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The Impact of Foreign Direct Investment on the Stock Market Development in Sweden

Department of Economics

Bachelor thesis. 15 ECTS

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Abstract

Previous research has found a significant relationship between FDI inflow and the domestic stock market development. However, the research mainly examines emerging economies that might benefit from foreign capital to a higher extent than a developed country. The purpose of this paper is to study if FDI as a determinant of the stock market development in Sweden. To measure the relationship, OMX Affärsvärlden General Index (AFGX) is used as proxy for stock market development and net FDI inflow is used as proxy for FDI. A time series regression analysis is conducted to examine the role of FDI on the stock market development and various macroeconomic control variables is also included in the model. Data used are the Swedish quarterly data observed between 1982 and 2017. The result suggests no strong contemporaneous relationship between FDIs and the stock market development, while the FDI during the previous quarter significantly and negatively affect the stock market implying that FDI might be considered as a short-term substitute to the stock market. The results are robust with respect to several checks. This thesis discusses the implication of these results.

Key words: FDI, Stock Market Development, European Union

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Contents

1. Introduction

The net inflow of FDI around the world has multiplied itself with 200 times between year 1970 and 2016 (World Bank, 2017). A foreign direct investment (FDI) is an investment made cross-border by an investor in one specific country, with the main objective to establish a long-lasting interest in another country. To be defined as a lasting interest, the investor has to own at least 10 percent of the voting power of the enterprise in which the direct investment is made (OECD, 2008). Countries classified as industrial accounted for 68% of the GDP in the world and 85% of the total market capitalization in 2010. Sweden's market capitalization as percent of GDP in 2010 made up to 118% which indicates a high foreign investment in the domestic stock market (Bodie et al, 2014). Since the first quarter of 1982, the Stockholm stock exchange has had a strong positive development. The Affärsvärldens General index (AGFX) indicates that there has been a development meaning that 10 SEK invested in 1982 would be worth about 550 SEK in nominal value today. The AFGX was introduced at first in 1937 and is an all-share index which reflects the market. In difference to i.e. the more popular index OMXS30, which measures the 30 most traded stocks on the Stockholm stock exchange, AFGX represent the total stock exchange development (NASDAQ, 2017).

The objective of this paper is to examine how the inflow of FDI affects the stock market development in Sweden. An important effect of the FDI flows is the mutual interest in sharing technology and knowledge between countries, which leads to an increase in efficiency and skilled labor. Further, it opens up an opportunity to foster the receiving country's products and services globally. FDI also serves as an important source of capital to economies (OECD, 2008). Hence, it has been a large growth in FDI inflow around the world, including Sweden. The main idea of this paper is to examine if this integration of the economy has had an effect of the stock market development in Sweden.

According the European Union regulations, Sweden follows the Maastricht treaty which contains rules regarding freedom of capital movement within the union. Without restrictions on capital movement across borders, European citizens and companies could, in short, invest where the return is highest without facing payment across borders. Companies could invest in, and possess, foreign companies within the European Union and also obtain capital where the rental of capital is at its lowest (The European commission, 2017). Since Sweden joined

the European Union in 1995 the net inflow of FDI has increased from 6,269 billion dollars to 17,637 billion dollars (World Bank 2017). Simultaneously there is an increasing opposition against the European Union with Brexit as culmination. If Sweden were about to leave the union they would also leave the Maastricht treaty leading to regulations of capital-movement. In our data set, the FDI inflow fluctuates significantly more after 1990, which indicates a higher flow of capital in and out of Sweden after the entrance to the European Union.

Studies which investigate factors determining the development in the stock market has been conducted on many different countries and economies. Malik and Amjad (2013) and Sekhri and Haque (2015) finds a positive impact of FDI on the stock market development in Pakistan and India. Rhee and Wang (2009) investigated the relationship in Indonesia, and finds a negative correlation. Ho and Iyke (2017) concludes that there is a consensus regarding the fact that factors such as real income level, inflation and exchange rates in a country have significant effect on the development. Further, the relationship between FDI and stock market development has mostly been studied in emerging economies and a majority of the papers discussed above, finds a positive relationship between the tested variables. With this paper, we aim to contribute to existing research in the subject of FDI and stock market development but with a focus on an industrialized country.

To our knowledge this is the first study investigating the relationship for Sweden, which is one of the most industrialized countries in the world. To investigate this relationship, quarterly data from 1982 to 2017 are used. To measure the stock market development, the dependent variable used is Affärsvärldens General Index (AFGX) and the main independent variable is the net FDI inflow which is used as a proxy for FDI. Various macroeconomic control variables are also used in different combinations to control for other factors, which can have an effect on the stock market development. A time-series regression analysis is used to check for this relationship.

We find evidence that the first lag of FDI is significantly and negatively associated with the stock market development, while there is no significant contemporary effect of FDI. This result diverges from the majority of previous studies conducted on emerging economies, which found a positive relationship between the tested variables. We were not able to find evidence of impact from FDI when not using its lagged value (t-1). The results are robust. We

have used alternative set of controls variables, and in each case the first lag of FDI stays statistically significant. This result is not explained by the saving or by the European membership as expected.

The remaining part of the paper is organized as follows. In Chapter *2* we present the literature review. In Chapter 3, economic theory related to how financial markets might be affected by the increase of global financial flows and globalization is discussed. In Chapter 4, data sources are presented and the variables used in this paper are explained. In Chapter 5 the econometric approach is discussed and the methodology of the analysis will be discussed. In Chapter 6 the results from the analysis are presented. In Chapter 7 Discussion and Conclusion, the results are interpreted and discussed further.

2. Literature Review

There is a substantial literature on the determinants of stock markets development both in developing and developed countries. Yet only some of them have examined the role of FDI whilst others have approached the subject in a more nonspecific way by looking at general determinants. To our knowledge, papers which aim at investigating the FDI effect on the stock market are mainly from emerging countries and our literature revive is going to focus on these studies.

There are opposing views in the existing literature on which affect FDI has on stock market development. A study made by Hausmann and Fernández-Arias (2000) concludes that FDI is nothing more than a substitute to the stock market. They observe that countries who are riskier, more financially underdeveloped and institutionally weaker has a higher inflow of FDI. In regard to this, their statement is that FDI correlates negatively with the development of stock markets. Similar results were found by Rhee and Wang (2009), who studied the relationship between foreign institutional ownership on the development on stock market liquidity in Indonesia by using econometric approaches. The authors found a negative correlation between foreign investments and stock market development in Indonesia.

Ho and Iyke (2017) conducted a study where they reviewed the existing literature on the determinants of stock market development. They concluded that there are a number of factors

that determine the development of the stock market, these factors can be divided into two major groups; macroeconomic factors and institutional factors. The existing empirical material predict different ways macroeconomic factors will affect stock market development. A consensus in the existing literature is that growth in the real income has a positive relationship on the stock mark, and simultaneously inflation and exchange rate has a negative effect on stock market development. Existing literature cannot agree on whether factors such as banking sector, interest rate and private capital flows has a positive or negative effect on the development of the domestic stock markets. Looking at institutional factors, the study suggests a lack of consensus regarding the legal origins and stock market integrations. On the other hand, factors such as protection of investors, governance stability, financial liberalization and trade openness all have a positive influence on the stock market development.

Regarding the flow of FDI, Claessens, Demirgüç-Kunt, and Huizinga. (2001) makes the argument that countries with solid institutions and stable economic fundamentals tends to have a high inflow of FDI, which thereby is boosting the financial institutions. A specification is made of which channels FDI fosters stock market development is made. First of all, for firms who wish to finance their investments with external capital and thereby trade in the domestic equity markets, FDI tends to improve the participation of corporations in financial markets. Secondly, FDI can increase the total market capitalization of the domestic stock market when foreign investors purchases and sells existing equities.

2.1 FDI and Stock Market Development

A recent study by Malik and Amjad (2013) examines the effects of FDI on the Pakistani stock market KSE. The authors based their study on secondary yearly data between 1985 and 2011, and by using econometric methods they investigated the relationship between FDI and stock market development. A strong causal effect between the inflow of FDI and the development of the total market capitalization was found. The results show that FDI had a positive impact on the Pakistani stock market. Another recent study, by Sekhri and Haque (2015), examined the same relationship for India. India has experienced an accelerating trend of FDI inflow during recent decades and the authors found a close relationship between FDI and the development of the domestic stock market of India SENSEX & NIFTY. The study

concludes that the flow of FDI has paved the way for the Indian stock market. This due to the increase in technology, knowledge and utilization, which lead to a more efficient industry. Jeffus (2004) investigates the relationship between FDI and stock market development in four Latin American countries. Jeffus (2004) findings suggest a high correlation between FDI and stock market indices. The author states that FDI works as a predictor for stock market development. The argument is that when firms enter a new market, one way for the firm to raise additional capital is by participating in the local stock market, which will lead to a high development of the local stock market.

Claessens and Rhee (1993) suggests that foreign portfolio investment has a long-term effect on domestic financial markets. They specify this by pointing out that equity flows generate efficiency of domestic capital market by leading to an extension of the liberalization and development of equity markets. It can also increase the equality of risk-taking between domestic and foreign investors. More on portfolio investments will be discussed in the section of theoretical framework.

2.2 FDI and the European Union

Dhingra, Ottaviano, Sampson & Van Reenen (2016) discuss the importance of a membership in the European Union with respect to FDI inflow. The authors show that being a member in the union has a positive effect on the FDI inflow. Further, a statistical significant difference cannot be found between being a member of the European Free Trade Association (EFTA) as Norway and Switzerland, and being outside of the European area. The authors continue to discuss important factors of the European Union, such as the reduction in trade and investment cost, as key determinants for firms when choosing where to invest.

2.3 Our Contribution

The conclusion from the previous research is that the increase of FDI have a positive effect on the development of the stock market in emerging economies. To our knowledge, this is the first study which directly focus on the relationship between FDI and stock market in context of a developed country.

In summary, the reviewed research has different views on which affect FDI has on the development of stock markets. In general, the effect is positive when tested on emerging economies. However, some researchers have found negative correlation between the tested variables. Work with respect only to an industrialized country have not been found and unlike previous research this paper investigate the relationship between FDI and stock market development in a developed country.

3. Theoretical Framework

Harry Markowitz first introduced the concept of modern portfolio theory in an article which was posted in the Journal of Finance in 1952. With the assumption that all the investors are risk-averse and desires the highest amount of return as possible given a fixed level of risk. The idea is that instead of putting all of her wealth in the same (risky) asset, the investor should divide and diversify the wealth into several different assets (Markowitz, 1952). Claessens and Rhee (1993) suggests in their article that foreign portfolio investment has a long-term effect on domestic financial markets. They specify this by pointing out that equity flows generate efficiency of domestic capital market by leading to an extension of the liberalization and development of equity markets. It can also increase the equality of risk-taking between domestic and foreign investors.

As a way to elaborate the Markowitz portfolio theory, Bodie et al (2014) explains the concept of international diversification. An investor will try to diversify the domestic market-risk by obtaining assets outside of its own borders. When an investor conducts international diversification, there are some risks that has to be accounted for. *Exchange rate risk* is one important factor to account for when an international diversification is made. When an investment is made in another currency there is always a risk for change in the exchange rate (Bodie et al, 2014). Because of this, this paper will include the exchange rate between the U.S. dollar and the Swedish Krona in the model to account for changes in the domestic currency.

As an extension of the neoclassical economic model, Solow (1956) and Swan (1956) developed the neoclassical growth model, also known as the Solow-Swan model. Under the assumption that markets are relatively free and competitive, i.e. trade of capital and goods

can flow from different economies, the authors discuss the effect of diminishing returns of capital as a main determinant of capital flows. To maximize their returns, investors will start seeking out investment opportunities in the country with lower efficiency in production. The neoclassical growth model was later discussed by Lucas (1990) who challenged this idea, he introduces the Lucas Paradox, meaning that the neoclassical model fails to explain capital flows, pointing at other factors such as political risk as major determinants. Lucas (1990) defines political risk as various market imperfections, leading to limitations in the capital flows between economies.

The discussion of political risk continues by Bodie et al. (2014). The authors support the claim that political risk is a main factor in regard to if a foreign investment is about to be made. In a report of the Swedish investment climate, The U.S. Department of State (2015) states that Sweden is an attractive country to invest, due to its political stability and a corrupt free climate. This paper will not account for political risk due to lack of availability of data in a quarterly frequency, but according to the World Bank (2017) Sweden is in the 98.6 percentile of political stability in the world and should be considered as an attractive country to invest in.

The inflow of a direct investment from a foreign actor causes an increase of capital in the domestic economy. With this increase of capital follows an increase of real wages which is consistent to the specific factor model (Feenstra and Taylor, 2017). Further, the OECD (2017) states that net household savings, which increases with an increase of real wages, is a major determinant of financial capital investment.

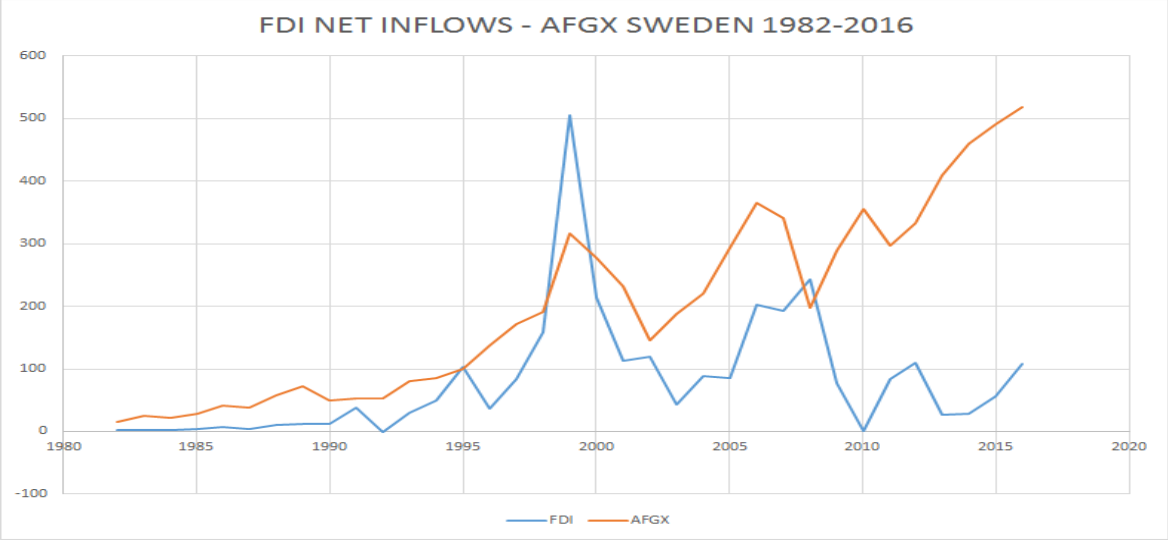
In conclusion, the modern portfolio theory and the neoclassical growth model serves as explanations to why investors seek investment opportunities abroad. The neoclassical growth model suggest that industrialized country would not be an attractive investment option, this due to relatively low levels of marginal product of capital. According to IMF (2015), Sweden is classified as an industrialized country. However, the Lucas Paradox suggest that other factors as political risk must be accounted for when choosing where to invest, meaning Sweden would in fact be attractive. Lastly, the specific factor model suggest that foreign capital increases real wages in the host country.

4. Data and Econometric Approach

4.1 Sample

Our dependent variables used is stock market development and is measured as the change in the OMX Affärsvärlden General Index (AFGX). According to Yartey (2008) changes in stock market index is often used as proxy for the overall stock market development. AFGX is an all-share index which measures the average development of the Stockholm Stock Exchange. AFGX has a base value of 100 in 1995. AFGX data is retrieved from the Bloomberg Terminal and is quarterly measures between 1982 and 2017. *Net Foreign direct investment* inflow (FDI) data is used as our main independent variables and is retrieved from the Statistics Sweden (SCB) statistical database, from the Swedish balance of payments. FDI is measured in billion SEK. The data used is quarterly measures from 1982 to 2017. The following figure presents the time series pattern of these two measures. The figure suggests that both measures increase over time and exhibit a common trend.

Figure 1: Time-Series Relationship between the main variables



Note: FDI and AFGX. FDI is measured in billion SEK.

The other control variables that we are going to use in our econometric analysis are retrieved from various databases. All variables are quarterly measures from 1982-2017. The time period was chosen du to the fact that quarterly FDI data was only available from 1982. *Gross domestic product (GDP)* is measured by the expenditure approach in million SEK, measured in constant prices, reference year 2016. GDP with the actual values is available from the

Statistic Sweden database. Due to interpretation purposes, we use the growth rate of GDP. GDP growth is retrieved from the Bloomberg Terminal. *The repo rate* is retrieved from the Swedish Riksbank. The repo rate is in percentage and is interpreted as a long-term interest rate. The exchange rate chosen was *USD/SEK*, since it is a well traded exchange rate that affects the value on other rates. We wished to include the EURO/SEK, but data were not available. *Consumer price index with fixed interest rate (CPIF) and Net household savings* are retrieved from the Bloomberg Terminal. The exchange rate is included to control for fluctuations of the exchange rate. *CPIF* measures price changes within the last 12 months in Sweden and is interpreted as the underlying inflation rate. *CPIF* is measured as change in the consumer price index on a yearly basis with fixed interest rate. *Net household saving*s is defined as the difference of household consumption and household disposable income, including net equity in pension funds and is measured in billion SEK.

We first check the time series properties of our variables using several tests and transformations. The first is to test for stationarity, or unit root, using the augmented Dickey-Fuller test. In this test, the null hypothesis is that the variable contains a unit root (see, for instance, Wooldridge, 2014). The null hypothesis was rejected for the variables with a p-value smaller than 0.05, i.e. the FDI, GDP Growth and CPIF variable, meaning that all variables except FDI, GDP Growth and CPIF contains a unit root. Taking the first difference of the highly persistent variables is a method to deal with non-stationarity. We apply the first difference to all variables except FDI and GDP Growth. According to the Dickey-Fuller test, the variable CPIF has a p-value of 0.0419 and does not contain a unit root. However, when manually testing the correlation between CPIF and the first lag of the variable, the correlation coefficient is large which indicates non-stationarity in the variable. The first difference is therefore used way for interpretation purposes. As observed in Table 1, after taking the first difference, the variables get weakly dependent, i.e. the process is not highly persistent anymore. The interpretation of the variable change and is now interpreted as the change of the variable, instead of the actual value.

Table 1: Unit root test based on the augmented Dickey-Fuller test

Variable	P-value	First difference p-value
AFGX	0.9763	0.0000
FDI	0.0000	
REPO	0.9080	0.0000
USD/SEK	0.6345	0.0000
GDP Growth	0.0000	
Net Savings	0.9885	0.0000
CPIF	0.0419	0.0000

Second, we investigate the correlation between measures used in the analysis. The results are given in Table 2. The estimators that we are going to use would be biased if there is a very high correlation between control variables.

Table 2. Correlation Matric of the Control Variables

Variable	FDI	Repo	GDP Growth	Net Saving	USD/SEK	Inflation
FDI	1.0000					
Repo	0.0121	1.0000				
GDP Growth	0.0752	0.0927	1.0000			
Net Saving	0.2033	0.2324	-0.0824	1.0000		
USD/SEK	0.0212	0.0336	-0.1891	0.1225	1.0000	
Inflation	0.0807	-0.0127	0.0255	-0.0296	0.0722	1.0000

Note: Cleaned variables are used.

Third, we manually test for the trend in out variables. As stated above, the first difference of the variables containing a unit root was used. This process also eliminates any possible time trend in the variable. To identify trends in a variable, a regression analysis is conducted on the variable of interest and a time-variable. The p-value for the time-variable determines if the variable of interest is trending. Because of the use of the first difference, evidence of trends is only found in the FDI variable. By including the time-variable in the model, the trend is accounted for.

Table 3. Analyzing the Trend in Measures

Variable	P-value	Trend

AFGX	0.2680	No
FDI	0.0100	Yes
REPO	0.7880	No
USD/SEK	0.8720	No
GDP Growth	0.6870	No
Net Savings	0.1190	No
CPIF	0.3230	No

Fourth, we test for seasonality in the variables. To detect seasonality, quarterly dummy-variables are created, which are then included in the regression along with the variable of interest.

The general regression specification to test for seasonality is

$$Y_t = \alpha + \beta_1 Q_2 + \beta_2 Q_3 + \beta_3 Q_4 + U_t \quad (1)$$

By performing a post-estimation F-test, with the null hypothesis that there is no difference between the quarters. The test can only be rejected for the FDI variable, meaning there is seasonal patterns in the net inflow of FDI. There are however no other seasonality in the time-series used in our analysis. The seasonality in the FDI variable is accounted for by including quarterly dummies in the regression settings.

Table 4. Analyzing for Seasonality

Variable	P-value	Seasonality

AFGX	0.0661	No
FDI	0.0315	Yes
REPO	0.5244	No
USD/SEK	0.5686	No
GDP Growth	0.9700	No
Net Savings	0.2250	No
CPIF	0.9769	No

4.2 Descriptive Statistics

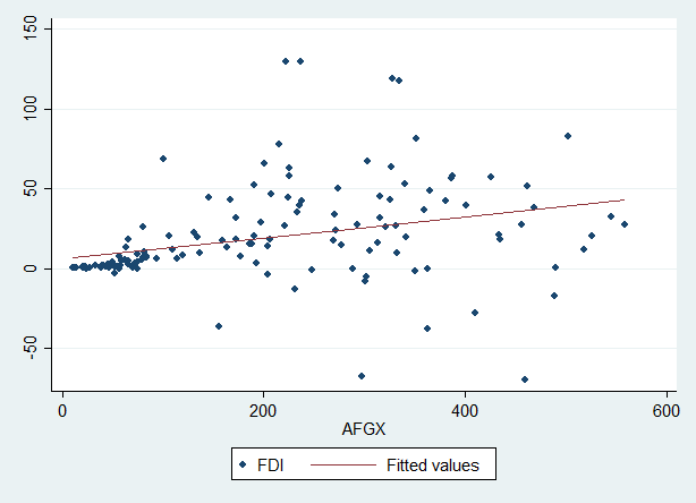
In this section of the paper, descriptive statistics for the variables used in the model will be presented. We have, in total, 142 observations. Due to first differencing, one observation is omitted. As discussed earlier, the first difference was applied to all variables except FDI and GDP Growth to deal with non-stationarity and is also used in table 5. As shown in the descriptive statistics the FDI variable has a mean of 19.357 billion SEK. The FDI includes negative values because of the data is measured as net inflow of FDI. The net inflow could decrease if a foreign company or country chose to divest in the domestic country and thereby observe negative values. Descriptive statistics for the raw variables can be seen in Appendix A.

Table 5. Descriptive statistics for changed variables

Variable	Obs.	Mean	Std. Dev.	Min	Max
AFGX	141	3.895106	23.00298	-67.49	91
FDI	142	19.35704	30.49999	-69.8	130
Repo	141	-.0799589	.6241639	-2.5	2.5083
USD/SEK	141	.0176965	.4222435	-1.199	1.7876
GDP Growth	142	.565493	.9671224	-3.7	2.5
Net Saving	141	2.97037	18.84693	-56.50484	58.74527
Inflation	141	-.064539	.9447702	-5.5	3.5

Below we will present the raw relationship between the main variables, AFGX and FDI. The variables exhibit a common trend, but the relationship does not seem to be very strong.

Figure 2: Raw relationship between the main variables.



The variable FDI contains an outlier at the value 349 in the second quarter of 1999. To deal with this, the value is replaced with 130 which is right above the second highest value at 129.8. (See Appendix A for raw relationship without outlier).

4.3 Econometric Approach

Our econometric model is based on the linear regression of the variables changes across time. The model that we estimate is given as follows:

$$AFGX_t = \alpha + \beta_1 FDI_t + \beta_3 GDP\ Growth_t + \beta_3 Repo_t + \beta_3 Net\ Saving_t + \beta_4 Inflation_t + \beta_5 USD/SEK_t + \beta_6 EU + u_t, \quad (2)$$

where t indicates time measured quarterly. $AFGX_t$ is the broad stock market index and FDI_t is the foreign direct investment, which is the key independent variable in this study. Our aim is to estimate β_1. The other variables are defined as above. u_t is the error term and assumed to be uncorrelated with the control variables.

Table 6: Description of all variables used

Variable	Description
AFGX	Affärsvärldens general index, measured as change in the index
FDI	Net inflow of FDI, measured in billion SEK
GDP growth	Change of GDP, measured in percent

REPO rate	Interest rate, measured as change in interest rate
USD/SEK	The exchange rate, closing monthly. Measured as change in the interest rate
Net Savings	Swedish household net savings, measured in billion SEK
CPIF	Inflation, measured as yearly change in consumer price index with fixed rate.
EU	Dummy variable, takes value 1 after Q1 1995

According to the literature and the economic theory, FDI has various effects on the receiving country. As stated by OECD (2008), an explanation to the rapid globalization of the financial markets is due to a liberalization of market control. Further, FDI is discussed as a main component to the increase in economic integration in recent decades. It is also discussed earlier in this paper that openness has a positive influence on the stock market development. In mind of this, we were anticipating a positive relationship ($\beta_1 > 0$) between the tested main variables. One important effect of FDI is the increase in technology which can improve the efficiency of the production. In this paper, one logical assumption is that the technology effect of FDI might not be incorporated in the receiving country in the period the investment is made, rather it might take a while and therefore the core model will be tested with the lag of FDI.

The model that involves the lags of FDI is written as:

$$AFGX_t = \alpha + \beta_0 FDI_t + \beta_1 FDI_{t-1} + \beta_2 GDP\ Growth_t + \beta_3 Repo_t + \beta_4 Net\ Saving_t + \beta_5 USD/SEK_t + \beta_6 Inflation_t + u_t \quad (3)$$

$$AFGX_t = \alpha + \beta_0 FDI_{t-1} + \beta_1 FDI_{t-1} + \beta_2 FDI_{t-2} + \beta_3 FDI_{t-3} + \beta_4 GDP\ Growth_t + \beta_5 Repo_t + \beta_6 Net\ Saving_t + \beta_7 USD/SEK_t + \beta_8 Inflation_t + u_t \quad (4)$$

The reason to use the distributed lag model is that some variables can explain the stock market development in more time periods than just its specific one. A lagged variable can be included if an independent variable is expected to affect the dependent variable in the next time period (Studenmund, 2014). In this data set, the lagged variable of FDI was included to test if the FDI inflow in one quarter had an effect on the stock market development in the next quarter or the quarter after that. The estimation of the coefficient on a lagged term is the same as in the linear regression analysis. In this model one problem would be the high correlation between the lagged FDI variables. In this case our estimators would be biased

(Studenmund, 2014). We present a correlation matrix in Appendix A to investigate this point. We do not observe a high correlation between the lags of FDI.

Our hypothesis based on theory and literature is, if Sweden receives FDI in a fair extent, wages and household savings would increase, and the population is more likely to invest in the stock market. Therefore, we predicted a positive relationship between FDI and stock market development. By creating a dummy variable when the levels of net savings is higher than its mean, and multiplying it with the FDI variable. We were able to test if the net savings has an effect through the FDI.

5. Results

5.1 Main Results

Our aim is to identify if FDI had an explanatory role in the Swedish stock market development. To achieve this a number of OLS regression models are estimated. The results are given in Table 7. We begin our analysis by estimating model (1). In the first column, we present FDI and stock market development relationship without lags. We find that there is no statistically significant relationship. As mentioned above FDI might affect stock market with a lag. In the second column of Table 7 we present the estimation the model (2) with the first lag. The results are negative and statistically significant. In the third column, we add second and third lags to test if the results with the first lag is robust. The first lag is still negative and statistically significant. We also observe a robust result that FDI has a positive effect on the stock market after a quarter, since there is positive correlation between the third lag of FDI and the stock market. Yet the parameter estimates lack statistical significance.

Throughout the various regression specifications, the control variables used had different effects on the stock market development. The Repo rate had a strong negative effect on the stock market and the growth of GDP had a strong positive effect on the stock market. We are not able to find evidence of the effect from neither the domestic household net savings, the exchange rate between the U.S. dollar and the Swedish Krona, or the underlying inflation rate on annual basis with fixed rate on the Swedish stock market.

Table 7. Regression output for main results

Equation	(1)	(2)	(3)
Dep. Var.	AFGX	AFGX	AFGX
FDI	-0.049	-0.049	-0.067
	(0.075)	(0.078)	(0.083)
FDI_{t-1}		-0.192***	-0.216***
		(0.068)	(0.067)
FDI_{t-2}			0.057
			(0.119)
FDI_{t-3}			0.149
			(0.101)
GDP Growth	4.760**	4.041**	4.723**
	(2.155)	(1.910)	(2.119)
Repo	-6.538**	-6.701**	-7.140**
	(2.905)	(2.922)	(2.816)
Net Saving	-0.129	-0.142	-0.163
	(-0.135)	(-0.124)	(-0.121)
USD/SEK	1.465	1.873	1.404
	(5.751)	(5.354)	(5.364)
Inflation	-0.538	-0.693	-0.543
	(1.379)	(1.197)	(1.261)
EU	-1.226	5.522	0.112
	(7.694)	(7.035)	(6.756)
Constant	0.941	0.110	-1.418
	(4.618)	(4.703)	(4.909)
Observations	141	141	139
Durbin-Watson	1.821	1.771	1.81
ARCH Disturbance	Yes	Yes	Yes
R-squared	0.124	0.173	0.207

Note: Robust standard errors in parentheses *** p<0.01, **p<0.05, * p<0.1. Time variable, t, and quarterly dummies are included in all settings. These values are not presented in these equations.

5.2 Additional Results

Throughout this thesis, a discussion has been made that the domestic net savings and the European Union membership could play a role in FDIs affection on stock market development. In this subsection, tests to check for theses effects will be conducted.

One of our initial thoughts was that a high inflow of FDI would increase the real wages and therefore encourage higher domestic net savings. From that, the assumption of a positive relationship between FDI and stock market was made. To test this hypothesis, the following test were conducted:

$$Afgx_t = \alpha + \beta_0 DNS_{t-1} + \beta_1 DNS_{t-1} * FDI_{t-1} + \beta_2(1 - DNS_{t-1}) * FDI_{t-1} + u_t \quad (5)$$

The key hypothesis to this test is $H_0: \beta_1 = \beta_2$. We are able to reject this hypothesis on the five percent level. The interpretation of this is that there is a significant difference of which affect the FDI has on the stock market when savings are high or low. We are therefore able to conclude that FDIs have a different effect on the stock market when the domestic household net savings are high.

Table 8: Effects from net savings and EU membership

Equation	(1)	(2)
Dep. Var.	AFGX	AFGX
DNS1	-3.077	
	(7.798)	
DNS1*FDI1	-0.225**	
	(0.092)	
EU1*FDI1		-0.195***
		(0.068)
Constant	-4.158	0.028
	(4.429)	(4.602)
F(1, 129)	6.02	8.18
Prob > F	0.0155**	0.0049
Observations	141	141
R-squared	0.165	0.182

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Various control variables were included in the equations. See appendix A for full equation.

As seen in table 7, we are not able to prove that there is an effect from the EU on the Swedish stock market. To check if FDI effect on the stock market changed when Sweden entered the European Union, the following test were conducted.

$$Afgx_t = \alpha + \beta_0 EU_{t-1} + \beta_1 EU_{t-1} * FDI_{t-1} + \beta_2(1 - EU_{t-1}) * FDI_{t-1} + U_t \quad (6)$$

The null-hypothesis to this test is $H_0: \beta_1 = \beta_2$. This hypothesis was rejected. We can conclude the FDIs effect on the stock market significantly changes with the entrance to the European Union.

6. Robustness

In this section, the robustness of the baseline results will be presented. The objective is to check if the results are stable when testing the core model with various combinations of control variables. We are now going to present a series of robustness analysis of the results presented above.

First, due to trends in the FDI variable, a time variable (t) was included in all regression specifications and to capture seasonality quarterly dummies are included in all regression models.

Second, to investigate heteroscedasticity in the residuals, autoregressive conditional heteroscedasticity (ARCH) test is conducted after each regression. In this test the null-hypothesis is $H_0: No\ ARCH\ effects$ and tested against $H_1: ARCH\ disturbance$. A rejection of the null-hypothesis concludes evidence of heteroscedasticity in the errors. The absence of heteroscedasticity is accounted for by using robust standard errors in the regression. For example, our third (3) model observe a significant result on the third lag of FDI when usual standard errors are used, but lacks significance when robust standard errors are used.

Third, in our model specifications one important issue is the serial correlation in the error terms, which implies that the error term in the regression in some systematic way depends on the error term in other time periods. Even though the serial correlation does not lead to the coefficient terms to be biased, it can seriously affect the standard errors invalidating the inference. To test for serial correlation, Durbin-Watson Statistic was used. The test is a post-estimation and is therefore used after every regression. The null-hypothesis is constructed as follows: $H_0: The\ errors\ are\ serially\ correlated$ and the alternative suggests that $H_1: The\ errors\ follows\ a\ first\ order\ autoregressive\ process$. A rejection of the null-hypothesis concludes evidence of serial correlated errors. We have conducted the tests and have not been able to find any evidence that there is serial correlation.

In the first model of Table A.9 in Appendix A, FDI was regressed without any control variables to check if the negative result was robust. The beta coefficient of the FDI variable was negative and not significantly different from zero.

In the second regression, the variables GDP growth, Repo, Net savings and USD/SEK was included to evaluate the previous result observed. The value of the FDI coefficient was still negative and non-significant. GDP growth was positive and significant on the five (5) percent level. The Repo coefficient was also significant at the ten (10) percent level and the coefficient has a negative sign. Net saving had a negative sign, and was non-significant different from zero.

In the third regression we excluded the variables net savings and USD/SEK from the model and the observation was still a negative sign on the FDIs affection on the stock market. GDP growth and Repo was still significant with the same signs as before,

In the fourth model we checked the robustness of the lagged FDI following the pattern above, we started by only including our main independent variable. FDI_{t-1} was still negative and statistically significant. After that we chose to include the variables GDP growth, Repo, Net savings and USD/SEK. These changes did not change the outcome of the effect from $FDI_{t-1.}$ After that, a test without Net Savings and USD/SEK was conducted and the conclusions from before holds.

At last we check the robustness for the other (second and third) lags of FDI. We did this by following the same pattern as with FDI and FDI_{t-1}. At first, only the lags were regressed against AFGX, secondly variables GDP growth, Repo, Net savings and USD/SEK were added and third, the variables Net Savings and USD/SEK was excluded. As observed in table 8 in Appendix A. The signs of FDI, FDI_{t-1}, FDI_{t-2} and FDI_{t-3} does not change throughout these tests.

Throughout all the regression sets, the control variables Repo and GDP growth remained statistically significant at the five (5) or ten (10) percent level. At every point in the regressions settings an increase of the Repo rate has a negative effect on the stock market

development. Complementary to this, an increase in the growth of gross domestic product was associated with an increase of the AFGX index.

According to Woolridge (2014) another way to check the robustness, or sensitivity on the baseline result, is to replace the main explanatory variable to a dummy that indicates the same thing without change the important conclusions. In this case, a dummy variable was created, it takes the value one (1) if net FDI inflow is considered to be high, in this case when the net inflow of FDI is larger than the mean value of the total observed values of the FDI variable (19.35704) and the value zero (0) otherwise. To account for the distributed effect, lags of this dummy variable are tested for. This dummy contains seasonality and a test, which includes the variable, will be regressed with quarterly dummies.

Second robustness test is to investigate the effect of outliers on our results. To this end, we trimmed our key independent variable (FDI) to exclude outliers. We chose to replace all values above the value of the 90^{th} percentile with the value of the 90^{th} percentile. We did the same with the lowest values, but replaced all values below the 10^{th} percentile with the value of the 10th percentile. The time series with the high outliers excluded contains seasonality and tests which includes the variable will be regressed with quarterly dummies.

Regressions conducted with these changes are shown in Appendix A. The main results are robust with respect to outliers, and created dummy variable indicating high flows of FDI. The signs and significance of the results are the same. To further examine the robustness, a third variable was created. This time both the top ten (10) percent, and the lower ten (10) percent of FDI values were changed in the same matter as before. After conducting these changes, the signs and the significance levels are consistent to the results showed in Table 7.

7. Discussions and Conclusions

The main goal for this paper is with to investigate if there is a relationship between the inflow of foreign direct investments and stock market development in Sweden. To achieve this, we specify models in which we use several control variables within a time series framework. Affärsvärldens general index (AFGX) is used as a proxy for the Swedish stock market development and the net inflow of FDI in Sweden is used as a proxy for FDI. Quarterly data from 35 years was used in the regression settings.

The results suggest a negative relationship between the first lag of FDI and the stock market, but the results from the regression output indicates a positive effect in the later quarters from FDI on stock market development. The later lags are positive and non-significant. This result is robust. More research on the subject needs to be conducted to increase the level of certainty. Our regression specifications give a result that was generally unexpected, since the initial hypothesis was that the inflow of FDI should have a positive effect on stock market development. Previous studies, such as Hausman and Fernández-Arias (2000) discuss FDI as a short-term substitute to the stock market regarding to the fact that foreign investors could chose to conduct FDIs instead of investments on the domestic stock market. This could inhibit the development of the stock market. Our result suggests similar results.

As previously discussed, not many similar studies have been conducted on a country like Sweden. Due to the high extent of research conducted on developing countries, with different establishment, government stability and levels of stock market development, our initial predictions were that our results might deviate from previous research. The results of this paper are indefinite and deviates from previous research in some aspects. The results differ from studies conducted by Malik and Amjad (2013) and Sekhri and Haque (2015) where the relationship was investigated in Pakistan and India. One could argue that the effect from FDI would differ when investigated in Sweden, hence there are significant differences between the countries in mind. As a reason for this, the argument could be made that the marginal effect of capital should be higher in developing economies and companies could extend their revenue when capital is added from external actors. According to IMF, (2015) Pakistan and India are developing economies while Sweden is considered a developed country, or economy. Earlier in this paper, a discussion was made that FDI would encourage the domestic population to increase their net savings, thereby foster stock market development. We find evidence that net savings affect the stock market through the FDI, but FDI did still inhibit the stock market even when savings are high. We make the same conclusion as before, hence we do not expect FDIs effect on real wages to be as high in a development country, like Sweden, as predicted by the specific factor model.

Previous studies often use monthly data, and thereby have a larger sample. Due to lack in availability in a lot of variables of interest in monthly basis the sample in this paper is rather

small. This is a limitation we are aware of and by an increase of the sample we believe this study could be improved, another way to extend the magnitude of the sample for future researchers would be to test for more countries, i.e. all of Scandinavia. Scandinavia should be of high interest since all four countries in the geographical area are industrialized economies, but Norway, as the only country of the four, is not a member of the European Union. Due to lack of availability of data, there might be a selection bias in the sample. For example none of the World Governance Indicators (i.e political stability), created by the World Bank, are reported in a quarterly frequency and could not be included in the data set. To capture the domestic wage-level GDP per capita is often used, this variable could only be found in a yearly frequency for our time-period.

Further research on the effect of the free capital movement, which comes with a membership of the union, on stock market development could as well be of interest for future studies. An econometric approach, like panel data analysis would also be preferable to future researchers. This to be able to include more control variables which could increase the level of robustness in the paper. Another potential channel for future research is to narrow the research question by looking at specific firms and in what way the company's stock react if the firm conduct, or retrieve, a foreign direct investment. This subject can also be related to tests of the efficient market hypothesis. It could be of interest to investigate in what form of efficiency the market reacts when the information of the FDI is made public.

In conclusion, by examining the FDI's impact of stock market development in more than one industrialized country, the sample would become larger. Making the determining if the FDI has an impact on the stock market development easier and more robust.

There is a lack of consensus in previous research regarding the subject. Malik and Amjad (2013), Sekhri and Haque (2015), Claessens, Demirgüç-Kunt, and Huizinga. (2001) and Jeffus (2004) all find a positive relationship between the variables, whilst Hausmann and Fernández-Arias (2000) and Rhee and Wang (2009) suggests the other way around. This papers results agree with the later sides arguments, since we were able to observe a negative effect of FDI t-1 and stock market development.

The findings of this paper are that, even though an initial relationship between FDI and stock market development cannot be proven, we are able to find a statistically significant negative

relationship between the first lag of FDI and stock market. The regression modelling output shows that the fundamental factors that have significant effect on the stock market development in our model is the growth of GDP, the Repo rate and the first lag of FDI.

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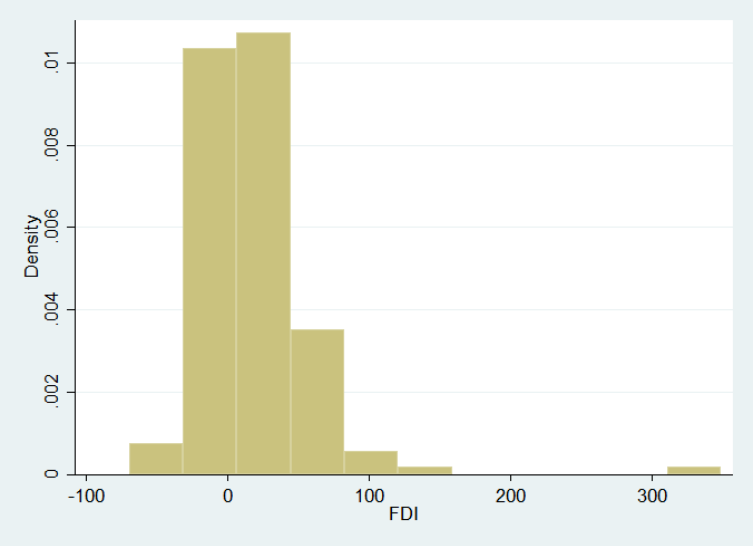
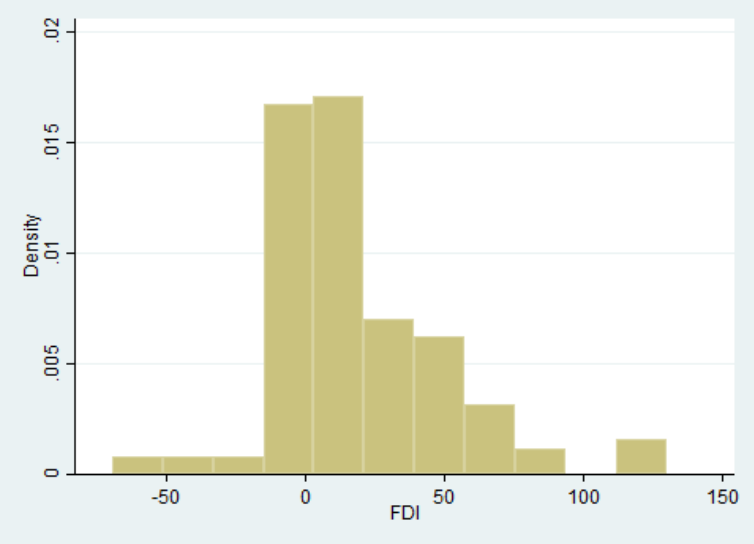
Appendix A

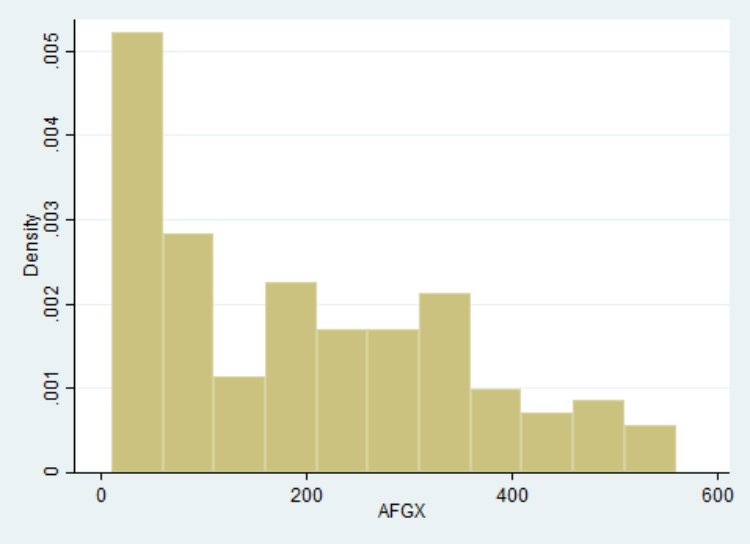
A.1 Distribution of the FDI variable with outlier



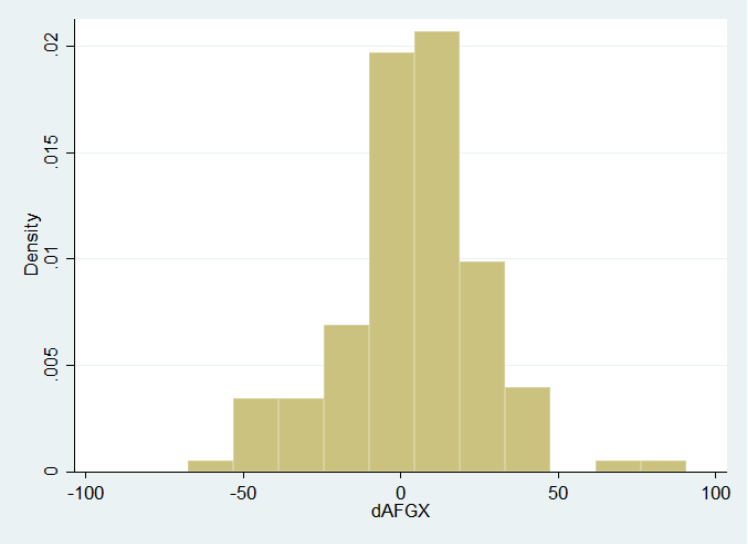
A.2 Distribution of the FDI variable without outlier



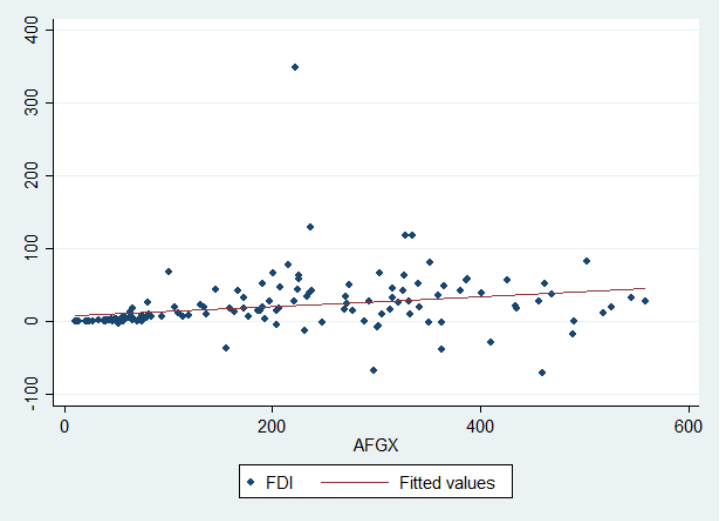
A.3 Distribution of the raw AFGX variable



A.4 Distribution of the AFGX variable, after first difference is used



A.5 Raw relationship between FDI and AFGX with outliers included



A.6. Correlation matrix for the lags of FDI

Variable	FDI1	FDI2	FDI3
FDI1	1.0000		
FDI2	0.1020	1.0000	
FDI3	0.3469	0.1028	1.0000

A.7 Effects from net savings and EU membership. Full equations.

Equation	(1)	(2)
Dep. Var.	AFGX	AFGX
DNS1	-3.077	
	(7.798)	
DNS1*FDI1	-0.225**	
	(0.092)	
gdpgrowth	3.478*	3.686*
	(1.805)	(1.930)
dREPO	-6.710**	-5.678*
	(2.843)	(3.117)
dUSDSEK	2.489	2.448
	(5.502)	(5.167)
dcpif	-0.902	-0.819
	(1.304)	(1.182)
EU	-5.573	
	(7.011)	
L.EU		5.298
		(6.981)
FDIEUhigh		-0.195***
		(0.068)
dnetsaving		-0.000
		(0.000)
Constant	-4.158	0.028
	(4.429)	(4.602)
Observations	141	141
R-squared	0.165	0.182

Robust standard errors in parentheses

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

A.8 Robustness checks.

Equation	(1)	(2)	(3)	(4)
Dep. Var.	AFGX	AFGX	AFGX	AFGX
D-FDI$_{t-1}$	-7.081			
	(5.629)			
D-FDI$_{t-2}$	-1.662			
	(5.590)			
D-FDI$_{t-3}$	0.718			
	(5.764)			
FDI10H$_{t-1}$		-0.242**		
		(0.097)		
FDI10H$_{t-2}$		0.038		
		(0.113)		
FDI10H$_{t-3}$		0.130		
		(0.118)		
FDI10L$_{t-1}$			-0.218***	
			(0.079)	
FDI10L$_{t-2}$			0.009	
			(0.138)	
FDI10L$_{t-3}$			0.137	
			(0.121)	
FDI10HL$_{t-1}$				-0.218
				(0.140)
FDI10HL$_{t-2}$				-0.044
				(0.145)
FDI10HL$_{t-3}$				0.086
				(0.157)
GDP Growth	4.333**	4.232**	3.771*	3.967*
	(2.105)	(2.133)	(2.124)	(2.158)
Repo	-5.650*	-5.777*	-6.338*	-6.043*
	(3.066)	(2.984)	(3.319)	(3.285)
Net Saving	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.369	-0.166	-2.478	-2.499
	(4.556)	(4.314)	(2.719)	(2.700)
Observations	139	139	139	139
ARCH Effect	Yes	Yes	Yes	Yes
Durbin-Watson	1.791	1.810	1.802	1.810
R-squared	0.147	0.183	0.137	0.103

A.9 Robustness checks

Robustness check for the main results

Equation	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep. Var.	AFGX	AFGX	AFGX	AFGX	AFGX	AFGX	AFGX	AFGX	AFGX
FDI	-0.046	-0.039	-0.053						
	(0.073)	(0.075)	(0.070)						
FDI_{t-1}				-0.183**	-0.182**	-0.178**	-0.220***	-0.224***	-0.218***
				(0.077)	(0.071)	(0.070)	(0.072)	(0.065)	(0.064)
FDI_{t-2}							0.022	0.038	0.042
							(0.113)	(0.112)	(0.112)
FDI_{t-3}							0.134	0.149	0.141
							(0.102)	(0.103)	(0.101)
GDP Growth		4.428**	4.581**		3.863**	4.000**		4.155**	4.358**
		(2.119)	(2.118)		(1.928)	(1.894)		(2.022)	(2.065)
Repo		-5.574*	-6.418**		-5.820*	-6.846**		-6.017**	-7.193***
		(3.112)	(2.856)		(2.985)	(2.816)		(2.964)	(2.735)
Net Saving		-0.122			-0.144			-0.158	
		(0.130)			(0.122)			(0.119)	
USD/SEK		1.828			2.238			1.914	
		(5.537)			(5.138)			(5.104)	
Constant	5.307	1.838	1.456	3.350	0.249	-0.328	2.586	-0.895	-1.623
	(3.792)	(4.154)	(4.183)	(3.923)	(4.245)	(4.288)	(3.979)	(4.388)	(4.509)
Observations	141	141	141	141	141	141	139	139	139
Durbin-Watson	1.662	1.826	1.808	1.628	1.783	1.759	1.643	1.812	1.784
ARCH Disturbance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.062	0.132	0.123	0.110	0.179	0.166	0.137	0.215	0.200

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