CHICKEN OR EGG?

THE RELATIONSHIP BETWEEN

IFRS ADOPTION AND FDI

by

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Date _____

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Abstract

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The main objective of the current study is to examine the direction of relationship between foreign direct investments (FDI) and international financial reporting within the framework of countries' economic level of development. Based on our findings for 135 countries during 2003-2011, we agree with the previous studies in the fact that developing countries benefit the most from the adoption of global standards in terms of attracting additional capital from abroad. We also found that a large inflow of FDI in its turn also increases the probability of adopting IFRS in developing countries, even after controlling for endogeneity. However, the probability of IFRS adoption rises with FDI only till the latter reaches 0.5 to 1.6 billion USD per year. Beyond that level FDI does not affect the probability of IFRS implementation by developing countries.

To Anton

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LIST OF ABBREVIATIONS

IFRS. International Financial Reporting Standards.

FDI. Foreign Direct Investments.

OLS. Ordinary Least Squares.

LPM. Linear Probability Model.

IV. Instrumental Variable.

LR. Likelihood Ratio.

Chapter 1

INTRODUCTION

Under the pressure of globalization processes, capital movements have almost effaced boundaries between countries. Foreign direct investments became a widespread process and a tool for countries to enhance their economic development. With fast development of financial markets attracting large volumes of FDI often calls for more transparent and comparable accounting reports. In general, the necessity of common financial language became a vital issue today.

Two interesting phenomena have been noticed recently by Lasmin (2012). First, within ten years more than 120 countries have partially or fully adopted global financial reporting standards (introduced in 2001). Second, during the same period there has been observed an enormous increase of foreign direct investments into the developing economies (almost ½ of the world investment flows). Surprisingly, only few papers have studied interaction between the level of International Financial Reporting Standards (IFRS) and Foreign Direct Investments (FDI) (Márquez-Ramos, 2008, 2011; Gordon, 2012; Lasmin, 2012). The authors mention themselves the necessity to continue the investigation of these phenomena and that the field leaves a platform for new discoveries in this particular area of economics.

The existing literature almost uniformly agrees that the IRFS implementation positively influences FDI flows and that developing countries benefit the most. But, as Márquez-Ramos (2011) presumes in her paper, the reverse causality might take place. Countries that have high level of FDI flows may be willing to implement IFRS as a consequence, but not as a cause. Thus, the true unbiased

effect of international financial reporting standards on the level of foreign direct investments remains to be studied. In this research, we are going to single out this effect by modeling both processes while relying on drivers for IFRS adoption and FDI inflows. In other words, this study answers the following question: Is it IFRS that drives FDI or it is FDI that enhances IFRS adoption?

Moreover, in this paper not only the direction of causality is defined, but also the precise level of FDI inflows (called threshold) that increases the probability of IFRS adoption is found. Therefore, after control for endogeneity, we turn to the estimation of the threshold model that will allow us to answer the following question: What is the level of FDI that increases the likelihood that a given country implements international financial reporting standards?

Our study finds that causality goes in both directions, but only for developing countries. In other words, developing countries benefit both from IFRS adoption in terms of increasing FDI inflows, and at the same time, higher level of FDI inflows raises the likelihood of adopting IFRS by developing countries. The latter effect, however, holds only till FDI inflow reaches 0.5 to 1.6 billion USD per year. FDI inflows beyond that level do not affect the probability of IFRS implementation in developing countries. We limited our analysis to the developing countries since no effect of IFRS adoption on FDI was found for developed countries.

The rest of the paper is structured as follows. Chapter 2 comprises the literature review related to this topic. Chapter 3 discusses the methodology, following by Chapter 4 describing data for the current research. Chapter 5 presents the empirical results. The last chapter offers the conclusions.

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LITERATURE REVIEW

The literature review section is organized in two major parts. In the first subsection the importance of International Financial Reporting Standards (IFRS) adoption is discussed. In the second subsection the literature about the relationship between IFRS adoption and FDI flows is reviewed.

2.1 International Financial Reporting Standards (IFRS) adoption by countries

The first subsection includes the studies about IFRS and some national standards, as well as about such issues as: the importance of global standards in the globalization process, the main reasons of IFRS adoption and barriers or fears of their implementation by countries, mandatory versus voluntary adoption.

With the fast globalization process during the last decades, including the globalization of capital markets, countries from different parts of the world perceived the need of creation of the common accounting standards. These standards had to be globally adopted with the aim to ensure investors all around the world with transparent and comparable financial reports. While international financial standards were first time adopted in 2001, nowadays, according to the American Institute of Certified Public Accountants (AICPA), about 120 countries already use IFRS, from which about 90 countries have fully adopted them and the rest permit their use (e.g. banks, large and medium sized enterprises) along with the national standards. The milestone in the history of IFRS adoption was the year 2005 when all EU listed companies were required to follow IFRS as the main type of financial reporting (Larson 2005).

Although the importance of worldwide IFRS adoption is widely recognized for several decades, part of the countries still stand over its full implementation. In the earlier macro-level papers the discussion about the global need of accounting standards harmonization takes place. Sutton (1993) was among the first who examined the reasons why some countries restrain to move towards the internationalization of accounting standards. He consider that nationalism is one of the main reasons for United States, which intends to develop its national accounting system in such a way that it becomes unique and perfect so that the other countries would adopt this system, but not vice versa. The author underlines the historical influences of some countries as United Kingdom on the former colonies in their movement toward global standards. The former colonies are still dependent in their decisions and tend to mimic its behavior in such kind of situations.

The more recent literature presume that one of the essential barriers for countries in implementing IFRS is some important discrepancies between local and international financial reporting standards. Among the crucial controversial issues between national and international financial reporting standards, the following are about to mention. In case of US generally accepted accounting standards (GAAP) according to a publication of New York Society of Security Analysts called The Finance Professional Post, some crucial differences take place. For instance, US GAAP provides with very distinct rules for companies and industries about revenue recognition, while IFRS is less concrete. As a result, revenues recorded are more inaccurate under IFRS. Another example is about research and development (R&D) costs. Under US GAAP R&D costs are recorded as expenses, but according to IFRS they can be capitalized and amortized. Thus, the misspecification of these types of cost takes place. The next difference about asset valuation arise a lot of discussion in the literature (Cairns, 2011; Georgiou, 2011; Smith-Lacroix, 2012). US, as well as other

countries like France, got used to evaluate assets at their historical costs, while IFRS requires reevaluating them at the fair value (market value). In such a way, book value of assets is more likely to be greater under IFRS. Ball (2006) mentions, in his theoretical paper, that the adoption process creates some additional costs for companies, which are payments for outsourcing services for reevaluating their assets at market price. Hallera's (2009) studies based on the survey of more than 700 German listed companies, in contrast, find out the considerable increase in net income and equity.

Both micro- and macro-level studies confirm that firms were concerned about specific problems that might arise because of mandatory adoption of IFRS in the European Union. Such papers analyzed the attitude of countries (Larson, 2004; Karampinis, 2011), and companies in particular (Jermakowicza, 2006), to the decision of EU to require listed companies to implement fully IFRS. Larson (2004) uses a survey of 2002 for 17 European countries (including some of the EU candidate and new member countries, Switzerland and European Economic Area countries). He concludes that surveyed countries are aware of a "two-standard system" evolvement, which may complicate financial reporting. These countries have specific tax system (Larson, 2004) and jurisdiction (Karampinis, 2011) that may confront with some rules and principles of IFRS. Karampinis (2011) points out the low level of institutions development in Greece that was one of the reasons for not so efficient implementation of IFRS. Based on the questionnaire of 112 EU listed companies, Jermakowicza (2006) also reveals some fears of companies on the threshold of IFRS mandatory adoption. In particular, companies perceived that this procedure would be costly and onerous. Moreover, according to the survey, the companies more likely would not implement IFRS voluntary.

Although there are some fears of what might happen because of IFRS adoption, a considerable number of countries and firms view this process as favorable for the development of the economy on the country and firm level. Countries voluntary converge their national standards to international ones in the form of full or partial adoption, as well as making their standards very similar to IFRS as in the case of China (Qu, 2010) and Pakistan (Ashraf, 2005). The most often motives mentioned in the literature are the following. Since IFRS are supported by WTO, OECD, IMF and WB, countries are obliged to use these standards to access funds from these politically influential bodies. This is especially true for the developing countries, which are highly dependent on the material support from world financial institutions (Gordon, 2012; Márquez-Ramos, 2011; Alp, 2009). The other important reason is to reduce informational costs between the economies to obtain financial reports commonly understandable. Guerreiro (2012) investigates in her paper how do institutions influence the voluntary adoption of IFRS by Portuguese unlisted companies. She consider that with the goal of convergence to efficient economy, institutions create some specific conditions for such companies so that they voluntary implement international standards. There are some more individual reasons, such as joining the European Union, as in the case of Turkey (Ali, 2009).

The next section describes the interaction of IFRS adoption and level of foreign direct investments in countries.

2.2 Relationship between IFRS adoption and FDI inflows

In general, it is considered that countries that implement international financial reporting standards have more transparent and comparable financial reports. This, in turn, lead to further openness of the economies, bigger FDI inflows,

development of foreign trade and, in general, improvement of capital markets. There are few studies about effect of IFRS adoption on the increase of FDI flows and international trade in general. In particular, Márquez-Ramos (2008) concludes that the adoption of IFRS enforces mutual trade in goods and FDI between countries, using the gravity model. Because of the enhanced financial information under the IFRS, the countries perform widely understandable, comparable reports. This, in turn, releases the access of foreign investors to accounting reports and enforces flow of investments. Márquez-Ramos also finds that the most beneficial groups are countries in transition. Gordon (2012) concentrates in her research on the difference in the impact of the IFRS adoption on the FDI inflows between developed and developing countries, using ordinary least squares approach. Gordon observes that the most sensible to this influence are developing countries, while the results for developed countries were statistically insignificant. With the tool of a two-stage instrumental variable model, Gordon concludes that inevitable need of developing countries for credits from international financial institution and in general to strengthen the economy fosters the adoption of IFRS by these countries. Lasmin (2012) also observes the positive influence of IFRS adoption on the economic development of countries, specifically, on the developing ones. However, the author does not observe any positive influence of IFRS adoption for developing countries on the inflow of foreign direct investments. This controversial result is obtained by using OLS regression with control variables derived from the Cobb-Douglas production function. Lasmin also points out that the implementation of IFRS cannot be the only solution for countries to enforce FDI and international trade. In 2011 Márquez-Ramos continues to study the importance of IFRS implementation. She concludes that it leads to the improving of financial transparency and comparability, and as a result, to the increased FDI and international trade.

Although the above mentioned research papers claim that IFRS indeed have a positive influence on the external economic activity of the countries adopted them, these studies did not take into consideration that IFRS adoption can be endogenous. Márquez-Ramos (2011) mentioned in her paper: "Causality could also work in the opposite direction; that is, countries may adopt IFRS as a result of foreign activities or, what is even more likely, there may be a factor affecting both foreign activities and IFRS adoption."

In this research paper we would like to address this issue. It answers three important questions: (1) whether the causality goes in both directions, (2) whether there is a distinct effect for developing and developed countries, (3) whether the non-linearity of the FDI effect increases the likelihood of IFRS implementation.

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METHODOLOGY

The relationship between FDI inflows and IFRS adoption was examined with different approaches. Márquez-Ramos (2008; 2011) uses gravity model to focus on bilateral FDI flows and IFRS adoption. She divided countries in two groups: transitional and non-transitional. The results reveal increased comparability and transparency effects among the IFRS adopters, especially for the first group. Lasmin (2012) assesses the sample from developing countries based on the Cobb-Douglas production function and applies ordinary least squares method (OLS) to find out the impact of IFRS adoption on level of FDI inflows. The author finds no clear evidence of the increased FDI inflows due to country's decision to adopt IFRS.

Followed by Gordon (2012) the methodology in this paper includes ordinary least squares and two-stage instrumental variable approaches. Following by Hansen (1999) we used threshold model to estimate the level of FDI that increase the probability of IRFS adoption.

In contrast to the other studies, this paper includes much more countries (135 in total), 9 years of the most recent observations (2003-2011), contains the largest sample for IFRS adoption variable for each country for the same period, includes variables already used in literature and new instrumental variables for both types of countries (developed and developing) to estimate the direction of causality in both directions, and finally, it finds out whether developing countries are likely to adopt IFRS after a certain level of FDI inflows is reached. The analysis is done separately for developing and developed countries. But

most importantly, this paper considers both impact of IFRS adoption on FDI inflows in each country and vice versa, as well as finds the threshold for FDI.

3.1 FDI estimation

3.1.1 Theory behind the FDI estimation

The estimation of FDI inflows is based on main determinants mentioned in the existing literature (Takagi, 2009; Noorbakhsh, 2001; Globerman, 2008; Du, 2009; Daniele, 2011; Cuervo, 2008; Bevan, 2009; Bitzenis, 2009). FDI determinants found in the literature can be divided into several groups that capture investment climate as well as market and infrastructure factors that attract FDI inflows. The first group is represented by some basic macroeconomic indicators and reflects market opportunities: GDP per capita (as a proxy for labor cost), natural logarithm of GDP (as a proxy for market factor) and GDP growth rate. The second group reflects investment climate factors that are important for foreign investors in their decision to move capital abroad. It is measured by such variables as: openness (sum of exports and imports divided by nominal GDP), annual average exchange rates and six corporate governance indicators (voice and accountability, political stability and no violence, government effectiveness, regulatory quality, rule of law, control of corruption). The third group concerns infrastructure factor represented by length of phone lines. The last group consists of instrumental variables, which will be discussed further. As it was mentioned in previous sections, IFRS adoption is expected to be another driver of FDI inflows. The choice of lagged independent variables (except IFRS adoption) is driven by the economic theory which suggests that all these factors have dilatory effect on FDI inflows.

It is expected that an endogeneity problem may occur in the regression of FDI caused by IFRS adoption variable and vice versa. To eliminate this problem,

specific variables are be used as instruments both for developed and developing countries.

3.1.2 FDI model specification

We start with the ordinary least squared approach, which is be used to check for consistency with the existing literature. The controls for year and country fixed effects are also included.

The initial regression is estimated with OLS:

$$
\begin{aligned}
LnFDI_{i,t} \; = \; & \beta_0 + \beta_1 IFRSadopt_{i,t} + X_{i,t-1}\delta \\
& + COUNTRY_i + YEAR_t + u_{i,t}
\end{aligned}
\tag{1}
$$

where: i and t subscripts stand for country and year, respectively; $LnFDI_{i,t}$ – natural logarithm of FDI inflows, $IFRSadopt_{i,t}$ – dummy for IFRS adopters for country i in year t (equals to 1 if country fully adopted IFRS and zero if IFRS is permitted, is partially adopted or required for some entities), $X_{i,t-1}$ is a matrix of control variables: $LnGDP_{i,t-1}$ - natural logarithm of GDP for country i in year $t-1$, $OPENESS_{i,t-1}$ - sum of exports and imports divided by nominal GDP for country i in year $t-1$, $EXCHANGErate_{i,t-1}$ - annual average exchange rate for country i in year $t-1$, $LENDINGrate_{i,t-1}$ – lending interest rate for country i in year $t-1$, $PHONElines_{i,t-1}$ – length of phone lines of country i in year $t-1$, $VOICE_{i,t-1}$ - voice and accountability indicator for country i in year $t-1$, $STABILITY_{i,t-1}$ - political stability and no violence indicator for country i in year $t-1$, $EFFECTIVENESS_{i,t-1}$ - government effectiveness indicator for country i in year $t-1$, $REGULATION_{i,t-1}$ - regulatory quality indicator for country i in year $t-1$, $LAW_{i,t-1}$ - rule of law indicator for country i in year $t-1$, $CORRUPTION_{i,t-1}$ - control of corruption for country i in year $t-1$. Country and year fixed effects are included as well.

3.1.3 Correction of the endogeneity problem in the regression of FDI

It is possible that IFRS may be endogenous in regression (1). As a remedy to this problem the existing literature suggests using financial aid received from World Bank as an instrumental variable (IV) for developing countries and market capitalization for developed countries (Gordon, 2012). It is argued that the motives for IFRS adoption are different for developed and developing countries and thus, it should be instrumented differently for each group.

In the first stage of IV analysis for developing countries IFRS adoption is instrumented with the help of *financial aid* (net official development aid) variable, measured in logarithms. This choice is explained by the fact that the financial aid for the economic development is received only by developing countries, and typical conditions for this aid create a strong incentive to adopt IFRS in such countries. In their decision to finance developing countries, World Bank requires countries to present their financial statements according to generally accepted principles. This, in turn, leads to an increase of interestingness and credibility for the side of foreign investors, who make a decision to move their capital in particular countries.

In the second stage of IV approach the estimated value of IFRS adoption is included in the initial equation (1) instead of IFRS and regression (1) is re-estimated with the generalized method of moments (GMM). This method is usually used for samples with large number of countries and small number of time periods in order to eliminate bias in the results obtained by OLS regression.

The endogeneity problem for developed countries can be solved with the help of another instrumental variable, i.e. market capitalization. It is measured in

logarithms, since values differ significantly from country to country. This variable represents the level of countries financial activity and most probably countries with higher market capitalization have more incentive to have comparable and transparent reporting which is enhancing the adoption of IFRS.

3.2 IFRS estimation

3.2.1 Theory behind IFRS estimation

The estimation of IFRS in this study derives from the theory of informational asymmetry. In particular, generally accepted accounting principles reduce informational asymmetry among countries, which improves investment climate and trade relations. It is assumed that countries benefit from IFRS adoption to different degrees conditionally on their current foreign capital inflows as a driver for economic development and on their future investment and foreign trade goals. In their movement towards global financial reporting, countries improve the understandability of their reports, making them comparable with other countries' reports under the same set of standards. In addition, the high quality IFR standards lead to more well-prepared and transparent reporting. Thus, gradually, information asymmetry lowers and it becomes easier for international investors to interpret financial reports under these set of standards.

We aimed to collect the ideal dataset, which would include determinants of IFRS adoption divided into two major groups: those that capture information asymmetry lowering factors and those that affect both IFRS adoption decision and FDI inflow factors. The theory suggests that the amount of annual financial reports performed or translated into English increases with the needs to attract more external financing (Jeanjean, 2010). The choice of English language is not

occasional, since it is the base language of international financial reporting standards. When the financial reports are published in English, the information cost between agents lowers and thus the possibility of raising international funds increases. And if the country adopts IFRS its main reporting language becomes English. The variable number of English people per 1000 of population could be a proxy for financial reporting held in English. We would expect that this variable positively relates to the willingness of a country to adopt IFRS. Another factor that the theory suggests as a proxy for high quality auditing is the choice of auditing by Big Four (Houqe, 2012). We would suggest that the more firms are audited by Big 4, the more reliable are financial reports within the country. In order to estimate the cultural effect that might influence the tradition to follow European institutions (IFRS adoption in particular, since it is originally from Europe), we would use as a proxy number of Christians as a percentage of total population (Ramanna and Sletten, 2009). Historically, former European colonies, near-border countries and countries intending to join European Union (as recent entrants, Romania and Bulgaria) are more acquainted and got used with its institutions such as IFRS and are mostly Christian countries.

Unfortunately, current data limitations did not allow constructing the described ideal data set. Some variables are only available for a single year, other exist for a very selective list of countries. Thus, IFRS adoption regression includes the same set of determinants as FDI. Particularly, to capture the foreign capital climate we include a proxy that consists of two variables, the level of portfolio investments and net FDI inflows, measured in logarithms. The investment climate is measured using the same group of factors as for FDI inflow: indicator of country's trade openness, annual average exchange rates and several corporate governance indicators. We expect that countries with more favorable investment climate, that presumes lower level of corruption, higher law

regulation and enhanced government effectiveness, will more likely benefit the most from IFRS adoption. However, it might be true that countries the weaker investment climate are more willing to adopt IFRS because of its concurrent benefits. The proxy for infrastructure climate is measured by the length of phone lines. In the estimation of IFRS determinants, several macroeconomic are included. These variables capture market factors: GDP per capita (as a proxy for labor cost), natural logarithm of GDP and GDP growth rate.

3.2.2 IFRS *model specification*

Initially the probit regression is run to compare our results to the existing studies:

$$
\begin{aligned}
IFRSadopt_{i,t} = \alpha_0 &+ \alpha_1 LnFDI_{i,t} + X_{i,t-1}\varphi \\
&+ COUNTRY_i + YEAR_t + \varepsilon_{i,t}
\end{aligned}
\tag{2}
$$

3.2.3 *Correction of the endogeneity problem in the IFRS regression*

However, FDI is potentially endogenous in the regression of IFRS adoption. The instrumental variable approach is used for the correction. As Beine (2010) suggests, the *remittances* are one of the most important funds for individuals in developing countries. In their desire to attract more remittances inflow, countries improve financial openness and thus create more favorable conditions in attraction of FDI. This in turn may lead to the consequent decision of developing countries to adopt IFRS. We argue that remittances affect IFRS adoption decision only through FDI, but not directly, and thus, is not correlated with the error term.

In the existing literature there is no relevant instrumental variable that can be used for developed countries in order to correct for endogeneity of FDI in the

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IFRS adoption equation. Since later on no effect of IFRS adoption on FDI inflows to developed countries is found we proceed with the analysis for developing countries only.

3.3 Threshold model specification and estimation for developing countries

3.3.1 Estimation of a threshold for FDI

We are now turning to the formulation of the threshold model that allows us to investigate whether developing countries are likely to adopt IFRS only after a certain level of FDI inflows is reached. Our model follows Hansen (1999) and is intended to find out such specific level of FDI.

We start with probit regression for IFRS adoption, in which we include the FDI threshold variable *k*:

$$
\begin{aligned}
IFRSadopt_{i,t} \;=\; & \gamma_0 + \gamma_1 LnFDI_{i,t} I(LnFDI_{i,t} \le k) \\
& + \gamma_2 LnFDI_{i,t} I(LnFDI_{i,t} > k) + X_{i,t\text{-}1}\varphi' \\
& + \; COUNTRY_i \; + \; YEAR_t \; + \; \varepsilon_{i,t}
\end{aligned}
\qquad (3)
$$

where $X_{i,t\text{-}1}$ is matrix of other explanatory variables, *I* is an indicator function, *k* is a threshold level of FDI (in logarithmic terms). Thus, the observations are grouped into those that are smaller and those that are bigger than the threshold value.

More detailed specification of the threshold model is the following:

$$
\begin{aligned}
IFRSadopt_{i,t} \;=\; & \gamma_0 + \gamma_1 D_{i,t} LnFDI_{i,t} \\
& + \gamma_2 (1 - D_{i,t}) LnFDI_{i,t} + X_{i,t\text{-}1}\varphi' \\
& + \; COUNTRY_i \; + \; YEAR_t \; + \; \varepsilon_{i,t}
\end{aligned}
\qquad (4)
$$

where k is a threshold level of FDI (in logarithmic terms) and $D_{i,t}$ is a dummy, defined as:

$$D_{i,t} = \begin{cases} 1, \text{if } \text{LnFDI}_{i,t} \leq k \\ 0, \text{if } \text{LnFDI}_{i,t} > k \end{cases} \tag{5}$$

Since in our case the variable of interest FDI is endogenous, we instrument it with remittances inflows. Thus, final specification uses instrumental variable (IV).

Because we do not know the exact threshold level of FDI, it has to be estimated. In contrast to Hansen (1999), who estimates the threshold level in OLS regressions by minimizing residual sum of squares, we proposed to estimate the threshold by directly maximizing likelihood ratio, since this is a probit model. So, we find the threshold as:

$$k^* = \underset{k}{\text{argmax}}\,(S_1(k)) \tag{6}$$

where $S_1(k)$ is the maximized likelihood ratio given values of k in the sample.

3.3.2 Inference

Once we obtain the threshold value of FDI, its significance is tested with the likelihood ratio test under the null that $\beta_1 = \beta_2$. The alternative hypothesis is that $\beta_1 \neq \beta_2$ (threshold effect is present). Therefore, we compute the likelihood ratio (LR) as a function of unrestricted maximum likelihood (ML) and restricted maximum likelihood:

$$\text{LR} = 2[\ln L(\hat{\beta}, \hat{\sigma}^2) - \ln L(\tilde{\beta}, \tilde{\sigma}^2)] \sim \chi^2(q) \tag{7}$$

where $L(\hat{\beta}, \hat{\sigma}^2)$ is unrestricted ML and $L(\widetilde{\beta}, \widetilde{\sigma}^2)$ is restricted ML (both estimated for the optimal threshold value), $q=1$.

Hansen (1999) proved that the "asymptotic distribution of LR is non-standard". As a solution to this problem, the author suggests to apply bootstrapping to the residuals to simulate the distribution of LR. This allows us to compute the asymptotically valid p-value for LR. As it was proved by Hansen (1999), when the threshold is present (that is, $\beta_1 \neq \beta_2$) the value of our estimated threshold is consistent with the true one. To construct confidence interval for the estimated threshold "no-rejection region" have to be defined with the help of LR statistics. The critical value is calculated as follows:

$$c(\alpha) = -2\log(1 - \sqrt{1-\alpha}) \qquad (8)$$

The critical values are calculated for 1, 5 and 10 percent of significance level, and then it is compared with the estimated LR. Our aim is to find what values of thresholds (k) enter the "no-rejection region", which are those whose likelihood ratio is less or equal to the critical values:

$$LR(k) \leq c(\alpha) \qquad (9)$$

DATA DESCRIPTION

The sample consists of 1111 observations for each variable and includes information about 135 countries during years 2003-2011. The data for macroeconomic indicators is taken from World Bank Indicators database. Some of these variables are presented in current US dollars (GDP, exchange rate, openness, net official development aid, market capitalization), in percentage values (lending rate) and as binary variables (IFRS, developed and developing countries). World Governance indicators database provided with information about such indicator components as: voice and accountability, political stability and no violence, government effectiveness, regulatory quality, rule of law, control of corruption. They are ranked mostly between -2.5 and 2.5.

The data for the information about the stage of IFRS adoption during 9 years (2003-2011) was collected from many sources. Main sources are Deloitte yearly report "IFRS in your Pocket", PriceWaterHouse report "IFRS adoption by country" and IFRS web site. For missing countries and missing years the more detailed search was executed in the different official documents and relevant articles or news.

The following variables were used in logarithmic terms: all instrumental variables (market capitalization, net official development aid, and remittances inflows), gross domestic product and length of phone lines. All variables were lagged by one period, since it is considered by theory that the effect on countries decision to adopt IFRS or on the level of FDI inflows is delaying by at least one year.

We consider that our dataset is not ideal primarily due to the main variable IFRS adoption. First of all, the data is incomplete, since it information for some years and countries is missing. Second, we are not sure to what extend countries use IFRS, even if it was a mandatory adoption. Countries may adopt IFRS, but still use extensively their local standards. Third, we there is no common opinion of whether to code countries that permit IFRS and those that require it for some industries as IFRS adopters. Finally, data for several countries is controversial, as in case of Ukraine. According to the Deloitte (that publishes reports about which countries adopted IFRS, where it is prohibited, where it is required for some industries or permitted for all industries), Ukraine is IFRS adopter for 2005-2010, but it is marked as prohibiting IFRS since 2010.

The summary statistics of the main variables is included in Table 1, followed by the variables description and source of data in Table 2.

Table 1. Descriptive statistics

Variable N=1111	Mean	Std. Dev.	Min	Max
FDI (current US, bln)	**8.14**	**30.50**	**0.00**	**340.00**
IFRS	**0.35**		**0**	**1**
GDP (current US, bln)	286.00	1 280.00	0.07	14 400.00
Openness	0.87	0.50	0.00	4.60
Phone lines (subscribers, bln)	0.01	0.03	0.00	0.37
Exchange rate (current US)	659.81	2 473.56	0.31	25 000.00
Lending rate	0.11	0.10	0.00	1.18
Financial aid (current USD, bln)	**0.61**	**1.19**	**-0.94**	**22.10**
Market capitalization (current USD, bln)	**478.00**	**2 000.00**	**0.02**	**19 900.00**
Remittances (current USD, bln)	**2.28**	**5.09**	**0.00**	**61.40**
Developing	0.83		0	1
World Governance Indicators (range from approx. -2.5 to 2.5):				
Voice & accountability	-0.12	0.89	-1.99	1.77
Political stability	-0.14	0.95	-2.83	1.54
Government effectiveness	-0.07	0.91	-1.87	2.41
Regulatory quality	-0.03	0.86	-2.15	2.12
Rule of law	-0.13	0.92	-2.12	1.99
Corruption	-0.12	0.95	-1.82	2.52

Table 2. Variables description

Variable	Unit of measure	Description	Capturing factor	Source
FDI	Natural logarithm	Foreign direct investments inflows	Main variable	World Bank Database
IFRS	Dummy	Equals to 1 if a country requires for all listed companies to adopt IFRS, '0' - in other cases (IFRS is permitted of required for some, i.e. banks)	Main variable	Deloitte "IFRS in your pocket", PwC "IFRS adoption by country", http://www.adoptifrs.org/countries.aspx, etc.
GDP	Natural logarithm; lagged	Nominal Gross Domestic Product	Market factor	World Bank Database
Openness	Current US dollars; lagged	Equals to the sum of total exports plus imports divided by nominal GDP	Investment climate	World Bank Database
Exchange rate	Current US dollars; lagged	Annual average exchange rate	Investment climate	World Bank Database
Lending rate	Percentage; lagged	Lending interest rate	Investment climate	World Bank Database
Phone lines	Number; lagged	Number of subscribers	Infrastructure	World Bank Database
Government indicators	Range from -2.5 to 2.5; lagged	Government indicators	Investment climate	Worldwide Governance Indicator Database
Financial aid	Natural logarithm	Net official development assistance	Instrumental variable	World Bank Database
Market capitalization	Natural logarithm	Market capitalization Equals to shares prices times shares outstanding	Instrumental variable	World Bank Database
Remittances	Natural logarithm	Remittances inflows	Instrumental variable	World Bank Database
Developing country	1	Equals to 1 if country is classified as developing		World Bank Database

C h a p t e r   5

EMPIRICAL RESULTS

To answer the question about the relationship between country's decision to adopt IFRS and foreign direct investment inflows to that country, we first turned to the results from the existing literature. The most sophisticated approach to the endogeneity problem in the regression of FDI was proposed by Gordon (2012), which was discussed in the previous section. We attempted to create a very similar dataset, including the same countries and explanatory variables, with some limitations that will be discussed further. In our dataset the time period was censored from year 1999, since there is no available data about countries' IFRS adoption before 2003. However, some of the obtained results are contradictive and unstable. This raises the concern about the model specification in the mentioned study, which we were trying to correct in our paper.

In general, we first replicated the previous model proposed by Gordon (2012), then we added and replaced some variables, extended our sample until year 2011, added more countries, and finally we proposed new solution to the endogeneity problem in the regression of IFRS.

5.1 Bootstrapping OLS analysis

Our benchmark model was ordinary least squared regression, the results of which were checked and confirmed by bootstrapping analysis. This technique is used since for small samples as ours it allows getting more precise estimates. We started from the FDI regression and its main determinants, then we added IFRS

adoption to these determinants and after that we controlled for effects of two types of countries: developed and developing (Table 3).

The first OLS regression aimed to check whether our explanatory variables indeed drive FDI inflow. The main determinants revealed are gross domestic product, trade openness, average lending rate and several government indicators (government effectiveness and regulatory quality). We found that IFRS dummy variable does not explain FDI.

Then, we continued our analysis and divided countries in two groups: developing and developed. The results for developing and developed countries vary. Some of the determinants are significant for developing countries (GDP, openness, political stability, corruption), some are significant for developed ones (GDP). Our variable of interest, IFRS adoption, is positive and highly significant at 1% significance level for developed countries and insignificant for developing. All the variables have expected signs.

Our results are very comparable to the results obtained earlier by Gordon (2012). However, we find some crucial discrepancies. Although we both agree on positive influence of IFRS adoption for the developed countries, the results for developing countries differ.[1] It was also found that variable GDP per capita and GDP growth rate are highly correlated with GDP. In contrast to Gordon, further these variable were excluded to avoid collinearity. We also replaced variable mobile cellular subscription (that in our opinion doesn't represent a true proxy for infrastructure, since it is highly correlated with the size of population) with the number of phone lines (that capture the stock factor of infrastructure). We argue for the usage of annual average exchange rate instead

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[1] Later we consider a specific instrumental variable to find out whether developing countries indeed benefit from adoption of global standards, as the theory predicts.

of year-end exchange rate, because it captures the whole year trend, and not only the one day effect. To sum up, in our model we tried to correct the misspecifications from the previous studies to obtain more precise results. We also extended the time period up to the most recent year with the available data – 2011 and we added new countries to the dataset. There were no major changes in the direction of the variables and their significance, so we continued to work with the new sample including the most recent observations. Table 3 summarizes the obtained results from the OLS estimations with bootstrapping.

Table 3. Bootstrapping (200 times) OLS analysis for FDI

Variables FDI	Benchmark (1)	All countries (2)	Developing (3)	Developed (4)
IFRS		0.110	0.0002	0.625***
GDP	0.758***	0.740***	0.453**	1.572***
Openness	0.751***	0.745***	0.805***	0.580
Phone lines	0.387**	0.398**	0.318*	0.599
Exchange rate	8.81e-05	9.11e-05	4.06e-05	0.00151
Lending rate	-0.612	-0.644	-0.482	-3.652
Voice & accountability	-0.222	-0.221	-0.219	0.308
Political stability	-0.193*	-0.196	-0.271**	0.484
Government effectiveness	-0.200	-0.207	-0.108	-0.564
Regulatory quality	0.179	0.187	0.127	0.152
Rule of law	0.109	0.112	0.158	0.00495
Corruption	0.397***	0.395***	0.399***	0.468
Constant	-48.18	-44.77	-151.0**	294.5**
Year trend	Yes	yes	yes	Yes
Country fixed effect	Yes	yes	yes	Yes
Number of countries	135	135	111	24
Number of observations	1,111	1,111	1,111	1,111
R-squared	0.229	0.230	0.277	0.194

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

5.2 Probit estimation for IFRS adoption

To find out whether FDI inflows indeed increase the probability of IFRS adoption, we performed the probit regression analysis. The results are presented in Table 4. We found that the probability that countries will adopt IFRS increases by 2.7 percentage points if FDI (in logs) inflows increase by 1%. We continued our analysis and divided countries into two groups: developing and developed, while controlling for endogeneity for both groups.

Table 4. Probit for IFRS

Variables IFRS	Coefficients	Marginal effects(*)
FDI	**0.074****	**0.027****
GDP	-0.195***	-0.070***
Openness	0.061	0.022
Phone lines	0.071	0.026
Exchange rate	1.70e-05	0.000
Lending rate	1.361***	0.490***
Voice & accountability	0.303***	0.109***
Political stability	-0.055	-0.020
Government effectiveness	0.255	0.092
Regulatory quality	1.014***	0.365***
Rule of law	-0.502***	-0.181***
Corruption	-0.456***	-0.164***
Year	yes	yes
Constant	-211.2***	
Observations	1,111	1,111
Pseudo R²	0.148	0.148

*** p<0.01, ** p<0.05, * p<0.1
(*) Marginal effects after bootstrap: probit
y = Pr(ifrsadopt) (predict) = .32563807

5.3 Instrumental variable (IV) analysis for FDI regression

Since the IFRS adoption variable is likely to be endogenous, we attempt to correct this problem with the help of distinct instruments for developed (net official development aid) and for developing countries (market capitalization). The results are included in the Table 5 and 6 (decomposed into two groups: 5 stands for developing countries and 6 – for developed). In order to get rid of high correlation between government indicators, principal component analysis was performed and with the help of orthogonal transformation of these variables we obtained a linearly uncorrelated variable (named Government in our further regressions).

As it is shown in Table 5, *financial aid* (net official development aid) received by developing countries is highly statistically significant as instrument. Once we included the instrumented variable IFRS adoption into the regression of FDI, the coefficient becomes significant at 3% significant level. If we turn back to the results of OLS regression for the developing countries, we find out that previously insignificant coefficient of IFRS became significant after instrumenting. Thus, the developing country's decision to adopt IFRS helps it to attract more FDI once we control for endogeneity of IFRS. Gordon (2012) also found that IFRS it significant at the level of 1% after being instrumented with the net official development aid. The second stage reveal that GDP, openness and phone lines influence the amount of FDI inflows to developing countries (consistent with OLS analysis).

After conducting post estimation Durbin-Wu-Hausman test, we reject the null that IFRS adoption is exogenous. Thus, the use of instrument is appropriate for the unbiased estimation of the IFRS effect on FDI inflows.

Table 5. Two-stage IV regression of FDI (developing countries)

Stage 1				*Stage 2*			
Variables IFRS	**Coef.**	**Std. Err.**	**P>t**	**Variables FDI**	**Coef.**	**Std. Err.**	**P>t**
GDP	-0.002	0.02	0.91	**IFRS**	**1.700**	**0.79**	**0.03**
Openness	0.061	0.04	0.11	GDP	1.066	0.06	0.00
Phone lines	0.042	0.02	0.01	Openness	1.131	0.12	0.00
Exchange rate	0.000	0.00	0.26	Phone lines	-0.147	0.07	0.03
Lending rate	0.740	0.23	0.00	Exchange rate	0.000	0.00	0.97
Government	0.049	0.01	0.00	Lending rate	-0.402	0.75	0.59
Financial aid	**0.045**	**0.01**	**0.00**	Government	0.073	0.05	0.13
Constant	-1.112	0.30	0.00	Constant	-4.387	0.97	0.00
Number of obs = 813		Prob > F = 0.0000					
F(7, 805) = 16.24		R-squared = 0.1027					

(*)Government is constructed by principal component analysis from six government indicators

In the Table 6 the results of the two-stage IV estimation for developed countries is presented. *Market capitalization*, suggested by Gordon (2012) to be used as an instrument, is highly significant, but with a negative sign. This result contradicts the theoretical expectations that countries with higher level of market capitalization require more the adoption of the worldwide accounting standards. This dubious first-stage result may distort the effect of the instrumented IFRS variable when it was plugged into the FDI regression at the second stage of IV analysis. The sign of the coefficient on IFRS in Gordon (2012) becomes negative and significant, that is very contradictive to the theory. Gordon in her study ignored the fact that none of the first stage factors has an effect on the instrumented variable, including market capitalization (the key instrument). This rather suggests that market capitalization is not a valid instrument for developed countries. As a result, we turn our analysis to the developing countries and check whether there is a reverse causality between FDI inflows and IFRS adoption.

Table 6. Two-stage IV regression of FDI (developed countries)

Stage 1				*Stage 2*			
Variables IFRS	**Coef.**	**Std. Err.**	**P>t**	**Variables FDI**	**Coef.**	**Std. Err.**	**P>t**
GDP	0.185	0.07	0.01	**IFRS**	**-1.919**	**0.80**	**0.02**
Openness	0.044	0.05	0.38	GDP	0.398	0.25	0.11
Phone lines	-0.025	0.07	0.73	Openness	0.570	0.14	0.00
Exchange rate	0.000	0.00	0.30	Phone lines	0.284	0.27	0.29
Lending rate	0.134	0.21	0.53	Exchange rate	-0.002	0.00	0.00
Government [(*)]	0.116	0.03	0.00	Lending rate	0.862	0.80	0.28
Market capitaliz-n	**-0.190**	**0.04**	**0.00**	Government	0.174	0.10	0.08
Constant	0.497	0.78	0.52	Constant	7.844	3.08	0.01
Number of obs =193		Prob > F = 0.0000					
F(7, 185) =19.03		R-squared = 0.2741					

[(*)]Government is constructed by principal component analysis from six government indicators

5.4 Instrumental variable (IV) analysis for IFRS regression

We started with probit regression to check whether FDI inflows have positive influence on the IFRS adoption and this assumption was confirmed. In addition, some other variables, such as GDP and phone lines (the proxy for infrastructure), positively influence the decision of a country to adopt global financial standards.

We further moved to the correction of the endogeneity problem in the regression of IFRS for developing countries. Our instrument *remittances* inflow is highly statistically significant in the first stage of instrumental variable analysis (Table 7). During the second stage of IV analysis we obtained the highly significant positive coefficient on FDI inflow, which means that the FDI (instrumented with remittances inflow) in its turn also influences the decision of a country to adopt IFRS.

Post estimation Wald test confirms our prediction that FDI is endogenous and has to be instrumented.

Table 7. Two-stage IV regression of IFRS adoption (developing countries)

Stage 1				*Stage 2*			
Variables FDI	**Coef.**	**Std. Err.**	**P>t**	**Variables IFRS**	**Coef.**	**Std. Err.**	**P>t**
GDP	0.921	0.06	0.00	**FDI**	**0.626**	**0.17**	**0.00**
Openness	0.942	0.12	0.00	GDP	-0.553	0.17	0.00
Phone lines	-0.007	0.06	0.91	Openness	-0.555	0.23	0.01
Exchange rate	0.000	0.00	0.16	Phone lines	-0.033	0.06	0.59
Lending rate	0.215	0.39	0.58	Exchange rate	0.000	0.00	0.57
Remittances	**0.130**	**0.04**	**0.00**	Lending rate	1.791	0.78	0.02
Constant	-4.650	1.05	0.00	Constant	0.706	1.25	0.57
Number of obs = 821		Prob > F = 0.0000					
F(7, 805) = 16.24		R-squared = 0.1027					

5.5 Threshold estimation

The threshold *k* of FDI inflows to developing countries is estimated by using two methods: IV probit and linear probability model. The results are presented in table 8. Since the level of foreign direct investments is endogenous in the regression, the best model is IV probit; other methods are used as some robustness check.

Table 8. Estimation of threshold value

Estimation method	**Threshold value**	**FDI, US billions**	**Likelihood**
IV Probit	k=20	1.32	-480.93
LPM	k=22	3.58	78.70

The significance of estimated threshold $k*$ is tested using the test described in eq. 7. Since the distribution of calculated test statistics LR is non-standard, it is simulated with the help of bootstrapping procedure. We performed the bootstrap procedure with 200 replications, which simulated the likelihood ratio distributions. We checked the p-values for both methods of estimations, and they are all equal to almost zero. The p-value and other components of the test are presented in the Table 9.

Unfortunately, IV probit is sensitive to bootstrapping and is very unstable (but when it converges, the estimated p-value for the test statistics is almost zero). Simulation of LR distribution with linear probability model (LPM) is stable and produces the same p-value.

As we can see from the Figures 1 and 2, the obtained threshold values with IV probit and LPM estimators are very close to each other, so we confirm that the results are robust and the p-value for LR estimated with LPM can be trusted.
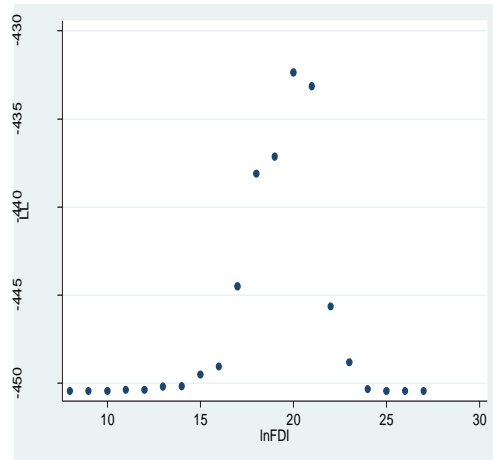
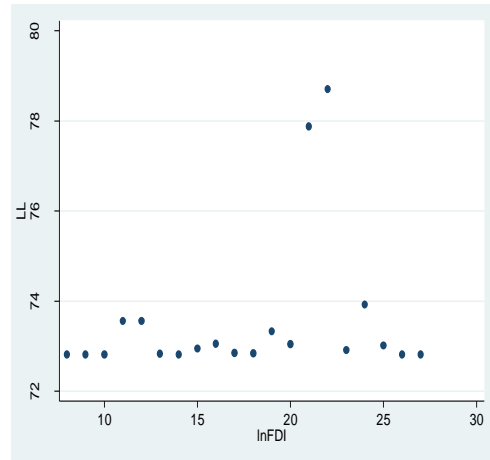

Figure 1. Likelihood of FDI (IV probit)   Figure 2. Likelihood of FDI (LPM)

Table 9. Test for significance of estimated threshold

LR	36.18
p-value	0.00
1% critical value	5.94
5% critical value	7.35
10% critical value	10.59

Our following concern is how precise our estimates of the threshold are. Using the critical value at 10% significance level, we construct "no-rejection" region, which is presented on the Figure 3. The 90% confidence interval is [20.5, 22.3].
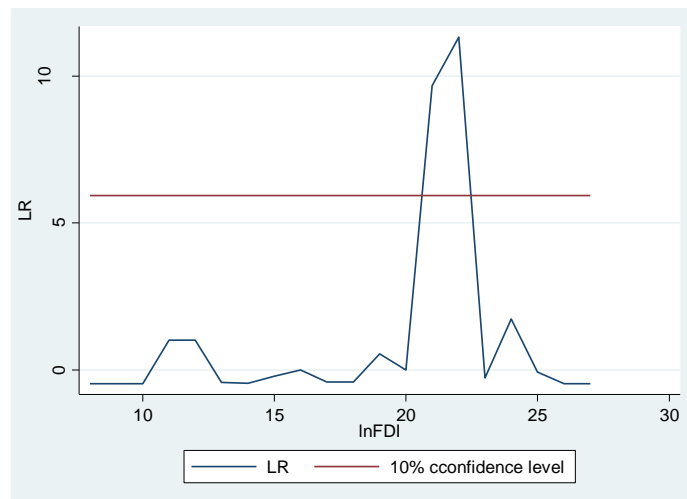

Figure 3. Confidence interval for the estimated threshold
(at 10% significance level)

To summarize, there is indeed a threshold for the FDI effect on the probability of the IFRS adoption. However, it contrasts to the original expectations. We found that higher FDI inflows increase the probability for developing countries to adopt IFRS, but before not after the certain level of FDI (0.5 to 1.6 billion USD per year). Specifically, the probability of these countries to adopt IFRS increases by 30 percentage points if FDI inflows increase by 1%. In contrast,

there is no statistically significant effect above that level of FDI. Other factors that increase the probability of IFRS adoption are: lending rate, voice and accountability, regulatory quality and the level of corruption. The results of instrumented probit regression are presented in the Table 10.

Table 10. Instrumented probit

Variables (threshold = 20)	First stage FDI	Second stage Probit (Coefficients) IFRS	Marginal effects(*) IFRS
LnFDI below threshold		**0.829****	**0.297****
LnFDI above threshold		**0.288**	**0.104**
Remittances	0.124***		
GDP	0.906***	-0.548	-0.197
Openness	0.940***	-0.504	-0.181
Phone lines	0.00851	0.0654	0.023
Exchange rate	-1.42e-05	4.96e-06	0.000
Lending rate	0.233	2.414**	0.867**
Voice & accountability	-0.0539	0.271***	0.097***
Political stability	0.180**	-0.0521	-0.019
Government effectiveness	-0.501***	0.496	0.178
Regulatory quality	0.527***	0.690**	0.248**
Rule of law	0.0237	-0.319	-0.114
Corruption	0.258*	-0.594***	-0.123***
Year	yes	yes	yes
Constant	-34.91	-125.9***	
Observations	821	821	821
R-squared / Pseudo R-squared	0.752	0.198	0.198

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

(*) Marginal effects after bootstrap: probit

y = Pr(ifrsadopt) (predict) = .323

C h a p t e r   6

CONCLUSIONS

The main objective of the current study is to examine the direction of relationship between foreign direct investments and international financial reporting within the framework of countries' economic level of development. We aimed to answer three questions: (1) whether the causality goes in both directions, (2) whether there is a distinct effect for developing and developed countries, (3) whether the non-linearity of the FDI effect increases the likelihood of IFRS implementation.

The results are consistent with the previous studies in the fact that developing countries benefit the most from the adoption of global standards in terms of attracting additional capital from abroad. We also found that FDI in its turn also increases the probability of adopting IFRS in developing countries, even after controlling for endogeneity. Further investigation revealed that higher FDI inflow stimulates a developing country to implement IFRS but only until the threshold is reached (around 0.5-1.6 billion USD per year).

The effect of IFRS adoption for developed countries is an unanswered question yet. The OLS estimation is biased. However, market capitalization as an invalid instrument for IFRS adoption in developed countries. Thus, a further investigation is needed.

Our research has several limitations. First, not all countries are included in the sample due to a missing data. Second, we were limited in including specific drivers for IFRS adoption because data for such indicators is cross sectional, but not time series. Finally, some countries that intentionally do not want to implement IFRS (such as United States of America) should be excluded from

the sample, but countries whose standards are very close to IFRS (such as China) should rather be considered as IFRS adopters. If all these limitations are taken into consideration the conclusion would be more precise.

In general, we showed that the causality between IFRS adoption and FDI inflows goes in both directions for developing countries, moreover, there is the threshold level of FDI impact on the probability of IFRS adoption.

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