive boards, a steady decline in the representation rates of females as career levels rise within organizations, and a persistent gender pay gap (Mercer, 2016). All these have to change and females' presence should be promoted in order EU to become a more attractive place for foreign investors.

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APPENDIX A

Table 1. Categorization of Quantity and Quality Measures of Human Capital

Quantity HC Measures	**Quantity HC Measures**
1. Average years of schooling (average years of total schooling, of secondary schooling and of tertiary schooling for population aged 15 and above) – *Stock Measure* 2. Attainment ratios (highest level attained – total secondary and total tertiary education) – *Flow Measure* 3. Completion ratios* (highest level completed – secondary, tertiary, secondary and tertiary level) – *Flow Measure* 4. Enrolment ratios in general and vocational education* - *Flow measure* 5. Government expenditure on education – *Flow Measure*	1. International test score (PISA on math, science and reading, and overall score)* - *Flow measure* 2. Labor force with different levels of education◊ - *Stock measure* **3.** Human Development Index◊ - *Stock Measure*

*Measures addressed for the first time in FDI literature - ◊ few studies check all of them

Table 2. List of Countries

Western EU Countries (EU-15)	Central and Eastern EU Countries (EU-13)
Austria	Bulgaria
Belgium	Croatia
Denmark	Cyprus
Finland	Czech Republic
France	Estonia
Germany	Hungary
Greece	Latvia
Ireland	Lithuania
Italy	Malta
Luxembourg	Poland
Netherlands	Romania
Portugal	Slovakia
Spain	Slovenia
Sweden	
United Kingdom	

Table 3. Summary Statistics, Definitions and Sources, EU-28

Variable	Description	Mean	Std. Dev.	Data Sources	Period
logFDIInflows	Log of FDI net inflows per year (in current U.S. dollars)	8.330	1.707	UNCTAD	1995-2012
LogGDP	Log of GDP (constant 2005 US$)	25.749	1.677	WDI	1995-2012
Interest_rate	Lending Interest Rate (%)	11.457	19.897	WDI	1995-2012
Trade	Trade (% of GDP)	103.222	51.733	WDI	1995-2012
GFCF	Gross Fixed Capital Formation (as a percentage of GDP)	23.1	4.714	WDI	1995-2012
R&D	Research and development expenditure over GDP	1.405	0.885	WDI	1995-2012
Business_freedom	Business freedom is an overall indicator of the efficiency of government regulation of business. The quantitative score is derived from an array of measurements of the difficulty of starting, operating, and closing a business.	76.196	10.694	Heritage Foundation	1995-2012
Crisis	Dummy for financial crisis (value 1 if year 2008-2012 and 0 otherwise)	0.25	0.433	Author's calculations	1995-2012

Comp/cap	Compensation of employees consists of all payments in cash, as well as in kind (such as food and housing), to employees in return for services rendered, and government contributions to social insurance schemes such as social security and pensions that provide benefits to employees/Employment (15-64)	35041.71	47633.31	WDI and Author's Calculations	1995-2012
LF_sec	Labor force with secondary education (% of total)	48.858	15.986	WDI	1995-2012
LF_tert	Labor force with tertiary education (% of total)	23.072	8.3724	WDI	1995-2012
GE_T	Government expenditure on education as % of GDP (%)	5.141	1.1426	WDI	1995-2012
GE_sec	Government expenditure on secondary education as % of GDP (%)	2.1891	0.5019	WDI	1995-2012
GE_tert	Government expenditure on tertiary education as % of GDP (%)	1.1769	0.4196	WDI	1995-2012
Expeduc	Expenditure on education as % of total government expenditure (%)	12.528	3.1498	WDI	1995-2012
Expsec	Expenditure on secondary education as % of total government expenditure (%)	4.9488	1.1240	WDI	1995-2012
Expupsec	Expenditure on upper secondary education as % of total government expenditure (%)	2.5687	0.6845	WDI	1995-2012
Expter	Expenditure on tertiary education as % of total government expenditure (%)	2.7363	0.8393	WDI	1995-2012
complsec5	Completed secondary education total, 15+, 5 year	36.734	12.989	Barro&Lee	1995-2010
compltert5	Completed tertiary education total, 15+, 5 year	10.819	4.4817	Barro&Lee	1995-2010
avgtotal5	Average years of total schooling, 15+	10.331	1.239	Barro&Lee	1995-2010
avgsec5	Average years secondary education total, 15+, 5 year	3.893	0.86	Barro&Lee	1995-2010
avgtert5	average years tertiary education total, 15+, 5 year	0.567	0.2111	Barro&Lee	1995-2010
totalsec5	total secondary education, total 15+, 5 year	58.487	13.322	Barro&Lee	1995-2010
totaltert5	total tertiary education, total 15+, 5 year	17.536	6.3284	Barro&Lee	1995-2010
Sec&Tert5	Completed secondary and tertiary education, total 15+, 5 year	47.554	13.506	Barro&Lee	1995-2010
PISA_math	PISA: Mean performance on the mathematics scale	490.63	27.105	WDI	2000-2012
PISA_read	PISA: Mean performance on the reading scale	486.92	25.787	WDI	2000-2012
PISA_science	PISA: Mean performance on the science scale	495.49	26.051	WDI	2000-2012

PISAall	PISA: Mean performance on the math, reading and science scale	491.28	25.160	Author's Calculations	2000-2012
enrsecvoclab	Enrolment in secondary vocational education/labor force	0.076	0.0986	WDI and Author's Calculations	2000-2012
enrupsecvoclab	Enrolment in upper secondary vocational education/labor force	0.0649	0.0799	WDI and Author's Calculations	2000-2012
enrtertvoc	Enrolment in tertiary vocational/labor force	0.0017	0.0028	UNECE and Author's Calculations	2000-2012
enrgenseclab	Enrolment in secondary general education/labor force	0.2237	0.3173	WDI and Author's Calculations	2000-2012
enrupgenseclab	Enrolment in upper secondary general education/labor force	0.0635	0.0718	WDI and Author's Calculations	2000-2012
enrtertgen	Enrolment in tertiary general/labor force	0.01065	0.0150	UNECE and Author's Calculations	2000-2012
HDI	Human Development Index	0.853	0.0456	WDI	1995-2012

Estimation with Fixed or Random Effects – European Union 15 (EU-15)

Table 1A. Government expenditure on education as % of total government expenditures and as % of GDP

VARIABLES	(1) Expeduc	(2) Expseceduc	(3) Expsecupeduc	(4) Exptertеduc	(5) GE educ %GDP	(6) GE sec %GDP	(7) GE tert %GDP	(1) Expeduc	(2) Expseceduc	(3) Expsecupeduc	(4) Exptertеduc	(5) GE educ %GDP	(6) GE sec %GDP	(7) GE tert %GDP
logGDPcon	1.130***	0.778***	1.090***	1.152***	1.237***	1.043***	1.388***	0.887***	0.936***	1.233***	0.765***	1.092***	1.214***	1.140***
	(0.206)	(0.170)	(0.184)	(0.264)	(0.147)	(0.205)	(0.315)	(0.202)	(0.203)	(0.222)	(0.218)	(0.157)	(0.235)	(0.283)
interest_rate	-0.0218	-0.0489	-0.188	-0.0543	0.0204	-0.133***	-0.110*	0.0561	0.0303	-0.173	0.0428	-0.0615	-0.0517	-0.0302
	(0.0524)	(0.0364)	(0.128)	(0.0714)	(0.0234)	(0.0445)	(0.0635)	(0.0476)	(0.0437)	(0.148)	(0.0453)	(0.0728)	(0.0598)	(0.0724)
trade	0.0183***	0.0205***	0.0234***	0.0205***	0.0194***	0.0215***	0.0211***	0.0192***	0.0213***	0.0269***	0.0197***	0.0168***	0.0193***	0.0172***
	(0.00303)	(0.00208)	(0.00355)	(0.00462)	(0.00304)	(0.00253)	(0.00546)	(0.00211)	(0.00225)	(0.00429)	(0.00210)	(0.00378)	(0.00344)	(0.00341)
GFCF	0.0520	0.107	0.0170	0.152	0.00597	0.0247	0.0276	-0.127	-0.0995	-0.00719	-0.148	0.0200	0.0516	0.0281
	(0.110)	(0.116)	(0.152)	(0.0927)	(0.0550)	(0.113)	(0.105)	(0.0925)	(0.0982)	(0.123)	(0.0916)	(0.0901)	(0.112)	(0.115)
Compensation								0.221***	0.177**	0.134*	0.232***	-0.00394	0.0487	0.0853
								(0.0815)	(0.0760)	(0.0707)	(0.0835)	(0.100)	(0.0947)	(0.106)
R&D								0.229**	0.294***	0.261***	0.340**	0.216*	0.314**	0.278
								(0.0983)	(0.102)	(0.0935)	(0.136)	(0.128)	(0.146)	(0.193)
crisis								-1.853***	-4.012***	-4.208***	-2.077***	-1.151***	-3.860***	-1.820***
								(0.419)	(1.526)	(0.576)	(0.425)	(0.346)	(1.446)	(0.322)
business_freedom								0.0155*	0.0193**	-0.0110	0.0255**	0.0280***	0.0362***	0.0338***
								(0.00936)	(0.00965)	(0.0110)	(0.0112)	(0.0105)	(0.0129)	(0.0123)
Expeduc	0.290***							0.0492						
	(0.0616)							(0.0429)						
Expsec		0.561***							0.113					
		(0.138)							(0.106)					
Expupsec			0.979***							0.955***				
			(0.244)							(0.220)				
Expter				0.437**							-0.167			
				(0.178)							(0.126)			
GE_T					0.110*							0.0230		
					(0.0635)							(0.106)		
GE_sec						0.824***							0.0900	
						(0.316)							(0.317)	
GE_tert							0.898**							0.00967
							(0.362)							(0.388)
Constant	-24.69***	-13.25*	-22.70***	-20.93**	-28.42***	-20.82***	-29.62***	-17.76**	-19.64**	-27.96***	-13.88*	-24.64***	-29.62***	-26.92***
	(8.616)	(7.406)	(8.067)	(9.641)	(5.018)	(8.017)	(11.18)	(7.898)	(8.040)	(8.715)	(8.355)	(5.790)	(9.286)	(10.34)
Observations	89	89	69	88	248	94	93	82	82	65	81	98	87	86
Number of Country	13	13	11	13	14	14	14	13	13	11	13	14	14	14
year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively.

Table 2A. Attainment, Completion ratios and Average Years of Schooling based on level of education

VARIABLES	(1) Total Sec	(2) Total tert	(3) Comple Sec	(4) Comple tert	(5) Comp Sec&Tert	(6) Avg years	(7) Avg sec	(8) Avg tert	(1) Total Sec	(2) Total tert	(3) Comple Sec	(4) Comple tert	(5) Comp Sec&Tert	(6) Avg years	(7) Avg sec	(8) Avg tert
logGDPcon	1.052***	1.131***	1.040***	1.074***	1.044***	1.056***	1.049***	1.106***	1.080***	1.057***	1.039***	1.041***	1.025***	1.017***	1.054***	1.050***
	(0.191)	(0.180)	(0.175)	(0.182)	(0.178)	(0.181)	(0.179)	(0.182)	(0.119)	(0.104)	(0.0944)	(0.109)	(0.0899)	(0.0876)	(0.0994)	(0.106)
interest_rate	-0.0097	-0.0334*	-0.0115	-0.00734	-0.0105	-0.0130	-0.0121	-0.0193	-0.0288	-0.0188	-0.0278	-0.0585	-0.0403	-0.0369	-0.0380	-0.0381
	(0.0188)	(0.0178)	(0.0201)	(0.0197)	(0.0199)	(0.0180)	(0.0197)	(0.0183)	(0.0447)	(0.0425)	(0.0419)	(0.0422)	(0.0495)	(0.0403)	(0.0465)	(0.0426)
trade	0.0182***	0.0130***	0.0182***	0.0142***	0.018***	0.0168***	0.0173***	0.0131***	0.0198***	0.0118***	0.0185***	0.0112**	0.0175***	0.0158***	0.0178***	0.0112***
	(0.0046)	(0.003)	(0.004)	(0.0045)	(0.0037)	(0.00452)	(0.00371)	(0.00345)	(0.00461)	(0.00316)	(0.00446)	(0.00446)	(0.00513)	(0.00461)	(0.00468)	(0.00358)
GFCF	0.0240	0.00511	0.0203	0.0118	0.0202	0.0152	0.0145	0.00718	0.0291	0.000506	0.00495	0.0130	0.000286	0.00175	0.00671	0.00611
	(0.0497)	(0.0454)	(0.0515)	(0.0491)	(0.0528)	(0.0559)	(0.0531)	(0.0468)	(0.0730)	(0.0433)	(0.0746)	(0.0536)	(0.0799)	(0.0705)	(0.0798)	(0.0461)
Compensation									0.00338	-0.00106	-0.00792	-0.0260	-0.0192	-0.0187	-0.0105	-0.0125
									(0.0879)	(0.0825)	(0.0789)	(0.0825)	(0.0809)	(0.0835)	(0.0819)	(0.0829)
R&D									0.276**	0.00206	0.325**	0.189**	0.282**	0.268***	0.318**	0.0808
									(0.115)	(0.0909)	(0.130)	(0.0962)	(0.115)	(0.0937)	(0.134)	(0.0944)
crisis									0.209	-0.00601	0.299	-0.201	0.0515	-0.0658	0.155	-0.113
									(0.307)	(0.304)	(0.431)	(0.330)	(0.458)	(0.373)	(0.428)	(0.316)
business_freedom									0.0161	0.000643	0.0166	0.00872	0.0206*	0.0201*	0.0203*	0.00327
									(0.0109)	(0.0121)	(0.0117)	(0.0102)	(0.0123)	(0.0122)	(0.0118)	(0.0113)
totalsec	-0.0034								-0.0184*							
	(0.0135)								(0.0109)							
totaltert		0.0867***								0.0928***						
		(0.0235)								(0.0228)						
complsectotal			-0.00773								-0.0133					
			(0.0150)								(0.00944)					
compltertotal				0.0640*								0.102***				
				(0.0461)								(0.0377)				
complsectert					-0.00247								-0.00283			
					(0.0121)								(0.00746)			
avgtotal						0.0651								0.105		
						(0.140)								(0.104)		
avgsectotal							0.0810								-0.138	
							(0.180)								(0.157)	
avgtertotal								2.130***								2.579***
								(0.783)								(0.699)
Constant	-22.19***	-25.74***	-21.99***	-23.28***	-22.14***	-23.12***	-22.67***	-24.62***	-22.02***	-22.30***	-21.92***	-21.92***	-21.83***	-22.51***	-22.22***	-22.08***
	(5.438)	(5.675)	(5.414)	(5.581)	(5.489)	(5.699)	(5.397)	(5.674)	(3.997)	(3.305)	(3.723)	(3.557)	(3.777)	(4.120)	(3.840)	(3.379)
Observations	325	325	325	325	325	325	325	325	116	116	116	116	116	116	116	116
Number of Country	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively.

Table 3A.Labor force with secondary and tertiary level of education

VARIABLES	(1) Labor force second	(2) Labor force tert	(1) Labor force second	(2) Labor force tert
logGDPcon	0.956***	0.990***	1.075***	1.036***
	(0.165)	(0.170)	(0.0926)	(0.0885)
interest_rate	-0.0409	-0.0221	-0.0229	-0.0562**
	(0.0363)	(0.0182)	(0.0422)	(0.0279)
trade	0.0185***	0.0131***	0.0183***	0.0130***
	(0.00527)	(0.00359)	(0.00367)	(0.00235)
GFCF	0.0571	0.0128	0.00924	0.0193
	(0.0851)	(0.0720)	(0.0728)	(0.0469)
Compensation			0.0143	-0.0234
			(0.0859)	(0.0768)
R&D			0.502***	0.0504
			(0.136)	(0.0983)
crisis			-1.841	-2.223*
			(1.400)	(1.262)
business_freedom			0.0233	0.00960
			(0.0153)	(0.0115)
LF_sec	-0.00692		-0.0278***	
	(0.0101)		(0.0104)	
LF_tert		0.0729***		0.0645***
		(0.0151)		(0.0129)
Constant	-16.37***	-19.60***	-23.09***	-22.33***
	(5.255)	(5.703)	(3.952)	(3.150)
Observations	168	168	119	119
Number of Country	14	14	14	14
year dummies	YES	YES	YES	YES

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively.

Table 4A.PISA math, science, reading and overall score

VARIABLES	(1) PISA maths	(2) PISA science	(3) PISA reading	(4) PISA All	(1) PISA maths	(2) PISA science	(3) PISA reading	(4) PISA All
logGDPcon	1.152***	1.125***	1.221***	1.170***	1.201***	1.190***	1.098***	1.177***
	(0.299)	(0.320)	(0.384)	(0.331)	(0.256)	(0.261)	(0.237)	(0.256)
interest_rate	-0.0810	-0.0652	-0.0545	-0.0625	-0.0426	-0.0668	-0.0787	-0.0632
	(0.0957)	(0.0964)	(0.102)	(0.0961)	(0.0839)	(0.0881)	(0.0936)	(0.0891)
trade	0.0179***	0.0203***	0.0199***	0.0191***	0.0184***	0.0168***	0.0177***	0.0181***
	(0.00388)	(0.00532)	(0.00494)	(0.00443)	(0.00461)	(0.00462)	(0.00468)	(0.00461)
GFCF	0.0142	0.0423	0.0249	0.0216	0.0417	0.0456	0.0435	0.0419
	(0.124)	(0.126)	(0.131)	(0.127)	(0.116)	(0.111)	(0.110)	(0.113)
Compensation					-0.344	-0.347	-0.295	-0.339
					(0.269)	(0.289)	(0.305)	(0.275)
R&D					0.279	0.249	0.341	0.309
					(0.252)	(0.217)	(0.265)	(0.252)
crisis					-3.479***	-3.510***	-3.758***	-3.589***
					(1.300)	(1.352)	(1.352)	(1.301)
business_freedom					0.0560***	0.0595***	0.0624***	0.0598***
					(0.0210)	(0.0212)	(0.0230)	(0.0221)
PISA_math	0.00979				0.00740			
	(0.00772)				(0.00607)			
PISA_science		0.00790				0.00950**		
		(0.00878)				(0.00467)		
PISA_reading			0.0129				0.0172	
			(0.0119)				(0.00930)	
PISAall				0.0114				0.0121*
				(0.00912)				(0.00654)
Constant	-26.46*	-24.45	-30.07	-27.86*	-21.97*	-20.58*	-14.94	-19.18*
	(13.91)	(15.20)	(18.77)	(15.84)	(11.30)	(11.32)	(9.399)	(10.59)
Observations	74	74	74	74	69	69	69	69
Number of Country	12	12	12	12	12	12	12	12
year dummies	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively

Table 5A. Vocational and General Education based on level of education

VARIABLES	(1) Secondary Vocational	(2) Upper secondary Vocational	(3) Tertiary Vocational	(4) Secondary General	(5) Upper Secondary General	(6) Tertiary general	(1) Secondary Vocational	(2) Upper secondary Vocational	(3) Tertiary Vocational	(4) Secondary General	(5) Upper Secondary General	(6) Tertiary general
logGDPcon	0.939***	0.927***	0.990***	0.943***	0.918***	0.898***	1.000***	0.960***	1.941***	0.969***	1.006***	1.212***
	(0.166)	(0.183)	(0.163)	(0.186)	(0.185)	(0.145)	(0.117)	(0.282)	(0.390)	(0.133)	(0.221)	(0.279)
interest_rate	-0.00575	-0.122	-0.290	0.00131	-0.0584	0.0342	-0.0913*	-0.0998	-0.387***	-0.0660	-0.0161	0.0385
	(0.0341)	(0.0803)	(0.190)	(0.0325)	(0.0620)	(0.0610)	(0.0506)	(0.0631)	(0.146)	(0.0557)	(0.0678)	(0.0605)
trade	0.0167***	0.0205***	0.0141***	0.0187***	0.0229***	0.0160***	0.0151***	0.0184***	0.0254***	0.0176***	0.0205***	0.0182***
	(0.00496)	(0.00656)	(0.00365)	(0.00485)	(0.00471)	(0.00354)	(0.00430)	(0.00398)	(0.00665)	(0.00507)	(0.00436)	(0.00392)
GFCF	0.0594	-0.132	0.0131	-0.0661	0.168**	0.0723	-0.00105	-0.00402	0.290**	-0.0446	-0.0524	0.0467
	(0.0721)	(0.0987)	(0.0548)	(0.0736)	(0.0697)	(0.0889)	(0.0832)	(0.120)	(0.121)	(0.0739)	(0.103)	(0.102)
Compensation							-0.0958	0.0728	0.845	-0.0721	0.100	0.191
							(0.0781)	(0.152)	(0.642)	(0.0832)	(0.169)	(0.511)
R&D							0.200	-0.00378	1.000***	0.202	0.174	0.201
							(0.123)	(0.225)	(0.368)	(0.138)	(0.171)	(0.275)
crisis							-2.040	-3.327**	-3.788***	-2.001	-3.142**	-1.133**
							(1.416)	(1.314)	(1.433)	(1.381)	(1.375)	(0.524)
business_freedom							0.0415**	0.0624***	0.0438**	0.0312**	0.0371**	0.0317**
							(0.0172)	(0.0149)	(0.0180)	(0.0156)	(0.0174)	(0.0147)
enrsecvoc	0.698						0.897					
	(1.201)						(0.877)					
enrupsecvoc		2.608***						3.188**				
		(0.681)						(1.613)				
enrtertvoc			157.2*						240.5***			
			(86.80)						(60.38)			
enrgensec				0.342						0.387		
				(0.396)						(0.283)		
enrupgensec					4.066***						3.514***	
					(0.994)						(1.189)	
enrtertgen						5.124						4.340
						(5.368)						(7.967)
Constant	-16.34***	-13.44**	-16.43***	-16.54***	-12.99**	-13.83**	-21.58***	-22.69**	-63.14***	-19.66***	-22.17***	-30.11**
	(5.139)	(6.784)	(5.674)	(6.004)	(6.320)	(5.443)	(4.959)	(10.10)	(17.39)	(4.758)	(7.872)	(13.11)
Observations	178	83	49	187	92	68	98	77	47	107	86	65
Number of Country	14	13	9	14	14	11	14	13	9	14	14	11
year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively.

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Table 6A.Government expenditure on education as % of total government expenditures and as % of GDP

VARIABLES	(1) Expeduc	(2) Expseceduc	(3) Expsecupeduc	(4) Exptertedu c	(5) GE educ %GDP	(6) GE sec %GDP	(7) GE tert %GDP	(1) Expeduc	(2) Expseceduc	(3) Expsecupeduc	(4) Exptertedu c	(5) GE educ %GDP	(6) GE sec %GDP	(7) GE tert %GDP
logGDPcon	0.789***	0.770***	0.696***	0.794***	0.851***	0.805***	0.811***	0.805***	0.782***	0.833***	0.805***	0.843***	0.826***	0.847***
	(0.122)	(0.124)	(0.130)	(0.118)	(0.0776)	(0.137)	(0.106)	(0.107)	(0.123)	(0.161)	(0.109)	(0.111)	(0.146)	(0.123)
interest_rate	-0.00715	0.0382**	0.0385**	-0.00587	-0.00962***	0.00106	-0.0118*	-0.0158	0.0300	0.0197	-0.0138	-0.0223***	-0.0134	-0.0248***
	(0.00647)	(0.0171)	(0.0160)	(0.00762)	(0.00200)	(0.0206)	(0.00634)	(0.00971)	(0.0256)	(0.0253)	(0.0102)	(0.00726)	(0.0199)	(0.00861)
trade	0.00348	0.00391	0.00462	0.00505	0.00134	0.00540	0.00442*	0.00317	0.00283	0.0104*	0.00456	0.00570	0.00669*	0.00695**
	(0.00349)	(0.00353)	(0.00355)	(0.00389)	(0.00325)	(0.00395)	(0.00257)	(0.00333)	(0.00352)	(0.00571)	(0.00365)	(0.00361)	(0.00392)	(0.00355)
GFCF	0.00895	0.00731	-0.0120	0.00738	-0.0116	0.00974	-0.00135	0.00262	-0.00185	-0.00400	-0.00154	0.0111	0.0157	0.0108
	(0.0167)	(0.0105)	(0.0126)	(0.0158)	(0.0139)	(0.00786)	(0.0158)	(0.0262)	(0.0232)	(0.0208)	(0.0264)	(0.0185)	(0.0215)	(0.0167)
Compensation								-0.0492	-0.0376	-0.0601	-0.0626*	0.00225	-0.0186	-0.00931
								(0.0481)	(0.0456)	(0.0781)	(0.0349)	(0.0384)	(0.0486)	(0.0380)
R&D								-0.220	-0.144	-0.768	-0.162	-0.557	-0.282	-0.517
								(0.389)	(0.368)	(0.603)	(0.349)	(0.378)	(0.280)	(0.350)
crisis								-0.117	0.851	0.827**	0.269	0.176	0.175	-0.00418
								(0.334)	(0.522)	(0.382)	(0.430)	(0.573)	(0.544)	(0.514)
business_freedom								-0.00743	-0.00307	-0.00557	-0.00785	-0.0117	-0.0131	-0.0116
								(0.0173)	(0.0245)	(0.0259)	(0.0145)	(0.0132)	(0.0160)	(0.0106)
Expeduc	0.0186							0.0176						
	(0.0336)							(0.0385)						
Expsec		0.190*							0.204*					
		(0.102)							(0.110)					
Expupsec			0.453***							0.475***				
			(0.0778)							(0.0636)				
Expter				0.0155							0.0213			
				(0.166)							(0.195)			
GE_T					0.0367							-0.00211		
					(0.127)							(0.169)		
GE_sec						0.0623							0.133	
						(0.465)							(0.479)	
GE_tert							-0.529							-0.195
							(0.513)							(0.435)
Constant	-13.43***	-13.57***	-11.47***	-12.70***	-14.39***	-13.28***	-12.27***	-11.40***	-12.58***	-13.92***	-11.19***	-12.90***	-12.39***	-12.19***
	(3.508)	(3.373)	(3.451)	(3.615)	(1.879)	(4.145)	(2.874)	(3.183)	(3.841)	(3.846)	(3.387)	(2.999)	(4.022)	(3.458)
Observations	111	95	82	107	193	114	134	103	90	80	101	133	109	127
Number of Country	10	10	8	10	11	11	11	10	9	8	10	13	11	11
year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively.

Table 7A.Attainment, Completion ratios and Average Years of Schooling based on level of education

VARIABLES	(1) Total Sec	(2) Total tert	(3) Comple Sec	(4) Comple tert	(5) Comp Sec&Tert	(6) Avg years	(7) Avg sec	(8) Avg tert	(1) Total Sec	(2) Total tert	(3) Comple Sec	(4) Comple tert	(5) Comp Sec&Tert	(6) Avg years	(7) Avg sec	(8) Avg tert
logGDPcon	0.988***	0.891***	1.090***	0.902***	1.020***	0.972***	0.661***	0.896***	1.021***	0.975***	1.158***	0.963***	1.032***	0.813***	0.815***	0.971***
	(0.0743)	(0.0754)	(0.145)	(0.0720)	(0.146)	(0.168)	(0.196)	(0.0740)	(0.155)	(0.146)	(0.264)	(0.150)	(0.210)	(0.146)	(0.0956)	(0.149)
interest_rate	-0.0047***	-0.0048***	-0.0049***	-0.0047***	-0.0049***	-0.0047***	-0.0042***	-0.0048***	-0.00892	-0.0155	-0.0230***	-0.0184**	-0.0224***	-0.0176*	-0.0197**	-0.0167*
	(0.000707)	(0.000718)	(0.000768)	(0.000674)	(0.000872)	(0.000769)	(0.000786)	(0.000703)	(0.0134)	(0.0106)	(0.00790)	(0.00901)	(0.00804)	(0.00918)	(0.00793)	(0.00984)
trade	0.00472*	0.00331*	0.00573*	0.00321	0.00515*	0.00537	0.00270	0.00330	0.00622	0.00504	0.00332	0.00413	0.00348	0.000714	0.00221	0.00461
	(0.00263)	(0.00301)	(0.00328)	(0.00323)	(0.00304)	(0.00460)	(0.00326)	(0.00306)	(0.00441)	(0.00410)	(0.00336)	(0.00392)	(0.00334)	(0.00441)	(0.00225)	(0.00399)
GFCF	0.0140	-0.00553	0.0171	-0.00492	0.0140	0.00929	0.0101	-0.00548	0.0384*	0.0163	0.0275	0.0168	0.0199	0.00136	0.0183	0.0168
	(0.0148)	(0.0129)	(0.0158)	(0.0128)	(0.0170)	(0.0157)	(0.0181)	(0.0128)	(0.0205)	(0.0190)	(0.0178)	(0.0190)	(0.0193)	(0.0173)	(0.0176)	(0.0191)
Compensation									0.0494	0.0428	0.00518	0.0273	0.0111	0.0361	0.0185	0.0360
									(0.0394)	(0.0279)	(0.0568)	(0.0381)	(0.0508)	(0.0431)	(0.0501)	(0.0309)
R&D									-0.494	-0.732*	-0.498	-0.755*	-0.611	-1.098**	-0.648	-0.745*
									(0.480)	(0.422)	(0.483)	(0.433)	(0.466)	(0.496)	(0.452)	(0.425)
crisis									0.899	0.267	0.871	0.347	0.745	0.317	0.911	0.302
									(0.568)	(0.540)	(0.582)	(0.504)	(0.530)	(0.470)	(0.661)	(0.520)
business_freedom									0.000923	-0.00507	0.00382	-0.00434	0.00269	-0.00373	0.00374	-0.00485
									(0.00838)	(0.00846)	(0.00821)	(0.00795)	(0.00807)	(0.00718)	(0.0104)	(0.00824)
totalsec	-0.0226**								-0.0215							
	(0.0114)								(0.0175)							
totaltert		0.00616								0.0255						
		(0.0152)								(0.0287)						
complsectotal			-0.0274								-0.0264					
			(0.0170)								(0.0211)					
compltertotal				0.0170								0.0264				
				(0.0186)								(0.0350)				
complsectert					-0.0226*								-0.0142			
					(0.0176)								(0.0119)			
avgtotal						-0.164								0.275*		
						(0.236)								(0.142)		
avgsectotal							-0.457								-0.248	
							(0.396)								(0.314)	
avgtertotal								0.256								0.686
								(0.434)								(0.807)
Constant	-18.06***	-16.03***	-20.72***	-16.32***	-19.03***	-17.30***	-10.17**	-16.16***	-18.51***	-17.41***	-21.23***	-16.82***	-18.18***	-15.00***	-12.77***	-17.19***
	(1.587)	(1.621)	(3.203)	(1.553)	(3.203)	(2.972)	(5.110)	(1.585)	(4.325)	(4.035)	(6.490)	(4.122)	(5.321)	(3.398)	(3.195)	(4.100)
Observations	232	232	232	232	232	232	232	232	138	138	138	138	138	138	138	138
Number of Country	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively.

Table 8A.Labor force with secondary and tertiary level of education

VARIABLES	(1) Labor force second	(2) Labor force tert	(1) Labor force second	(2) Labor force tert
logGDPcon	0.885***	0.840***	1.000***	0.850***
	(0.0951)	(0.0810)	(0.246)	(0.132)
interest_rate	-0.00719***	-0.00761***	-0.0259***	-0.0214**
	(0.00252)	(0.00232)	(0.00774)	(0.00861)
trade	0.00302	0.00322	0.00649**	0.00656*
	(0.00243)	(0.00253)	(0.00280)	(0.00386)
GFCF	-0.0136	-0.0191	0.0151	0.00276
	(0.0191)	(0.0160)	(0.0244)	(0.0187)
Compensation			-0.00525	0.0161
			(0.0615)	(0.0360)
R&D			-0.572	-0.559
			(0.387)	(0.406)
crisis			0.473	0.561
			(0.471)	(0.598)
business_freedom			-0.00961	-0.00557
			(0.00955)	(0.00953)
LF_sec	-0.00510		-0.0141	
	(0.00820)		(0.0204)	
LF_tert		0.00162		0.00537
		(0.0115)		(0.0155)
Constant	-15.50***	-14.52***	-15.92***	-13.29***
	(2.241)	(2.232)	(4.852)	(3.501)
Observations	190	190	150	150
Number of Country	11	11	11	11
year dummies	YES	YES	YES	YES

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively.

Table 9A. PISA math, science, reading and overall score

VARIABLES	(1) PISA maths	(2) PISA science	(3) PISAreading	(4) PISA All	(1) PISA maths	(2) PISA science	(3) PISAreading	(4) PISA All
logGDPcon	0.940***	0.900***	0.915***	0.919***	0.992***	0.934***	0.946***	0.954***
	(0.169)	(0.171)	(0.158)	(0.167)	(0.116)	(0.141)	(0.136)	(0.131)
interest_rate	-0.0297***	-0.0238**	-0.0280***	-0.0277***	-0.0325***	-0.0272***	-0.0286***	-0.0299***
	(0.00842)	(0.0101)	(0.00673)	(0.00856)	(0.00436)	(0.00618)	(0.00524)	(0.00492)
trade	0.00623**	0.00465	0.00363	0.00495*	0.00318	0.00214	0.00116	0.00210
	(0.00272)	(0.00290)	(0.00286)	(0.00282)	(0.00317)	(0.00366)	(0.00360)	(0.00352)
GFCF	0.0290*	0.0230	0.0194	0.0237	0.0269	0.0217	0.0177	0.0212
	(0.0173)	(0.0148)	(0.0148)	(0.0156)	(0.0222)	(0.0219)	(0.0223)	(0.0221)
Compensation					-0.113**	-0.0993	-0.0796	-0.0956
					(0.0568)	(0.0695)	(0.0698)	(0.0656)
R&D					0.309	0.302	0.173	0.281
					(0.376)	(0.430)	(0.408)	(0.400)
crisis					0.204	0.277	0.347	0.267
					(0.373)	(0.417)	(0.379)	(0.392)
business_freedom					0.00221	-0.00371	-0.000420	-0.000379
					(0.0110)	(0.0134)	(0.0135)	(0.0129)
PISAmath	-0.0116**				-0.0148***			
	(0.00505)				(0.00309)			
PISAscience		-0.00852				-0.0112**		
		(0.00561)				(0.00460)		
PISAread			-0.00994**				-0.0109***	
			(0.00441)				(0.00370)	
PISAall				-0.0103**				-0.0127***
				(0.00511)				(0.00387)
Constant	-11.11***	-11.29***	-10.84***	-10.93***	-9.937***	-9.628**	-10.31***	-9.720***
	(3.192)	(4.262)	(3.294)	(3.479)	(2.941)	(3.919)	(3.311)	(3.267)
Observations	99	99	99	99	99	99	99	99
Number of Country	11	11	11	11	11	11	11	11

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively.

Table 10A. Vocational and General Education based on level of education

VARIABLES	(1) Secondary Vocational	(2) Upper secondary Vocational	(3) Tertiary Vocational	(4) Secondary General	(5) Upper Secondary General	(6) Tertiary general	(1) Secondary Vocational	(2) Upper secondary Vocational	(3) Tertiary Vocational	(4) Secondary General	(5) Upper Secondary General	(6) Tertiary general
logGDPcon	0.766***	0.724***	0.730***	0.900***	0.806***	0.782***	0.803***	0.805***	0.802***	0.887***	0.860***	0.852***
	(0.0634)	(0.0788)	(0.142)	(0.0792)	(0.103)	(0.103)	(0.0814)	(0.0795)	(0.158)	(0.126)	(0.123)	(0.142)
interest_rate	-0.0046***	-0.00865**	-0.00789**	-0.0045***	-0.0111**	-0.0169*	-0.0116*	-0.0158**	-0.0194***	-0.0168**	-0.0207***	-0.0274***
	(0.000860)	(0.00419)	(0.00361)	(0.000638)	(0.00499)	(0.00921)	(0.00683)	(0.00655)	(0.00484)	(0.00683)	(0.00734)	(0.00908)
trade	0.00889***	0.00994***	0.00356	0.00460	0.00418	0.00267	0.0144***	0.0141***	0.00832	0.00699**	0.00780**	0.00645*
	(0.00233)	(0.00360)	(0.00388)	(0.00313)	(0.00335)	(0.00269)	(0.00389)	(0.00391)	(0.00509)	(0.00339)	(0.00365)	(0.00374)
GFCF	-0.0109	-0.00883	-0.0188	-0.00572	-0.0121	-0.0104	0.000135	0.00749	-0.00786	0.00249	0.00963	0.00836
	(0.0120)	(0.0139)	(0.0184)	(0.0121)	(0.0164)	(0.0163)	(0.0146)	(0.0155)	(0.0236)	(0.0202)	(0.0213)	(0.0210)
Compensation							-0.0185	-0.0225	-0.0539	0.00547	0.000216	-0.0109
							(0.0329)	(0.0304)	(0.0439)	(0.0456)	(0.0455)	(0.0390)
R&D							-0.712**	-0.726**	-0.878**	-0.521	-0.567	-0.777*
							(0.315)	(0.328)	(0.428)	(0.343)	(0.358)	(0.453)
crisis							0.949**	0.238	1.280*	0.666	0.328	0.759
							(0.416)	(0.320)	(0.760)	(0.438)	(0.464)	(0.601)
business_freedom							0.000485	-0.000252	-0.0170**	-0.00703	-0.0108	-0.00940
							(0.00669)	(0.00901)	(0.00806)	(0.00784)	(0.00971)	(0.00727)
enrsecvoc	11.64**						15.26***					
	(5.053)						(5.112)					
enrupsecvoc		12.24*						14.18**				
		(7.066)						(5.528)				
enrtertvoc			-67.63						-22.63			
			(140.2)						(113.3)			
enrgensec				3.216*						1.803		
				(2.806)						(2.078)		
enrupgensec					4.160						2.384	
					(6.883)						(5.276)	
enrtertgen						-20.27						-21.75
						(31.59)						(29.00)
Constant	-13.90***	-11.70***	-10.51***	-16.64***	-12.67***	-11.61***	-14.36***	-13.61***	-10.77**	-14.57***	-13.34***	-12.73***
	(1.640)	(1.946)	(3.822)	(2.125)	(2.744)	(2.449)	(2.417)	(2.353)	(4.314)	(3.598)	(3.325)	(3.612)
Observations	218	155	116	219	155	128	148	139	111	148	139	125
Number of Country	11	11	11	11	11	11	11	11	11	11	11	11
year dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively.

Tables A 5 or 3 year averages - EU-15

Table 1B.Government expenditure on education as % of total government expenditures and as % of GDP

VARIABLES	(1) Expeduc	(2) Expseceduc	(3) Expsecupeduc	(4) Exptertеduc	(5) GE educ	(6) GE sec	(7) GE tert	(1) Expeduc	(2) Expseceduc	(3) Expsecupeduc	(4) Exptertеduc	(5) GE educ	(6) GE sec	(7) GE tert
logGDPcon	1.228***	0.917***	1.194***	1.335***	1.241***	1.145***	1.340***	1.224***	1.003***	1.264***	0.898***	1.183***	1.166***	1.145***
	(0.161)	(0.141)	(0.144)	(0.257)	(0.226)	(0.167)	(0.228)	(0.197)	(0.159)	(0.152)	(0.283)	(0.197)	(0.203)	(0.277)
interest_rate	0.00696	-0.0133	-0.0999**	-0.0204	-0.113***	-0.0334	-0.0289	0.0644	0.0631	-0.129*	-0.00575	-0.0186	0.0183	0.00344
	(0.0448)	(0.0399)	(0.0431)	(0.0348)	(0.0437)	(0.0356)	(0.0361)	(0.0599)	(0.0446)	(0.0767)	(0.0413)	(0.0430)	(0.0568)	(0.0480)
Trade	0.0184***	0.0196***	0.0190***	0.0201***	0.0212***	0.0212***	0.0209***	0.0189***	0.0195***	0.0196***	0.0193***	0.0195***	0.0196***	0.0187***
	(0.00436)	(0.00362)	(0.00377)	(0.00632)	(0.00601)	(0.00418)	(0.00580)	(0.00358)	(0.00211)	(0.00340)	(0.00434)	(0.00502)	(0.00409)	(0.00514)
GFCF	0.0332	-0.00640	0.119	0.0461	-0.00423	0.0822	0.0820	0.0525	0.0318	0.109	0.00566	0.0793	0.0961	0.0818
	(0.0712)	(0.0830)	(0.0774)	(0.0950)	(0.0744)	(0.0783)	(0.0771)	(0.0707)	(0.0715)	(0.0672)	(0.0920)	(0.0737)	(0.0723)	(0.0791)
R&D								0.246**	0.303***	0.221***	0.546***	0.280*	0.201	0.340*
								(0.117)	(0.0925)	(0.0712)	(0.129)	(0.156)	(0.155)	(0.175)
Compensation								0.130	0.144*	0.0471	0.108	0.0544	0.110	0.0968
								(0.0897)	(0.0830)	(0.0767)	(0.0885)	(0.0900)	(0.0917)	(0.0850)
crisis								0.211	0.297	-0.980	-0.762	-0.588	-0.446	-0.466
								(0.622)	(0.640)	(0.750)	(0.612)	(0.400)	(0.429)	(0.470)
business_freedom								0.00149	0.00961	0.0105	0.0400***	0.0185	0.0187	0.0206
								(0.0162)	(0.0125)	(0.0141)	(0.0124)	(0.0128)	(0.0137)	(0.0145)
Expeduc	0.295***							0.234**						
	(0.0680)							(0.113)						
Expsec		0.573***							0.450***					
		(0.0983)							(0.143)					
Expupsec			0.954***							0.811***				
			(0.265)							(0.259)				
Expter				0.460**							-0.323			
				(0.182)							(0.304)			
GE_T					-0.0110							0.0739		
					(0.159)							(0.0857)		
GE_sec						0.656**							0.452	
						(0.272)							(0.320)	
GE_tert							0.694**							-0.0445
							(0.312)							(0.396)
Constant	-29.54***	-19.54***	-28.98***	-30.59***	-25.18***	-26.41***	-31.15***	-31.46***	-25.37***	-31.79***	-20.84**	-28.66***	-29.87***	-28.04***
	(5.859)	(5.302)	(5.477)	(8.861)	(7.377)	(5.325)	(7.579)	(6.974)	(5.664)	(5.630)	(9.703)	(6.318)	(6.646)	(8.875)
Observations	31	31	25	31	69	33	33	31	31	25	31	34	33	33
Number of Country	13	13	11	13	14	14	14	13	13	11	13	14	14	14

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively. Data 5year averaged

Table 2B.Attainment, Completion ratios and Average Years of Schooling based on level of education

VARIABLES	(1) Total Sec	(2) Total Tert	(3) Completed Sec	(4) Completed Tert	(5) Completed Sec&Ter	(6) Avg Years	(7) Avg Secondary	(8) Avg Tert	(1) Total Sec	(2) Total Tert	(3) Completed Sec	(4) Completed Tert	(5) Completed Sec&Ter	(6) Avg Years	(7) Avg Secondary	(8) Avg Tert
logGDPcon	1.257***	1.109***	1.282***	1.117***	1.258***	1.237***	1.218***	1.106***	1.197***	1.175***	1.181***	1.183***	1.185***	1.174***	1.181***	1.179***
	(0.222)	(0.174)	(0.211)	(0.190)	(0.209)	(0.227)	(0.205)	(0.178)	(0.178)	(0.160)	(0.154)	(0.163)	(0.163)	(0.155)	(0.172)	(0.162)
interest_rate	-0.0780	-0.0299	-0.0815*	-0.0618*	-0.0705*	-0.0565	-0.0477	-0.0423	-0.0137	-0.0150	-0.0198	-0.0399	-0.0168	-0.0235	-0.0171	-0.0277
	(0.0484)	(0.0415)	(0.0457)	(0.0325)	(0.0412)	(0.0432)	(0.0436)	(0.0371)	(0.0368)	(0.0344)	(0.0372)	(0.0413)	(0.0373)	(0.0340)	(0.0371)	(0.0373)
Trade	0.0205***	0.00692	0.0218***	0.00740	0.0185***	0.0181***	0.0199***	0.00659	0.0203***	0.0158***	0.0198***	0.0164**	0.0195***	0.0184***	0.0196***	0.0159***
	(0.00640)	(0.00474)	(0.00640)	(0.00549)	(0.00636)	(0.00574)	(0.00597)	(0.00466)	(0.00518)	(0.00533)	(0.00526)	(0.00637)	(0.00559)	(0.00586)	(0.00521)	(0.00579)
GFCF	0.00811	-0.00736	-0.0131	-0.0127	-0.0103	0.00574	0.00874	-0.00901	0.0681	0.0693	0.0712	0.0699	0.0729	0.0662	0.0734	0.0696
	(0.0789)	(0.0520)	(0.0741)	(0.0590)	(0.0717)	(0.0696)	(0.0728)	(0.0545)	(0.0732)	(0.0549)	(0.0726)	(0.0603)	(0.0740)	(0.0697)	(0.0731)	(0.0564)
R&D									0.371**	0.233	0.387**	0.331**	0.352**	0.365***	0.350**	0.278*
									(0.144)	(0.159)	(0.157)	(0.152)	(0.167)	(0.131)	(0.166)	(0.161)
Compensation									0.0681	0.0506	0.0546	0.0271	0.0583	0.0397	0.0562	0.0378
									(0.0850)	(0.0940)	(0.0813)	(0.0966)	(0.0822)	(0.0911)	(0.0850)	(0.0963)
crisis									-0.549	-0.760*	-0.512	-0.805**	-0.630	-0.764*	-0.631	-0.788**
									(0.479)	(0.389)	(0.528)	(0.392)	(0.494)	(0.407)	(0.491)	(0.388)
business_freedom									0.0199*	0.0142	0.0204*	0.0184	0.0205*	0.0222*	0.0206*	0.0157
									(0.0109)	(0.0126)	(0.0115)	(0.0115)	(0.0117)	(0.0121)	(0.0114)	(0.0119)
totalsec5	0.0358								-0.00554							
	(0.0240)								(0.00932)							
totaltert5		0.155***								0.0525**						
		(0.0313)								(0.0239)						
complsec5			0.0325								-0.00448					
			(0.0232)								(0.00918)					
compltert5				0.192***								0.0516*				
				(0.0402)								(0.0377)				
Sec&Tert5					0.0358*								0.00122			
					(0.0189)								(0.00874)			
avgtotal15						0.373***								0.0889		
						(0.123)								(0.115)		
avgsec5							0.630***								0.0235	
							(0.225)								(0.172)	
avgtert5								4.433***								1.387*
								(0.867)								(0.729)
Constant	-27.95***	-23.74***	-27.38***	-23.00***	-27.08***	-29.10***	-27.67***	-23.31***	-28.62***	-28.03***	-28.25***	-28.04***	-28.57***	-28.75***	-28.49***	-27.99***
	(7.402)	(5.230)	(6.937)	(6.017)	(6.776)	(7.700)	(6.561)	(5.497)	(5.727)	(5.193)	(5.289)	(5.479)	(5.528)	(5.472)	(5.586)	(5.337)
Observations	74	74	74	74	74	74	74	74	35	35	35	35	35	35	35	35
Number of Country	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively. Data 5year averaged.

Table 3B. Labor force with secondary and tertiary level of education

VARIABLES	(1) Labor force second	(2) Labor force tert	(1) Labor force second	(2) Labor force tert
logGDPcon	1.061***	0.956***	1.195***	1.146***
	(0.200)	(0.176)	(0.140)	(0.145)
interest_rate	-0.0439	-0.0229	-0.00639	-0.0393
	(0.0382)	(0.0227)	(0.0305)	(0.0308)
Trade	0.0212***	0.0131***	0.0194***	0.0154***
	(0.00557)	(0.00410)	(0.00438)	(0.00407)
GFCF	0.0337	0.0412	0.0690	0.0678
	(0.0733)	(0.0588)	(0.0684)	(0.0462)
R&D			0.519***	0.237*
			(0.141)	(0.137)
Compensation			0.0866	0.00256
			(0.0832)	(0.100)
crisis			-0.476	-0.924**
			(0.457)	(0.365)
business_freedom			0.0187*	0.0169
			(0.0113)	(0.0118)
LF_sec	-0.00468		-0.0204**	
	(0.0105)		(0.00985)	
LF_tert		0.0646***		0.0493***
		(0.0104)		(0.0166)
Constant	-21.36***	-19.92***	-28.35***	-27.00***
	(6.623)	(5.857)	(4.954)	(4.829)
Observations	45	45	35	35
Number of Country	14	14	14	14

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively. Data 5year averaged

Table 4B.PISA math, science, reading and overall score

VARIABLES	(1) RE PISA Maths	(2) RE PISA reading	(3) RE PISA science	(4) RE PISA All	(1) RE PISA Maths	(2) RE PISA reading	(3) RE PISA science	(4) RE PISA All
logGDPcon	1.425***	1.475***	1.419***	1.442***	1.660***	1.745***	1.740***	1.733***
	(0.337)	(0.395)	(0.404)	(0.382)	(0.295)	(0.362)	(0.367)	(0.370)
interest_rate	0.0750*	0.0801*	0.0848*	0.0851*	0.00337	0.0273	0.00821	0.0234
	(0.0446)	(0.0435)	(0.0445)	(0.0446)	(0.0641)	(0.0619)	(0.0623)	(0.0610)
Trade	0.0218***	0.0222***	0.0234***	0.0226***	0.0256***	0.0278***	0.0288***	0.0288***
	(0.00578)	(0.00648)	(0.00796)	(0.00662)	(0.00501)	(0.00596)	(0.00593)	(0.00601)
GFCF	0.220*	0.225*	0.231*	0.229*	0.189*	0.251**	0.246**	0.248**
	(0.128)	(0.125)	(0.120)	(0.125)	(0.111)	(0.125)	(0.116)	(0.121)
R&D					0.441***	0.537*	0.643**	0.613**
					(0.170)	(0.275)	(0.291)	(0.272)
Compensation					-0.131	0.208	0.165	0.180
					(0.527)	(0.695)	(0.672)	(0.679)
crisis					-0.814*	-0.607	-0.675*	-0.632
					(0.430)	(0.465)	(0.407)	(0.435)
business_freedom					0.0316	0.0164	0.0194	0.0168
					(0.0260)	(0.0251)	(0.0225)	(0.0247)
PISA_math	0.00809				-0.000666			
	(0.00957)				(0.00407)			
PISA_read		0.00890				0.000788		
		(0.0130)				(0.00729)		
PISA_science			0.0007*				0.00997*	
			(0.00735)				(0.00741)	
PISAall				0.00663				-0.00525
				(0.0113)				(0.00700)
Constant	-40.25***	-42.20***	-36.44***	-40.30***	-43.41***	-50.73***	-45.00**	-47.23**
	(13.48)	(16.16)	(13.81)	(15.27)	(14.99)	(17.74)	(18.41)	(18.70)
Observations	37	37	37	37	34	34	34	34
Number of Country	12	12	12	12	12	12	12	12

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively. Data 3year averaged

Table 5B. Vocational and General Education based on level of education

VARIABLES	(1) Secondary Vocational	(2) Upper secondary Vocational	(3) Tertiary Vocational	(4) Secondary General	(5) Upper Secondary General	(6) Tertiary general	(1) Secondary Vocational	(2) Upper secondary Vocational	(3) Tertiary Vocational	(4) Secondary General	(5) Upper Secondary General	(6) Tertiary general
logGDPcon	1.548***	1.218***	0.768***	1.351***	1.201***	1.238***	1.210***	1.175***	0.931***	1.230***	1.209***	1.274***
	(0.241)	(0.402)	(0.266)	(0.338)	(0.327)	(0.333)	(0.169)	(0.321)	(0.283)	(0.178)	(0.228)	(0.243)
interest_rate	0.0103	0.0329	0.146***	0.00117	0.0227	0.110***	-0.0412	-0.0849	0.00837	-0.00815	-0.0207	0.0254
	(0.0400)	(0.0466)	(0.0448)	(0.0423)	(0.0403)	(0.0410)	(0.0569)	(0.0602)	(0.107)	(0.0553)	(0.0575)	(0.0647)
Trade	0.0323***	0.0158*	0.0105**	0.0374***	0.0166***	0.0148**	0.0181***	0.0206***	0.0153**	0.0214***	0.0226***	0.0211***
	(0.00840)	(0.00907)	(0.00430)	(0.00750)	(0.00638)	(0.00664)	(0.00521)	(0.00400)	(0.00693)	(0.00476)	(0.00504)	(0.00402)
GFCF	0.00165	0.178	0.0626	0.0301	0.186*	0.175	0.0881	0.0823	0.0285	0.0839	0.0381	0.0467
	(0.0413)	(0.122)	(0.102)	(0.0377)	(0.102)	(0.117)	(0.0711)	(0.0953)	(0.125)	(0.0723)	(0.0743)	(0.0996)
R&D							0.412**	0.0989	0.215	0.379**	0.263	0.309*
							(0.209)	(0.289)	(0.285)	(0.170)	(0.179)	(0.183)
Compensation							0.000614	0.0565	-0.0950	0.0451	0.0494	-0.159
							(0.0895)	(0.147)	(0.213)	(0.0731)	(0.0954)	(0.269)
crisis							-0.536	-1.291***	-0.695	-0.464	-1.000***	-0.996***
							(0.350)	(0.312)	(0.528)	(0.301)	(0.311)	(0.293)
business_freedom							0.0256	0.0658**	0.0256	0.0111	0.0442**	0.0483**
							(0.0178)	(0.0292)	(0.0304)	(0.0133)	(0.0197)	(0.0202)
enrsecvoc	-2.088						-0.277					
	(1.904)						(1.623)					
enrupsecvoc		1.872						2.972**				
		(2.497)						(1.923)				
enrtertvoc			4.394						75.26***			
			(70.15)						(59.73)			
enrgensec				0.913**						0.00627		
				(0.384)						(0.462)		
enrupgensec					2.688*						3.049***	
					(1.611)						(1.094)	
enrtertgen						-6.433						5.299
						(8.094)						(5.444)
Constant	-35.05***	-29.25**	-14.30**	-31.21***	-29.04***	-29.78***	-29.19***	-31.20***	-19.01*	-29.39***	-30.31***	-30.46***
	(6.648)	(12.82)	(7.270)	(9.030)	(10.41)	(10.56)	(5.813)	(11.33)	(10.09)	(5.990)	(8.421)	(10.65)
Observations	227	110	87	239	122	111	49	36	29	53	40	37
Number of Country	14	13	12	14	14	14	14	13	12	14	14	14

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively. Data 3year averaged.

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Table 6B.Government expenditure on education as % of total government expenditures and as % of GDP

VARIABLES	(1) Expeduc	(2) Expseceduc	(3) Expsecupeduc	(4) Exptereduc	(5) GE educ	(6) GE sec	(7) GE tert	(1) Expeduc	(2) Expseceduc	(3) Expsecupeduc	(4) Exptereduc	(5) GE educ	(6) GE sec	(7) GE tert
logGDPcon	0.843***	0.883***	0.751***	0.819***	1.237***	0.939***	0.872***	0.793***	0.824***	0.833***	0.818***	0.860***	0.814***	0.798***
	(0.124)	(0.117)	(0.176)	(0.134)	(0.0889)	(0.0967)	(0.0688)	(0.118)	(0.105)	(0.184)	(0.103)	(0.138)	(0.146)	(0.153)
interest_rate	-0.0141	-0.00836	-0.0155	-0.0127	-0.0137***	-0.0117***	-0.0115***	-0.00251	0.00692	-0.00171	-0.00568	-0.00853	-0.00782	-0.00858
	(0.0107)	(0.0120)	(0.0161)	(0.0104)	(0.00377)	(0.00301)	(0.00354)	(0.0151)	(0.0207)	(0.0195)	(0.0139)	(0.0141)	(0.0157)	(0.0134)
Trade	0.00828**	0.00834*	0.00393	0.00841**	0.0113***	0.00491	0.00524**	0.00674	0.00485	0.0119	0.00823**	0.00650	0.00664	0.00652
	(0.00381)	(0.00427)	(0.00467)	(0.00411)	(0.00372)	(0.00344)	(0.00262)	(0.00483)	(0.00458)	(0.00919)	(0.00404)	(0.00424)	(0.00496)	(0.00422)
GFCF	0.00418	0.000681	-0.0127	0.00254	-0.0202	-0.0182	-0.0137	-0.0129	-0.0207	-0.00732	-0.0143	0.0407	0.0204	0.0377
	(0.0432)	(0.0375)	(0.0341)	(0.0391)	(0.0315)	(0.0308)	(0.0343)	(0.0491)	(0.0418)	(0.0323)	(0.0455)	(0.0306)	(0.0398)	(0.0338)
R&D								-0.452*	-0.565**	-1.129**	-0.694***	-0.601**	-0.376*	-0.655**
								(0.251)	(0.274)	(0.514)	(0.217)	(0.306)	(0.229)	(0.306)
Compensation								0.00155	-0.0158	0.0163	-0.00362	0.0502	0.0524	0.0561
								(0.0384)	(0.0376)	(0.0897)	(0.0395)	(0.0446)	(0.0571)	(0.0455)
crisis								0.974**	1.250***	0.865**	0.778	0.829**	0.724	0.699**
								(0.488)	(0.418)	(0.356)	(0.479)	(0.332)	(0.496)	(0.343)
business_freedom								-0.00833	-0.00553	-0.0104	-0.00251	-0.0265*	-0.0261	-0.0229
								(0.0186)	(0.0165)	(0.0320)	(0.0214)	(0.0161)	(0.0172)	(0.0143)
Expeduc	0.0351							0.0461						
	(0.0483)							(0.0474)						
Expsec		0.166*							0.226**					
		(0.164)							(0.0921)					
Expupsec			0.552***							0.618***				
			(0.134)							(0.104)				
Expter				0.209							0.326			
				(0.235)							(0.248)			
GE_T					0.322							0.247		
					(0.209)							(0.206)		
GE_sec						0.338							0.287	
						(0.430)							(0.369)	
GE_tert							0.545							0.728
							(0.714)							(0.738)
Constant	-14.32***	-15.70***	-12.02**	-13.79***	-25.08***	-16.11***	-14.48***	-12.05***	-13.10***	-14.18***	-13.10***	-14.62***	-12.54***	-12.80***
	(3.400)	(3.115)	(4.891)	(3.662)	(2.405)	(2.731)	(2.137)	(3.721)	(3.110)	(4.685)	(3.544)	(3.654)	(3.759)	(4.545)
Observations	33	32	26	33	56	39	44	31	30	25	31	39	35	39
Number of Country	10	10	8	10	11	11	11	10	10	8	10	11	11	11

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively. Data 5year averaged.

Table 7B. Attainment, Completion ratios and Average Years of Schooling based on level of education

VARIABLES	(1) Total Sec	(2) Total Tert	(3) Completed Sec	(4) Completed Tert	(5) Completed Sec&Ter	(6) Avg Years	(7) Avg Secondary	(8) Avg Tert	(1) Total Sec	(2) Total Tert	(3) Completed Sec	(4) Completed Tert	(5) Completed Sec&Ter	(6) Avg Years	(7) Avg Secondary	(8) Avg Tert
logGDPcon	1.129***	1.160***	1.308***	1.177***	1.183***	0.888***	1.212***	1.165***	0.887***	0.766***	1.180***	0.778***	1.067***	0.732***	0.589***	0.770***
	(0.147)	(0.0872)	(0.260)	(0.108)	(0.230)	(0.213)	(0.0733)	(0.0950)	(0.154)	(0.200)	(0.153)	(0.211)	(0.152)	(0.213)	(0.220)	(0.206)
interest_rate	-0.0218***	-0.0203***	-0.0226***	-0.0201***	-0.0222***	-0.0203***	-0.0205***	-0.0202***	-0.00825	-0.0107	-0.0236*	-0.00961	-0.0236*	-0.00997	-0.0189	-0.0101
	(0.00803)	(0.00756)	(0.00817)	(0.00767)	(0.00813)	(0.00731)	(0.00771)	(0.00760)	(0.0141)	(0.0143)	(0.0132)	(0.0142)	(0.0127)	(0.0133)	(0.0115)	(0.0143)
Trade	0.0100**	0.00876**	0.0135**	0.00821*	0.0111**	0.00406	0.00640*	0.00844*	0.00935**	0.00622	0.00859**	0.00538	0.00810*	0.00621	0.00513	0.00589
	(0.00438)	(0.00424)	(0.00558)	(0.00456)	(0.00532)	(0.00552)	(0.00334)	(0.00440)	(0.00416)	(0.00434)	(0.00419)	(0.00424)	(0.00416)	(0.00590)	(0.00412)	(0.00426)
GFCF	-0.0683	-0.0622	-0.0543	-0.0545	-0.0646	0.0796*	-0.0626	-0.0591	0.0448	0.0330	0.0429	0.0369	0.0387	0.0260	0.0357	0.0344
	(0.0450)	(0.0445)	(0.0383)	(0.0453)	(0.0401)	(0.0413)	(0.0419)	(0.0448)	(0.0377)	(0.0411)	(0.0323)	(0.0427)	(0.0338)	(0.0451)	(0.0378)	(0.0420)
R&D									-0.480***	-0.561**	-0.400*	-0.571**	-0.391*	-0.635***	-0.453**	-0.566**
									(0.164)	(0.247)	(0.206)	(0.236)	(0.224)	(0.230)	(0.224)	(0.241)
Compensation									0.0612	0.0559	0.0207	0.0551	0.0240	0.0616	0.0506	0.0570
									(0.0518)	(0.0588)	(0.0622)	(0.0516)	(0.0686)	(0.0456)	(0.0579)	(0.0556)
crisis									0.999**	0.842	1.058**	0.792	1.247***	0.735*	1.551**	0.818
									(0.496)	(0.635)	(0.430)	(0.559)	(0.474)	(0.407)	(0.761)	(0.607)
business_freedom									-0.0196*	-0.0225*	-0.0151**	-0.0244*	-0.0133**	-0.0232*	-0.0155*	-0.0232*
									(0.0104)	(0.0120)	(0.00595)	(0.0126)	(0.00622)	(0.0128)	(0.00878)	(0.0122)
totalsec5	0.00766								-0.0231**							
	(0.0127)								(0.0115)							
totaltert5		0.0503***								0.00269						
		(0.0159)								(0.0336)						
complsec5			-0.0123								-0.0447***					
			(0.0186)								(0.0151)					
compltert5				0.0766***								0.0241				
				(0.0248)								(0.0396)				
Sec&Tert5					0.00197								-0.0370***			
					(0.0159)								(0.0129)			
avgtotal15						0.338								0.0914		
						(0.209)								(0.229)		
avgsec5							0.408***								-0.447	
							(0.135)								(0.324)	
avgtert5								1.561***								0.255
								(0.478)								(0.943)
Constant	-20.00***	-21.02***	-24.09***	-21.55***	-21.14***	-16.28***	-22.70***	-21.20***	-13.71***	-11.29*	-20.22***	-11.64*	-17.49***	-11.16**	-5.882	-11.44*
	(3.261)	(2.308)	(5.811)	(2.881)	(4.835)	(4.116)	(1.963)	(2.532)	(5.026)	(6.603)	(4.039)	(6.814)	(3.935)	(5.322)	(7.410)	(6.758)
Observations	58	58	58	58	58	58	58	58	39	39	39	39	39	39	39	39
Number of Country	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively. Data 5year averaged.

Table 8B. Labor force with secondary and tertiary level of education

VARIABLES	(1) Labor force second	(2) Labor force tert	(1) Labor force second	(2) Labor force tert
logGDPcon	0.915***	0.967***	0.756**	0.633***
	(0.194)	(0.136)	(0.343)	(0.222)
interest_rate	-0.0146***	-0.0151***	-0.0109	-0.0150
	(0.00292)	(0.00288)	(0.0115)	(0.0131)
Trade	0.0123***	0.0126***	0.00623	0.00339
	(0.00393)	(0.00344)	(0.00385)	(0.00542)
GFCF	-0.00731	-0.00685	0.0325	0.0354
	(0.0400)	(0.0327)	(0.0450)	(0.0388)
R&D			-0.557**	-0.457
			(0.243)	(0.291)
Compensation			0.0558	0.0279
			(0.0676)	(0.0735)
crisis			0.865**	1.368**
			(0.430)	(0.660)
business_freedom			-0.0221*	-0.0209*
			(0.0127)	(0.0119)
LF_sec	-0.0122		0.000608	
	(0.0168)		(0.0242)	
LF_tert		0.0138		-0.0296
		(0.0250)		(0.0233)
Constant	-16.76***	-17.07***	-11.08	-7.163
	(4.595)	(3.645)	(8.136)	(7.374)
Observations	51	51	39	39
Number of Country	11	11	11	11

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively. Data 5year averaged.

Table 9B.PISA math, science, reading and overall score

VARIABLES	(1) PISA Maths	(2) PISA reading	(3) PISA science	(4) PISA All	(1) PISA Maths	(2) PISA reading	(3) PISA science	(4) PISA All
logGDPcon	0.971***	1.032***	0.952***	0.988***	0.997***	1.032***	0.960***	1.002***
	(0.152)	(0.159)	(0.156)	(0.160)	(0.161)	(0.169)	(0.164)	(0.166)
interest_rate	-0.0235***	-0.0202***	-0.0174***	-0.0204***	-0.0235***	-0.0174***	-0.0170***	-0.0192***
	(0.00390)	(0.00388)	(0.00332)	(0.00382)	(0.00436)	(0.00600)	(0.00386)	(0.00484)
Trade	0.00756**	0.00765**	0.00716**	0.00761**	0.00804*	0.00604	0.00692*	0.00708*
	(0.00367)	(0.00344)	(0.00354)	(0.00361)	(0.00419)	(0.00373)	(0.00410)	(0.00405)
GFCF	0.0608***	0.0532***	0.0597***	0.0583***	0.0595***	0.0551***	0.0614***	0.0585***
	(0.0131)	(0.0147)	(0.0139)	(0.0132)	(0.0170)	(0.0199)	(0.0190)	(0.0181)
R&D					0.0156	0.0809	0.0614	0.106
					(0.318)	(0.354)	(0.349)	(0.332)
Compensation					-0.0127	-0.00853	-0.0115	-0.0123
					(0.0563)	(0.0467)	(0.0513)	(0.0516)
crisis					-0.0425	0.111	0.0170	0.0125
					(0.304)	(0.283)	(0.325)	(0.307)
business_freedom					0.00219	0.00546	-0.000693	0.00345
					(0.0115)	(0.0163)	(0.0149)	(0.0142)
PISA_math	-0.0155***				-0.0167***			
	(0.00437)				(0.00510)			
PISA_read		-0.0150***				-0.0173***		
		(0.00345)				(0.00474)		
PISA_science			-0.0119***				-0.0127***	
			(0.00406)				(0.00435)	
PISAall				-0.0153***				-0.0172***
				(0.00397)				(0.00419)
Constant	-10.97***	-12.63***	-12.12***	-11.41***	-11.11***	-11.85***	-11.84**	-11.04**
	(3.439)	(3.343)	(4.027)	(3.508)	(4.212)	(4.395)	(4.704)	(4.365)
Observations	41	41	41	41	41	41	41	41
Number of Country	11	11	11	11	11	11	11	11

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively. Data 3year averaged.

Table 10B.Vocational and General Education based on level of education

VARIABLES	(1) Secondary Vocational	(2) Upper secondary Vocational	(3) Tertiary Vocational	(4) Secondary General	(5) Upper Secondary General	(6) Tertiary general	(1) Secondary Vocational	(2) Upper secondary Vocational	(3) Tertiary Vocational	(4) Secondary General	(5) Upper Secondary General	(6) Tertiary general
logGDPcon	1.254***	0.990***	1.032***	1.200***	1.101***	1.130***	0.845***	0.840***	0.867***	0.861***	0.866***	0.864***
	(0.138)	(0.123)	(0.174)	(0.136)	(0.142)	(0.120)	(0.107)	(0.107)	(0.186)	(0.168)	(0.161)	(0.157)
interest_rate	-0.0174***	-0.0194**	-0.0269***	-0.0173***	-0.0168**	-0.0193**	-0.0237***	-0.0240***	-0.0331***	-0.0234***	-0.0223***	-0.0257***
	(0.00225)	(0.00929)	(0.00809)	(0.00231)	(0.00833)	(0.00853)	(0.00674)	(0.00660)	(0.00668)	(0.00528)	(0.00547)	(0.00511)
Trade	0.0117**	0.00680**	0.00858***	0.0119***	0.00716**	0.00849**	0.0130***	0.0129***	0.00586	0.00584	0.00586	0.00528
	(0.00455)	(0.00328)	(0.00320)	(0.00389)	(0.00359)	(0.00342)	(0.00499)	(0.00491)	(0.00483)	(0.00407)	(0.00431)	(0.00390)
GFCF	-0.0277	0.0426	0.0517**	-0.0268	0.0409	0.0392	0.0308	0.0306	0.0464	0.0435	0.0431	0.0426
	(0.0328)	(0.0281)	(0.0237)	(0.0312)	(0.0298)	(0.0274)	(0.0239)	(0.0240)	(0.0297)	(0.0275)	(0.0285)	(0.0273)
R&D							-0.692**	-0.689**	-0.400	-0.218	-0.138	-0.191
							(0.347)	(0.348)	(0.373)	(0.308)	(0.268)	(0.350)
Compensation							0.0160	0.0160	0.0466	0.0433	0.0348	0.0430
							(0.0381)	(0.0381)	(0.0360)	(0.0428)	(0.0520)	(0.0441)
crisis							0.317*	0.325*	0.346***	0.323	0.328*	0.300
							(0.177)	(0.175)	(0.0958)	(0.224)	(0.189)	(0.217)
business_freedom							-0.0105	-0.0105	-0.0110	-0.00819	-0.00847	-0.00872
							(0.0105)	(0.0103)	(0.0107)	(0.0118)	(0.0128)	(0.0112)
enrsecvoc	-0.156						9.120*					
	(6.117)						(5.241)					
enrupsecvoc		1.334*						9.338*				
		(4.750)						(5.173)				
enrtertvoc			-322.6***						-171.0*			
			(98.05)						(92.37)			
enrgensec				1.694						-0.0212		
				(2.294)						(2.688)		
enrupgensec					11.26*						6.852	
					(15.66)						(10.10)	
enrtertgen						-17.84						-15.57
						(19.50)						(26.68)
Constant	-23.76***	-18.36***	-19.38***	-22.71***	-21.50***	-21.71***	-14.39***	-14.27***	-14.36***	-14.72***	-15.09***	-14.57***
	(3.249)	(3.232)	(4.529)	(3.590)	(3.657)	(3.328)	(3.231)	(3.197)	(5.127)	(4.911)	(4.577)	(4.496)
Observations	259	184	163	259	184	174	56	56	51	56	56	56
Number of Country	11	11	11	11	11	11	11	11	11	11	11	11

Notes: Robust standard errors reported in parenthesis. *, **, *** Significant at the 10%, 5% and 1% levels respectively. Data 3year averaged.

APPENDIX B

Figure 1: Trend in FDI Inflows (in logarithm) from 1980-2014 in Western and CEE EU countries

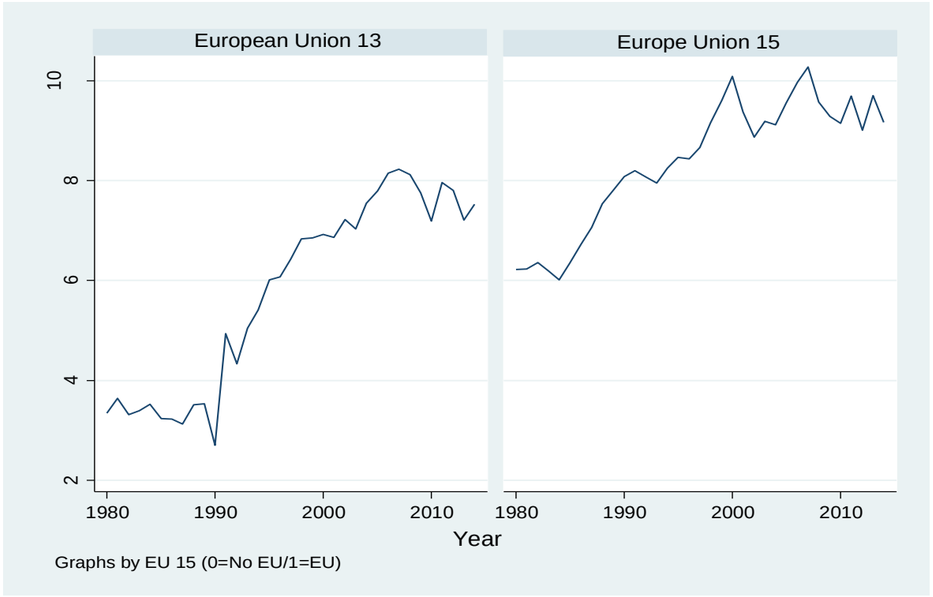

Figure 1: FDI Inflows in older and newer European Union countries

Table 1. Variables and Some Descriptive Statistics (EU-28)

Variable	Description	Mean	Std. Dev.	Data Source	Period
logFDIInflows	Log of FDI inflows	8.330	1.707	UNCTAD	1995-2012
logGDPcon	Log of GDP (constant 2005 US$)	25.749	1.677	WDI	1995-2012
interest_rate	Lending Interest Rate (%)	11.457	19.897	WDI	1995-2012
trade	Trade (% of GDP)	103.222	51.733	WDI	1995-2012
GFCF	Gross Fixed Capital Formation (as a percentage of GDP)	23.1	4.714	WDI	1995-2012
R&D	Research and development expenditure over GDP	1.405	0.885	WDI	1995-2012
Business_Freedom	Business freedom is an overall indicator of the efficiency of government regulation of business. The quantitative score is derived from an array of measurements of the difficulty of starting, operating, and closing a business.	76.196	10.694	Heritage Foundation	1995-2012
Crisis	Dummy for financial crisis (value 1 if year 2008-2012 and 0 otherwise)	0.25	0.433	Author's calculations	1995-2012
Logcompen_cap	Log of annual compensation per employee	35041.71	47633.31	WDI and Author's Calculations	1995-2012
GPIsec	Gross enrolment ratio, secondary, gender parity index (GPI)	1.014	0.0589	WDI	1995-2012
GPIupsec	Gross enrolment ratio, upper secondary, gender parity index (GPI)	1.040	0.0951	WDI	1995-2012
GPItert	Gross enrolment ratio, tertiary, gender parity index (GPI)	1.28	0.2259	WDI	1995-2012
LF_secgender	Male labor force with secondary education minus female labor force with secondary education	2.626	5.436175	WDI and Author's Calculations	1995-2012
LF_tertgender	Male labor force with tertiary education minus female labor force with tertiary education	5.245	5.296992	WDI and Author's Calculations	1995-2012
PISA_math_gender	Males mean performance on the mathematics scale minus females mean performance on the mathematics scale	9.38561	7.288916	WDI and Author's Calculations	2000-2012
PISA_read_gender	Males mean performance on the reading scale minus females mean performance on the reading scale	-40.033	10.67921	WDI and Author's Calculations	2000-2012
PISA_science_gender	Males mean performance on the science scale minus females mean performance on the science scale	-0.666	8.827864	WDI and Author's Calculations	2000-2012
PISA_All_gender	Males mean performance on the math, reading, science scale minus females Males mean performance on the math, reading, science scale	-10.437	7.956574	Author's Calculations	2000-2012
compl_sec_gender	Male completed secondary aged 15+ minus female completed secondary aged 15+	6.55	5.026	Barro & Lee and Author's Calculations	1995-2010
compl_tert_gender	Male completed tertiary aged 15+ minus female completed tertiary aged 15+	2.028	3.474	Barro & Lee and Author's Calculations	1995-2010
compl_sectert_gender	Male completed secondary and tertiary level aged 15+ minus female completed secondary and tertiary level aged 15+	8.582	6.369	Barro & Lee and Author's Calculations	1995-2010
avg_sec_gender	Male average years of secondary schooling minus females average years of secondary schooling aged 15+	0. 303	.40789	Barro & Lee and Author's Calculations	1995-2010
avg_tert_gender	Male average years of tertiary schooling minus females average years of tertiary schooling aged 15+	0.031	0.1243	Barro & Lee and Author's Calculations	1995-2010

total_sec_gender	Males total secondary education minus females total secondary education aged 15+	4.77	4.626	Barro & Lee and Author's Calculations	1995-2010
total_tert_gender	Males total tertiary education minus females total tertiary education aged 15+	0,7246	5.475	Barro & Lee and Author's Calculations	1995-2010
voc_sec_gender	Males enrolment in secondary vocational education/labor force minus females enrolment in secondary vocational education/labor force	0.0078552	.0115544	WDI and Author's Calculations	2000-2012
voc_uppersec_gender	Males Enrolment in upper secondary vocational education/labor force minus females Enrolment in upper secondary vocational education/labor force	0.007418	.0114088	WDI and Author's Calculations	2000-2012
tert_vocgender	Males Enrolment 5B/labor force minus females Enrolment 5B/labor force	-0.00125	.0019895	WDI and Author's Calculations	2000-2012
gen_sec_gender	Males Enrolment in secondary general education/labor force minus females Enrolment in secondary general education/labor force	-0.003225	.0074995	WDI and Author's Calculations	2000-2012
gen_uppersec_gender	Males Enrolment in upper secondary general education/labor force minus females Enrolment in upper secondary general education/labor force	-0.006494	.0071911	UNECE and Author's Calculations	2000-2012
tert_gengender	Males Enrolment 5A/labor force minus females Enrolment 5A/labor force	-0.005557	.0077757	UNECE and Author's Calculations	2000-2012
LF_sec	Labor force with secondary education (% of total)	48.858	15.986	WDI	1995-2012
LF_tert	Labor force with tertiary education (% of total)	23.072	8.3724	WDI	1995-2012
complsec5	Completed secondary education total, 15+, 5 year	36.734	12.989	Barro&Lee	1995-2010
compltert5	Completed tertiary education total, 15+, 5 year	10.819	4.4817	Barro&Lee	1995-2010
avgtotal5	Average years of total schooling, 15+	10.331	1.239	Barro&Lee	1995-2010
avgsec5	Average years secondary education total, 15+, 5 year	3.893	0.86	Barro&Lee	1995-2010
avgtert5	average years tertiary education total, 15+, 5 year	0.567	0.2111	Barro&Lee	1995-2010
totalsec5	total secondary education, total 15+, 5 year	58.487	11.322	Barro&Lee	1995-2010
totaltert5	total tertiary education, total 15+, 5 year	17.536	6.3284	Barro&Lee	1995-2010
Sec&Tert5	Completed secondary and tertiary education, total 15+, 5 year	47.554	11.506	Barro&Lee	1995-2010
complsectotal	Interpolation Completed secondary education total, 15+	36.818	12.666	Barro&Lee and Author's Calculations	1995-2010
compltertotal	Interpolation Completed tertiary education total, 15+	10.749	4.253	Barro&Lee and Author's Calculations	1995-2010
avgtotal	Interpolation Average years of total schooling, 15+	10.327	1.182	Barro&Lee and Author's Calculations	1995-2010
avgsectotal	Interpolation Average years secondary education total, 15+	3.894	0.8183	Barro&Lee and Author's Calculations	1995-2010
avgtertotal	Interpolation average years tertiary education total, 15+	0.5637	0.2	Barro&Lee and Author's Calculations	1995-2010
totalsec	Interpolation total secondary education, total 15+	58.701	11.083	Barro&Lee and Author's	1995-2010

				Calculations	
totaltert	Interpolation total tertiary education, total 15+	17.442	6.005	Barro&Lee and Author's Calculations	1995-2010
complsectert	Interpolation completed secondary and tertiary education, total 15+	47.568	12.9791	Barro&Lee and Author's Calculations	1995-2010
PISA_math	PISA: Mean performance on the mathematics scale	490.63	27.105	WDI	2000-2012
PISA_read	PISA: Mean performance on the reading scale	486.92	25.787	WDI	2000-2012
PISA_science	PISA: Mean performance on the science scale	495.49	26.051	WDI	2000-2012
PISAall	PISA: Mean performance on the math, reading and science scale	491.28	25.160	Author's Calculations	2000-2012
enrsecvoclab	Enrolment in secondary vocational education/labor force	0.076	0.0986	WDI and Author's Calculations	2000-2012
enrupsecvoclab	Enrolment in upper secondary vocational education/labor force	0.0649	0.0799	WDI and Author's Calculations	2000-2012
enrtertvoc	Enrolment in tertiary vocational/labor force	0.0017	0.0028	UNECE and Author's Calculations	2000-2012
enrgenseclab	Enrolment in secondary general education/labor force	0.2237	0.3173	WDI and Author's Calculations	2000-2012
enrupgenseclab	Enrolment in upper secondary general education/labor force	0.0635	0.0718	WDI and Author's Calculations	2000-2012
enrtertgen	Enrolment in tertiary general/labor force	0.01065	0.0150	UNECE and Author's Calculations	2000-2012
HDI	Human Development Index	0.853	0.0456	WDI	1995-2012

Table 2: Labor force with secondary and tertiary level of education, Western (EU-15) and CEE countries – Time period 1995-2012

VARIABLES	(1) Labor Force Secondary	(2) Labor Force Tertiary	(1) Labor Force Secondary	(2) Labor Force Tertiary
logGDPcon	1.126***	1.145***	1.005***	0.997***
	(0.0799)	(0.0808)	(0.220)	(0.188)
IR	-0.00103	-0.0355	-0.0252**	-0.0125
	(0.0387)	(0.0253)	(0.0114)	(0.0116)
trade	0.0204***	0.0142***	0.00436	0.00393
	(0.00286)	(0.00248)	(0.00376)	(0.00294)
GFCF	-0.00149	0.0354	0.0305	0.0347
	(0.0603)	(0.0501)	(0.0259)	(0.0258)
logcompen_cap	0.0377	-0.00778	0.00535	0.0131
	(0.0742)	(0.0757)	(0.0575)	(0.0445)
R&D	0.385***	0.117**	-0.623*	-0.599*
	(0.130)	(0.106)	(0.464)	(0.420)
crisis	-1.801	-2.315*	0.712	0.791
	(1.507)	(1.312)	(0.729)	(0.641)
business_freedom	0.0137**	0.0129**	-0.00770*	-0.0104*
	(0.0147)	(0.0130)	(0.0109)	(0.0129)
democ	0.388**	0.285	0.0685	0.147
	(0.180)	(0.174)	(0.199)	(0.237)
labor_force_with_secondary_educa	-0.0264		-0.0104	
	(0.0108)		(0.0200)	
labor_force_secgender	0.0456***		0.0222***	
	(0.0156)		(0.0259)	
labor_force_with_tertiary_educat		0.0621***		-0.00911
		(0.0126)		(0.0379)
labor_force_tertgender		-0.0224**		-0.0182***
		(0.0135)		(0.0341)
Constant	-28.06***	-29.17***	-17.60***	-19.09***
	(4.505)	(4.175)	(4.495)	(4.970)
Observations	119	119	142	142
Number of Country	14	14	11	11
EU	Western EU	Western EU	CEE	CEE

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Attainment, Completion ratios and Average Years of Schooling based on level of education – Time period: 1995-2010 – Western EU and CEE countries

VARIABLES	(1) Completed Sec 15	(2) Completed Tert 15	(1) Completed Sec 15	(2) Completed Tert 15
logGDPcon	1.108***	1.058***	1.130***	1.200***
	(0.0933)	(0.121)	(0.236)	(0.222)
IR	-0.00736	-0.0517	-0.0146	-0.0133
	(0.0433)	(0.0438)	(0.00957)	(0.00953)
trade	0.0161***	0.0119**	0.000240	-0.00425
	(0.00459)	(0.00519)	(0.00350)	(0.00311)
GFCF	0.0183	0.00572	0.0504*	0.0648**
	(0.0573)	(0.0566)	(0.0269)	(0.0262)
Wages	-0.00831	-0.0226	-0.0386	-0.0572
	(0.0714)	(0.0856)	(0.0516)	(0.0494)
R&D	0.359***	0.183*	-0.515**	-0.822**
	(0.0989)	(0.101)	(0.479)	(0.417)
crisis	-0.266*	-0.116	1.044**	0.780*
	(0.408)	(0.382)	(0.446)	(0.469)
business_freedom	0.0147	0.00666	-0.0133	-0.0169*
	(0.0121)	(0.0111)	(0.00855)	(0.0101)
democ	0.123	0.00685	0.282	0.104
	(0.156)	(0.196)	(0.200)	(0.212)
icomplsectotal15	-0.00497		-0.0279***	
	(0.00947)		(0.0197)	
compl_sec_gender	-0.0752***		-0.0329***	
	(0.0201)		(0.0210)	
icompltertotal15		0.0917**		0.132**
		(0.0615)		(0.0602)
compl_tert_gender		-0.0123**		-0.0826
		(0.0360)		(0.0662)
Constant	-25.28***	-22.12***	-21.56***	-23.76***
	(3.796)	(5.061)	(5.766)	(5.238)
Observations	116	116	131	131
Number of Country	14	14	11	11
	Western EU	Western EU	CEE	CEE

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Vocational and General Education based on level of education – Western countries (EU15) and CEE – Time period: 2000-2012

VARIABLES	(1) Secondary Vocational	(2) Tertiary Vocational	(3) Secondary General	(4) Tertiary General	(1) Secondary Vocational	(2) Tertiary Vocational	(3) Secondary General	(4) Tertiary General
logGDPcon	1.192***	1.684***	1.004***	1.245***	0.694***	1.015***	0.844***	0.858***
	(0.119)	(0.547)	(0.132)	(0.282)	(0.0851)	(0.203)	(0.128)	(0.154)
IR	-0.0283	-0.440**	-0.0644	0.0544	0.000464	-0.0189**	-0.00427	-0.0308***
	(0.0395)	(0.174)	(0.0549)	(0.0881)	(0.00732)	(0.00871)	(0.00778)	(0.00769)
trade	0.0173***	0.0259***	0.0180***	0.0182***	0.0145***	0.00406	0.00917***	0.00317
	(0.00356)	(0.00692)	(0.00503)	(0.00380)	(0.00459)	(0.00474)	(0.00347)	(0.00409)
GFCF	0.0379	0.162	0.0425	0.0403	0.0330	0.0267	0.0561**	0.0338
	(0.0810)	(0.194)	(0.0731)	(0.101)	(0.0253)	(0.0425)	(0.0286)	(0.0316)
Wages	-0.0312	0.826	-0.0747	0.0471	-0.0157	-0.0752	0.0124	-0.0175
	(0.0689)	(0.804)	(0.0774)	(0.679)	(0.0297)	(0.0482)	(0.0257)	(0.0422)
R&D	0.261**	0.906**	0.160*	0.192*	-0.689**	-1.002**	-0.624*	-0.677*
	(0.117)	(0.395)	(0.158)	(0.271)	(0.320)	(0.444)	(0.342)	(0.476)
crisis	-1.897	-4.288**	-2.023*	-1.151**	1.050***	1.525***	1.193***	0.528*
	(1.460)	(1.678)	(1.421)	(0.525)	(0.386)	(0.536)	(0.348)	(0.385)
business_freedom	0.0412**	0.0350*	0.0336**	0.0353**	-0.0106	-0.0132*	-0.0200*	0.00122
	(0.0178)	(0.0198)	(0.0164)	(0.0173)	(0.00926)	(0.0155)	(0.0111)	(0.00758)
democ	0.111*	0.436*	0.0353*	0.00145	0.324*	0.0619	0.378*	0.163
	(0.150)	(0.400)	(0.149)	(0.291)	(0.178)	(0.363)	(0.203)	(0.264)
enrsecvoclab	1.490				13.59***			
	(0.430)				(4.644)			
voc_sec_gender	-17.05***				45.78***			
	(3.172)				(14.67)			
enr5Blab		71.06				-1,105**		
		(184.8)				(491.7)		
tert_vocgender		-395.6				-1,397**		
		(400.1)				(675.7)		
enrgenseclab			0.401				0.718	
			(0.254)				(1.713)	
gen_sec_gender			-9.907*				-108.7***	
			(5.961)				(26.43)	
enr5Alab				-22.86				105.2
				(59.67)				(89.04)
tert_gengender				-52.46				242.5
				(112.7)				(155.9)
Constant	-29.95***	-47.60**	-20.46***	-29.72***	-15.09***	-17.00***	-18.29***	-12.37***
	(6.047)	(23.56)	(5.381)	(11.30)	(2.330)	(5.664)	(3.196)	(4.255)
Observations	98	105	107	65	140	99	140	117
Number of Country	14	14	14	14	11	11	11	11
	Western EU	Western EU	Western EU	Western EU	CEE	CEE	CEE	CEE

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

APPENDIX C

Table 1. List of EU countries

European Union Countries	
Austria	Belgium
Cyprus	Czech Republic
Denmark	Estonia
Hungary	Finland
France	Greece
Germany	Latvia
Ireland	Poland
Italy	Slovakia
Luxembourg	Slovenia
Netherlands	
Portugal	
Spain	
Sweden	
United Kingdom	

Table 2. Descriptive Statistics

Variable	Description	Mean	Std. Dev.	Data Sources	Period
logFDIInflows	Log of FDI net inflows per year (in current U.S. dollars)	8.695	1.563	WDI	2000-2012
logGDPcon	Log of GDP (constant 2005 US$)	25.853	1.638	WDI	2000-2012
interest_rate	Lending Interest Rate (%)	7.098	3.386	WDI	2000-2012
trade	Trade (% of GDP)	112.99	56.159	WDI	2000-2012
tax	Corporate Income Tax Rate (%)	23.62	5.863	WDI	2000-2012
Democ	Institutionalized Democracy	9.644	0.603	POLITY IV	2000-2012
icompltertotal15	Total population with completed tertiary level of education (aged 15+)	12.55	4.625	Barro and Lee	2000-2012
STEM	Total graduates in STEM fields (% of all fields)	21.42	2.258	Eurostat	2000-2012
Icompltertfem15	Females with completed tertiary level of education (aged 15+)	7.83	4.89	Barro and Lee	2000-2012
STEM_fem	Females graduates in STEM fields (% of active population of all fields)	15.47	3.62	Eurostat	2000-2012
smcefemp	Females (15-74) as % of active population in science, mathematics, computing, engineering, construction and manufacturing	11.26	4.46	Eurostat	2000-2012
smcefemac	Females (15-74) as % of active population in science, mathematics and computing	6.173	2.574	Eurostat	2000-2012
emcfemact	Females (15-74) as % of active population in engineering, manufacturing and construction	6.93	3.23	Eurostat	2000-2012
othersfact	Others – Females (17-74) as % of active population	2.72	1.61	Eurostat	2000-2012
religion_dum	Religion Dummy (0=Orthodox_Catholics/1=Protestants))	0.178	0.384	Author's calculations	2000-2012
lng_dum1	Language (0=Balto-Slavic/1=Celtic/2=Italic/3=Germanic/4=Hellenic/5=Uralic/6=Afro)	2.285	1.793	Author's calculations	2000-2012
total_hofstede	Total Hofstede Culture	53.26	11.00	Author's calculations	2000-2012

Table 3: Estimation Results, FDI – Males' Education - Culture

VARIABLES	(1) Baseline	(2) Human Capital	(3) Human Capital Gender Males	(4) Science, Maths, Computing, Engineering, Manurfacturing, Construction	(5) Science, Math, computing	(6) Engineering	(7) Construction / Others	(8) Culture and HC	(10) Culture and Males education	(11) Culture# Males Education	Democracy # Males Education
ECONOMIC											
logGDPcon	1.159***	1.087***	1.050***	0.855***	1.098***	1.089***	1.119***	0.705***	0.673***	0.780***	0.711***
	(0.0486)	(0.0747)	(0.0923)	(0.117)	(0.0868)	(0.110)	(0.0663)	(0.153)	(0.160)	(0.164)	(0.182)
interest_rate	0.00147	-0.0382	-0.0529	-0.0518	-0.0473	-0.0507	-0.0612	-0.101*	-0.102*	-0.0972*	-0.0748
	(0.00784)	(0.0541)	(0.0523)	(0.0508)	(0.0492)	(0.0505)	(0.0445)	(0.0571)	(0.0588)	(0.0561)	(0.0631)
trade	0.0152***	0.0094***	0.0119***	0.0109***	0.0123***	0.0121***	0.0150***	0.00522**	0.00465*	0.00763*	0.00860*
	(0.00188)	(0.00330)	(0.00343)	(0.00327)	(0.0035)	(0.00340)	(0.00297)	(0.00563)	(0.00585)	(0.0056)	(0.00574)
tax	-0.071***	-0.00453	-0.0111	0.00651	-0.00542	-0.00972	-0.00177	-0.00459	-0.00658	-0.00141	-0.00675
	(0.00536)	(0.0143)	(0.0205)	(0.0211)	(0.0202)	(0.0200)	(0.0189)	(0.0225)	(0.0235)	(0.0231)	(0.0195)
HUMAN CAPITAL											
icompltertotal15		0.0797***						0.0316*			
		(0.0189)						(0.0478)			
STEM	0.00890*							0.0433***			
	(0.0205)							(0.00869)			
GENDER											
icomptermaletotal15			0.0333*	0.0220	0.0334*	0.0342*	0.0606**		0.0289*	0.0211	0.0674**
			(0.0303)	(0.0291)	(0.0304)	(0.0304)	(0.0246)		(0.0493)	(0.0527)	(0.0260)
STEM_male			0.00741						0.0378	0.442	1.630
			(0.0197)						(0.00850)	(0.434)	(0.830)
smcmalact				0.0899							
				(0.0406)							
smcemact					0.0205						
					(0.0220)						
emcmact						0.00881					
						(0.0201)					
othersm							-0.0422***				
							(0.0141)				
INSTITUTIONS											
democ								0.617***	0.601***	0.561***	5.427*
								(0.0848)	(0.0856)	(0.0946)	(2.946)
CULTURE											
religion_dum								0.902***	0.929***	0.878***	1.266***
								(0.337)	(0.350)	(0.338)	(0.350)
total_hofstede								0.0567***	0.0577***	0.341**	0.0599***
								(0.0214)	(0.0218)	(0.260)	(0.0226)
c.STEM_male#c.total_hofstede										-0.00822	
										(0.00737)	
c.STEM_male#c.democ											-0.167

											(0.0835)
Constant	-19.95***	-16.16***	-14.73***	-12.62***	-17.68***	-16.41***	-15.36***	-6.116*	-5.481	-25.31	-67.69**
	(1.288)	(2.151)	(2.474)	(2.746)	(3.018)	(3.256)	(1.697)	(3.323)	(3.546)	(17.26)	(31.51)
Observations	276	228	228	228	228	228	228	228	228	228	228
R-squared	0.64	0.62	0.65	0.67	0.61	0.64	0.62	0.52	0.58	0.48	0.36

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Estimation Results (Males and Females)

VARIABLES	(1) Tertiary level of education	(2) STEM Education
logGDPcon	1.175***	0.766***
	(0.0611)	(0.163)
interest_rate	-0.00364	-0.00123
	(0.00865)	(0.0640)
trade	0.0123***	0.0120***
	(0.00237)	(0.00448)
tax	-0.0628***	-0.0435**
	(0.00585)	(0.0207)
democ	0.0642**	0.488***
	(0.0804)	(0.125)
icompterfemtotal15	0.104***	
	(0.0184)	
icomptermaletotal15	0.0202*	
	(0.0145)	
STEM_fem		0.008**
		(0.115)
STEM_male		0.0315
		(0.104)
religion_dum	0.822*	1.111**
	(0.129)	(0.476)
totalHof_dum	0.264**	0.471*
	(0.128)	(0.342)
Constant	-21.56***	-8.290**
	(1.512)	(3.967)
Observations	244	228
R-squared	0.63	0.56

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1