The Impact of Inflation Targeting on Attracting Foreign Direct Investment

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This study investigates if nations adopting the inflation targeting monetary policy are more successful in attracting FDI than nations utilizing alternative monetary policies. Subsequently, we inquire if inflation targeting is more successful for developing or developed nations. Our results provide four contributions to inflation targeting literature: (i) inflation targeting has a positive impact on attracting FDI; (ii) the attraction is stronger for developed nations than for developing nations; (iii) the attraction is stronger for lower-middle income developing nations than for upper-middle income developing nations; (iv) the relationship between FDI and imports/exports is that of a substitute, not of a compliment.

INTRODUCTION

In 1990 New Zealand became the first country to implement a monetary policy known as inflation targeting. The young policy uses inflation targeting as its primary objective to drive all monetary actions and decisions. There are currently 27 countries representing six continents using this monetary policy (Hammond, 2012). The new policy first became popular in developed nations. After New Zealand, nine additional developed nations looking to stabilize their economy took on the inflation targeting framework during the 1990s. Throughout 1999 and 2000, four developing nations also announced implementation of the inflation targeting strategy. To date, 12 developed and 15 developing nations have adopted this policy. Regardless of economic classification, the young monetary policy has served well for most participating nations in controlling inflation and increasing international trade (Fraga et al., 2004). Each nation's inflation targeting adoption year is provided in Table 1, along with their 2013 inflation target range (Hammond, 2012)[1].

Inflation targeting has become a key feature for conducting monetary policy in which decisions are guided by expectations of future inflation relative to an announced target (Green, 1996). Four main elements have commonly been included to help define this monetary policy (Hammond, 2012; Heenan et al., 2006; Mishkin, 2004; Svensson, 1999): "(1) an explicit central bank mandate to pursue price stability as the primary objective of monetary policy and high degree of operational autonomy, (2) explicit quantitative public targets used for inflation, (3) central bank accountability for performance in achieving the inflation objective, mainly through high transparency requirements for policy strategy and implementation, and (4) a policy approach based on a forward looking assessment of inflation pressures, taking into account a wide array of information" (Roger, 2010, p. 46). King (2005) provides two guidelines of the inflation targeting policy as (1) a precise numerical target for inflation in the medium

term and (2) a response to economic shocks in the short term. Jonas and Mishkin (2004) support a medium-term horizon as the best focus, suggesting this allows for the inevitability of missed targets. They continue that if the central bank has complete transparency, inflation target misses should not be detrimental to the economy, or a reason to abandon inflation targeting altogether.

TABLE 1
INFLATION TARGETING NATIONS

This table provides a list of nations that have adopted the inflation targeting monetary policy. Year IT Started is the year that the nation officially adopted inflation targeting according to Hammond (2012). Economic Class is according to the World Bank databank, which provides four levels of income, high income, upper middle income, lower middle income, and low income. Target Range is the 2013 target inflation range for each nation taken from Hammond (2012).

Nation	Year IT Started	World Bank Economic Class	2013 Inflation Target Range (%)	Nation	Year IT Started	World Bank Economic Class	2013 Inflation Target Range (%)
New Zealand	1990	High income: OECD	1 – 3	Hungary	2001	Upper-middle income	3
Canada	1991	High income: OECD	1 – 3	Iceland	2001	High income: OECD	2.5
United Kingdom	1992	High income: OECD	2	Mexico	2001	Upper-middle income	2 – 4
Australia	1993	High income: OECD	2 – 3	Norway	2001	High income: OECD	2.5
Sweden	1993	High income: OECD	2	Peru	2002	Upper-middle income	1 – 3
Czech Republic	1997	High income: OECD	1 – 3	Philippines	2002	Lower-middle income	3 – 5
Israel	1997	High income: OECD	1 – 3	Guatemala	2005	Lower-middle income	3 – 5
Poland	1998	High income: OECD	1.5 – 3.5	Indonesia	2005	Lower-middle income	3.5 – 5.5
Republic of Korea	1998	High income: OECD	2 – 4	Romania	2005	Upper-middle income	1.5 – 3.5
Brazil	1999	Upper-middle income	2.5 – 6.5	Armenia	2006	Lower-middle income	2.5 – 5.5
Chile	1999	High income: OECD	2 – 4	Serbia	2006	Upper-middle income	2.5 – 5.5
Colombia	1999	Upper-middle income	2 – 4	Turkey	2006	Upper-middle income	3 – 7
South Africa	2000	Upper-middle income	3 – 6	Ghana	2007	Lower-middle income	6 – 10
Thailand	2000	Upper-middle income	1.5 – 4.5				

Intuitively, every country participates in some level of inflation monitoring and inflation control, but only a few put inflation control above all other national goals. Many prolific central banks, such as the U.S. Federal Reserve, the Bank of Japan, the European Central Bank, and the Swiss National Bank have taken on certain elements of inflation targeting (Roger, 2010). However, there is a clear difference between using inflation targeting as one of many tools for addressing national goals, and using it as the single primary determinant of all monetary actions within a nation (Nessen and Vestin, 2005). Although the primary requirements previously listed do not vary significantly throughout the literature, each central bank does have and uses their own variety of strategies and tools within the inflation targeting framework. (Cespedes et al., 2014; Hammond, 2012)

Since inflation targeting was first put into action in 1990 there has been significant analysis on the country level regarding what inflation targeting is, how and why it should be implemented, how it should be managed, and what the economic outcomes for adopting countries are (Calvo and Mishkin, 2003; Goncalves and Carvalho, 2009; Green, 1996; Jonas and Mishkin, 2004, Svensson, 1997, 1999; Walsh, 2002). An early study by Fraga et al. (2004) analyzed the impact of inflation targeting on inflation control along with other macroeconomic indicators. The authors found inflation targeting had been successful for developed and developing nations. Roger (2010) provided similar results from a brief statistical analysis of inflation control by adopting nations, while also providing a call for more inflation targeting research. Further statistical analysis has been minimal and mixed in regards to the effectiveness of inflation targeting over controlling inflation, along with improving other economic indicators. With inflation targeting reaching the 25-year mark, what is missing from the literature is a more in-depth statistical analysis to better gage if inflation targeting has been successful.

This study intends to take that next step in considering the impact of inflation targeting on foreign direct investment (FDI). Previous empirical inflation targeting research has focused on the influence of inflation targeting on various statistics surrounding inflation and its volatility (Broto, 2011; Ginindza and

Maasoumi, 2013; Goncalves and Salles, 2008; Lin and Ye, 2007, 2009; Neuman and von Hagen, 2002; Vega and Winkelried, 2005), GDP (Abo-Zaid and Tuzemen, 2012; Ball and Sheridan, 2004; Goncalves and Salles, 2008; Mollick et al., 2011; Siregar and Goo, 2010), exchange rate pass through (Aleem and Lahiani, 2014; Prasertnukul et al., 2010; Siregar and Goo, 2010), exchange rate volatility (Pontines, 2011; Prasertnukul et al., 2010), and interest rates (Neumann and von Hagen, 2002).

Expanding the literature beyond these adopting nation's specific macroeconomic indicators, we provide the first empirical study to our knowledge to go deep into the international trade influence of inflation targeting. In addition, many past studies focus on just a small number of inflation targeting nations typically within the same region. Our primary focus is a large conglomerate spreading across 50 nations to better generalize the influence of inflation targeting. We consider past literature regarding FDI entry, inflation targeting practices, and inflation's impact on international business in order to empirically test whether adopting nations attract higher levels of FDI than non-inflation targeting nations. The results show that inflation targeting is significant in attracting FDI cash flows. The attraction is slightly stronger for developed nations than for developing nations. However, when the developing nations are split between upper- and lower-middle incomes we do find inflation targeting to attract more FDI for the lesser developed nations. These findings, along with similar future studies will be useful on the firm and national levels for inflation targeting nations, trade partners of inflation targeters, as well as potential inflation targeting implementers.

The remainder of this paper is structured in the following manner. The introduction is followed by the theoretical and empirical review of inflation targeting and FDI, which helps develop our hypotheses. The subsequent sections discuss our empirical research methodology and results. In the concluding portion of the paper, we discuss the potential implications of the research, as well as the limitations and future research possibilities.

THEORETICAL DEVELOPMENT

Monetary Policy and Inflation Targeting

Inflation targeting developed as an extension of the framework for a floating exchange rate. Throughout the early 1900s when globalization was first becoming a major factor for national economies, the issue of how a country should manage its currency in relation to exchange rates became a hot topic. There emerged two primary strategies. First a fixed exchange rate, where a nation sets a specific exchange rate between its currency and one of the dominant currencies around the world (e.g., US Dollar, Japanese Yen, or British Pound). Arguments for fixed exchange rates were economic stability, increased international trade, and a much needed barricade to speculative attacks (Nurkse, 1944).

The alternative option is a floating exchange rate, where a nation has no fixed ties to any other currency. Friedman (1953) argued that with a floating exchange rate investors could hedge against speculative attacks through forward contracts, a nation's central bank would have control over their monetary policy and be able to adjust accordingly for any situation, and that price levels, employment levels, and exchange rates will be free to balance out naturally and efficiently.

Since this early debate there has been a great amount of literature arguing for each exchange rate method, while also producing a variety of combination strategies. Calvo and Mishkin (2003) suggest the majority of countries choose an intermediate path, where an exchange rate is often stabilized by a central bank, but also allowed to shift with economic situations, commonly known as a "soft peg". However, the intermediate methods present another issue, what is publically stated versus what is actually applied. This discrepancy throughout the literature is known as the *de jure* versus *de facto* classifications. *De jure* is what the authority figures have announced their monetary policies to be, while *de facto* describes what classification the countries' actions actually fall under (Broda, 2004).

The combination (fixed and floating) strategies complicate monetary policy decisions even more due to the uncertainty of monetary authority's goals and actions (Hoffmann, 2007). For any exchange rate policy to instill confidence, domestically and abroad, complete transparency of all monetary authority goals and actions is critical (Jonas and Mishkin, 2004; Mishkin, 1998). Kinoshita and Campos (2003)

found that in transition economies effective monetary institutions play a crucial mediating role in attracting international business, especially FDI.

It is from this ongoing debate that the inflation targeting framework has evolved. Its roots lie with the floating exchange rate because it typically has no set ties to any other currency. In order to give the exchange rate proper guidance, inflation control serves as the primary objective and determining factor for all monetary actions. Under the inflation targeting framework inflation is given a range, which allows for monetary flexibility with adjustments of other economic tools to a certain extent. For example, the 2013 target range for the developed high income economy of Australia was 2% to 3%, the upper-middle income developing economy of Brazil was 2.5% to 6.5%, and lower-middle income Ghana was 6% to 10% (Hammond 2012). Although inflation targeting is one of many intermediate strategies, its framework addresses the majority of premier topics debated throughout literature regarding exchange rate policies (Fraga et al., 2004; Green, 1996; Nessen and Vestin, 2005; Svensson, 1997; Walsh, 2002).

It was not until the 1960s and 1970s that scholars attempted to develop an underline theory to help determine the choice of a nation's exchange rate. Two very similar theoretical streams came forth in the form of the theory of optimal exchange rate regimes, and theory of optimal currency areas (McKinnon, 1963; Mundell, 1961; Poole, 1970). The theories did not look to determine a general answer for what exchange rate method was best. They attempted to develop and adapt a model that a nation or region could use to help determine their optimal monetary choice based on certain economic factors, such as financial stability, international trade patterns, and future forecasting among others. The literature that has progressed is typically not concerned with expanding on these theories, but rather examines the pros and cons of different monetary frameworks in relation to certain nations and economic levels. While using these models the debate between a fixed exchange rate and a floating exchange rate evolved into a rules-versus-discretion debate. This took the focus away from the policy choice, and on to the deeper level of implementation and monitoring of the chosen policy (Green, 1996). Our study looks to take on a similar form by evaluating the relatively new inflation targeting framework. We look to empirically test, by means of an OLS Fixed Effects regression, the impact of inflation targeting on national FDI for both developed and developing nations.

Inflation Targeting and Inflation Control

Previous studies have already shown that adoption of the inflation targeting policy is significant in not just lowering inflation, but also increased control over the volatility of inflation as well as other economic indicators. Lin and Ye (2009) looked at a group of 13 developing inflation targeting nations against 39 non-inflation targeting (control) nations and found the inflation targeting policy to be significant in lowering inflation. On average, adopting nations helped decrease inflation by an average of nearly 3% annually. This study also shows the significance of inflation targeting in reducing inflation variability, which they defined as the standard deviation of the 3-year moving average of inflation. In a similar study of seven developed inflation targeting nations against 15 control nations, Lin and Ye (2007) did not find significance for lowering inflation or inflation variability. After controlling for hyperinflation (defined as an annual inflation rate greater than 40%), their results were the same. Ginindza and Maasoumi (2013) looking at 12 inflation targeters against 18 control nations found inflation targeting helps stabilize inflation, however there is no added benefit for the early adopters. Broto (2011) focused solely on South American countries (5 inflation targeting, 3 control) and found inflation targeting to be significant in lowering inflation, inflation volatility, and inflation uncertainty. Working with a sample of 25 nations (14 inflation targeting, 11 control), Capistran and Ramos-Francia (2010) found inflation targeting reduces the dispersion of long run inflation expectations; however, the full effect is not felt until the third year following adoption. In sum, most studies show that inflation targeting adoption is effective in reducing and controlling inflation.

As the results for inflation targeting drift towards supporting its positive influence on inflation, scholars have started to branch out by testing additional economic indicators. Neumann and von Hagen (2002) look at the influence of inflation targeting on volatility of inflation, output, and interest rates for a slightly smaller list of developed nations (6 inflation targeting, 3 control) and find results supporting the

inflation targeting policy. However, Ball and Sheridan (2004) provide similar analysis on developed nations (7 inflation targeting, 13 control) and find no support for inflation targeting improving these monetary statistics. Goncalves and Salles (2008) focus strictly on developing nations (13 inflation targeting, 23 control) and find inflation targeters are able to lower inflation and lower GDP growth volatility. Goncalves and Salles also control for hyperinflation and retain their significance, however, their cut off was measured at greater than 50% annual inflation. Siregar and Goo (2010) look specifically into adopting nations Indonesia and Thailand, where they find inflation targeting significantly increased GDP growth rates while decreasing GDP volatility. Abo-Zaid and Tuzemen (2012) using a sample of 50 countries (23 inflation targeting, 27 control) find developing nation inflation targeters have higher and more stable GDP growth, along with lower and more stable inflation. Developed inflation targeting nations were also found to have higher GDP growth and conduct more disciplined fiscal policy after adopting. Overall, the authors suggest non-inflation targeting nations would benefit from adopting the policy. Mollick et al. (2011) found inflation targeting led to higher output income per capita for developed and developing nations, however the long run effect is lower for developing nations than for developed.

Prasertnukul et al. (2010) define the exchange rate pass-through as an indicator of how changes in nominal exchange rates affect domestic prices. When using data from East-Asian inflation targeters (Indonesia, Philippines, Republic of Korea, and Thailand), the authors found inflation targeting helps stabilize inflation through reducing exchange rate pass-through and reduced exchange rate volatility. Siregar and Goo (2010) also found inflation targeting to be significant in reducing the pass-through effect. Aleem and Lahiani (2014) looked at developing nation inflation targeters in East Asia and Latin America and found that inflation targeting helps lower exchange rate pass-through, and was associated with a more credible monetary policy. Pontines (2011) used 23 inflation targeting nations and 51 control nations to find that exchange rate volatility is lower for inflation targeters, and the relationship is stronger for developing nations. Thus, inflation targeting literature has stayed mostly within the national economic statistics.

Inflation Targeting and FDI Entry

Past research has led several scholars to exploring how inflation rates influence international business, and specifically with respect to FDI. However, the inflation targeting policy has not yet been directly tested on any form of international business. Past literature suggests that price stability may be the prime indicator of a legitimate macroeconomic management by a host government (Kinoshita and Campos, 2003). A history of low inflation and manageable fiscal deficits signals to investors how committed and credible the government is. High and unpredictable inflation serves as a proxy for macroeconomic instability while distorting the information content of the market prices and the local incentive structure (Obwona, 2001). Under the location portion of the OLI paradigm (Dunning, 1980), some authors propose that locational advantages related to economic policy and history are key determinants of FDI (Kinoshita and Campos, 2003; Pugel et al., 1996). Many studies in a variety of economic regions have seen negative relationships between inflation rates and economic growth (Briault, 1995; Fisher, 1993; Obwona 2001; Sarel, 1996).

In the majority of international business exchange rates bring additional concerns and uncertainty. Pontines (2011) shows that developing nations with inflation targeting have lower nominal and real exchange rate volatility than non-inflation targeters. Prasertnukul et al. (2010) also found declines in exchange rate volatility for inflation targeting nations Republic of Korea and Thailand. Due to inflation targeting nations seeing significant declines and increased stability in their inflation and exchange rates, the prior relationships between inflation and FDI bring us to our first hypothesis.

Hypothesis 1: Nations utilizing inflation targeting will see greater increases in FDI than that of a non-inflation targeting nation.

The Role of Economic Development

Although inflation targeting has helped economies of every level with their inflation, it may be best suited in aid to developing nations (Goncalves and Salles, 2008). The majority of developed economies already have established and historical economic success. The reputations they have built will help in attracting FDI beyond what their inflation levels contribute. Ferreira de Mendonca and de Guimaraes e Souza (2012) find inflation targeting is the ideal monetary regime for developing economies because it helps bring inflation levels down to "internationally acceptable levels", which are already in place by the majority of developed inflation targeters. Calvo and Mishkin (2003) also suggest developing nations have more to gain from inflation targeting because they typically suffer from weak fiscal, financial, and monetary institutions. Fraga et al. (2004) explains how developing nations have the difficult challenge of balancing low credibility and fragile economic institutions with higher macroeconomic instability and vulnerability to economic shocks.

The primary focus of the inflation targeting strategy is to control inflation, but expected indirect effects are economic stability, increased international business, and a positive reputation for its monetary institutions (Fraga et al., 2004; Green, 1996; Roger, 2010). Garrett (2000) posits that before a country's domestic economy can succeed, they need to interact through international trade. When studying transition economies in Eastern Europe, Kinoshita and Campos (2003) indicate that successful implementation of economic reform leading to both stable economic performance and low inflation are strong signals for potential FDI. The wider range of opportunities to positively impact a developing nation's economy, along with their need of international business leads us to our next hypothesis.

Hypothesis 2: The effects of inflation targeting on FDI will be stronger for less developed nations.

METHODS AND DATA

Sample

The sample consists of 27 inflation targeting nations, along with 23 control nations, separated into five regional/economic clusters. The clusters used for our analysis are show in Table 2. The clusters were determined based on four sources. We started with the clustering suggested by Ronen and Shenkar (1985), who include 17 inflation targeting nations throughout their clusters. The majority of our non-inflation targeting (control) nations were also taken from their work. Next, we used Sirota and Greenwood's (1971) clusters, which are based on similar determinants to those used by Ronen and Shenkar. Finalizing the sample we used economic classifications from both the World Bank and International Monetary Fund databases.

Each nation's classification is shown in Table 1. Terminology used is that of the World Bank, where developed nations are labeled as High Income, and developing nations include lower-middle income and upper-middle income. Armenia and Ghana are the only inflation targeting nations without a natural cluster group, while India is the lone control nation without a cluster group. Although China and India are commonly labeled as "Other" or "Independent" in past clustering literature, we include them as control nations due to their high growth and significant impact on the global economy over the previous three decades[2]. In Table 2 Finland is listed as a control nation, however, from 1993-1997 they are considered to be an inflation targeter prior to their adoption of the Euro (Ginindza and Maasoumi, 2013; Roger, 2010)[3]. Therefore, our final sample of inflation targeting nations is 27, where the non-inflation targeting control nations for comparisons settled in at 23.

The group of inflation targeting nations, as well as their non-inflation targeting cluster nations represents a variety of economic levels. There are 25 developed and 25 developing nations, with nine of the developing nations considered lower-middle income and 16 upper-middle income. For this reason we will be running four additional regressions of the same model. The first regression will include the full sample of 50 nations mentioned previously and test Hypothesis 1. The second model will include just the 25 nations considered to be developing nations, while the third will consist of the 25 developed nations, which will allow us to test Hypothesis 2. We also go further into the developing nation group and run

separate regressions between the upper-middle income and lower-middle income classifications provided by the World Bank data bank, which also helps test Hypothesis 2.

TABLE 2
INFLATION TARGETING CLUSTERS

This table provides the cluster groups developed for proper control nations to be used. Data used was taken from Ronen and Shenkar (1985), Sirota and Greenwood (1971), the World Bank, the International Monetary Fund, as well as previous inflation targeting article samples. Ghana and Armenia are the only inflation targeting countries without a natural cluster, while India is the only control nation used without a natural cluster.

	Anglo	Eastern European	East Asian	Latin American	Nordic
Inflation Targeting Nations	Australia	Czech Republic	Indonesia	Brazil	Iceland
	Canada	Hungary	Philippines	Chile	Norway
	Israel	Poland	Republic of Korea	Colombia	Sweden
	New Zealand	Romania	Thailand	Guatemala	
	South Africa	Serbia		Mexico	
	United Kingdom	Turkey		Peru	
Non-Inflation Targeting Nations	Austria	Bulgaria	China	Argentina	Denmark
	Ireland	Croatia	Japan	Ecuador	Finland
	Switzerland	Greece	Hong Kong	Honduras	
	United States	Slovak Republic	Malaysia	Paraguay	
			Singapore	Uruguay	
			Vietnam	Venezuela	

Of the 27 countries adopting the inflation targeting monetary policy, their adoption years represent 13 different years of the possible 22-year range. New Zealand was the first to implement the strategy in 1990, and Ghana the most recent in 2007. Table 1 provides a complete list of the adoption years. Due to the availability of data our final sample time frame is 1996-2012. Full monetary data from the World Bank for many of the Eastern European and South American nations is incomplete through the early 1990s. Government and Economic control variables from the World Bank are also unavailable prior to 1996.

Variables

Our primary dependent variable is the annual total Foreign Direct Investment (*FDIT*) as reported by the World Bank[4]. To gauge whether inflation targeting shows a difference between FDI inflows *(FDIIN)* and outflows *(FDIOUT)*, each measure is also used as a dependent variable. The World Bank measures each FDI variable as the annual percentage of GDP. This allows for a measure of international trade that will not be skewed simply by the typical growth of an economy for a given year.

Although imports and exports are not considered part of FDI, they are a major contributor to international business and the constant strides we take towards a truly global economy. As Lipsey (2004) points out, although the measures are significantly different (between FDI and imports/exports), there has always been a close connection with the determining factors. Where the controversial question comes in is if the relationship between FDI and imports/exports is complementary, or that of a substitute. Findings typically report mixed results or no significant relationship at all, however, there is a small lean towards a complimentary relationship when significance is found (Blomstrom et al., 1988; Lipsey and Weiss, 1981, 1984). Most studies tend to use firm level data in a more isolated sample; however, by using annual growth in imports *(IMPG)* and exports *(EXPG)* as alternative dependent variables we offer a different perspective to this relationship, while also providing a wider range of economic indicators to better gauge where inflation targeting can benefit an economy.

The primary variable of interest is a dummy variable for nations using the inflation targeting monetary policy (*IT*). If a country has implemented inflation targeting *IT* will take on the value of 1, otherwise it will be represented by a 0. The data for this variable was obtained from Hammond (2012)

and Roger (2010) who provide a comprehensive list of inflation targeting nations according to the Bank of England and IMF, respectively.

Past research shows the significance of both economic and political factors in determining national level FDI (Bevan and Estrin, 2004; Biswas, 2002; Schneider and Frey, 1985). We apply four controls related to these national level factors that are collected from the Worldwide Governance Indicators database produced annually by the World Bank[5]. Each indicator is measured with a five-point scale, where smaller values represent the more risky nations regarding their control of corruption (*CORRUPT*), rule of law *(LAW)*, government effectiveness *(GOVEFF)*, and voice and accountability *(VOCACCT)* [6]. Applying these control variables will put all nations on a more level playing field considering the riskiness of investing in the nation. Developing nations are typically more risky than developed nations. Therefore, the risk indicators may diminish the possibility of finding significance for Hypothesis 2, which predicts a difference in FDI likelihood between a developing and more developed nation.

The next control variable is a proxy for market size, measured by GDP per capita *(GDPPC)*. This controls for the size and spending habits of the economy and has been a popular dependent variable among inflation targeting research (Abo-Zaid and Tuzemen, 2012; Goncalves and Salles, 2008; Neumann and von Hagen, 2002; Siregar and Goo, 2010). From Mollick et al. (2011) and Ferreira de Mendonca and Guimaraes e Souza (2012) we use a control for the level of globalization *(OPENNESS)* of each nation, measured as the percentage of imports and exports out of GDP. Due to strong correlation, we use annual import and export growth as alternative dependent variables instead of percentage of GDP. We also control for the population *(POPULATION)* by taking the log of the annual population for each nation. The last control variable is the three-year average lagged value of the annual percentage change in inflation *(LAGINFLPC)*, in order to give potential investors time to react to the previous year's inflation for a specific nation. Obwona (2001) asserts that creating a favorable climate for investment takes time to develop the partnership between the government and the private sector with the necessary level of transparency. Consistent with Goncalves and Salles (2008) we remove 34 observations with annual inflation greater than 50%.

TABLE 3
INFLATION TARGETING SUMMARY STATISTICS

FDIT is total foreign direct investment (fdi) as a percentage of gross domestic product (gdp). FDIIN is the total inbound fdi as a percentage of gdp. FDIOUT is the total outbound fdi as a percentage of gdp. IMPG is the annual growth of imports. EXPG is the annual growth of exports. IT is a binary variable where one signifies if the country was an inflation targeter during the observation year. CORRUPT is a measurement of the nation's control over their corruption on a scale from zero to five. LAW is a measurement of the nation's rule of law on a scale from zero to five. GOVEFF is a measurement of the effectiveness of a nation's government on a scale from zero to five. VOCACCT is a measurement of the nation's voice and accountability rights on a scale from zero to five. GDPPC is the gdp per capita based in current US$. LAGINFLPC is the three year lagged average inflation percentage change based on the consumer price index. OPENNESS is the total US$ value of imports and exports as a percentage of gdp. POPULATION is the log value of the nation's total population. Each variable is based on the individual country year observation.

Variable	Obs.	Mean	Std. Dev.	Min	Max
FDIT	718	7.130739	11.33165	-35.3518	101.7779
FDIIN	826	4.214435	5.643436	-16.1454	52.05155
FDIOUT	718	2.734394	6.306216	-23.3288	50.06254
IMPG	813	6.820356	10.95763	-50.0596	57.66691
EXPG	788	6.553736	8.467293	-31.805	50.65073
IT	830	0.391566	0.488395	0	1
CORRUPT	830	2.987024	1.170058	0.86	5
LAW	830	2.916319	1.061946	0.81	4.51
GOVEFF	830	3.095169	1.008416	0.96	4.87
VOCACCT	830	2.921849	0.902635	0.49	4.33
GDPPC	830	16588.59	17765.72	259.7111	99557.73
LAGINFLPC	816	0.327673	2.259284	-9.37542	26.38543
OPENNESS	827	90.26971	69.60545	14.93284	447.2391
POPULATION	830	7.288019	0.682888	5.429617	9.130557

Table 3 provides summary statistics for the independent variables. The *IT* mean of 0.39 indicates that nearly half of the sample years are provided by inflation targeting nations. FDI inflows account for approximately 60 percent of total FDI for all observations. The maximum corruption score is exactly five due to the Scandinavian nation's extremely low levels of corruption.

Table 4 provides the correlation matrix for the independent variables. A couple of the governance indicators experience correlations above 80 and 90 percent; however, this was expected due to the small precision scale and unavoidable overlap in the measurement criteria. As Allison (2012) explains, as long as the collinear variables are used strictly as control variables, and are not collinear with your variable of interest, there is no problem with the high correlations.

TABLE 4
INFLATION TARGETING CORRELATION MATRIX

IT is a binary variable where the value of one signifies that the country was an inflation targeter during the observation year. CORRUPT is a measurement of the nation's control over their corruption on a scale from zero to five. LAW is a measurement of the nation's rule of law on a scale from zero to five. GOVEFF is a measurement of the effectiveness of a nation's government on a scale from zero to five. VOCACCT is a measurement of the nation's voice and accountability rights on a scale from zero to five. GDPPC is the gdp per capita based in current US$. LAGINFLPC is the three year lagged average inflation percentage change based on the consumer price index. OPENNESS is the total US$ value of imports and exports as a percentage of gdp. POPULATION is the log value of the nation's total population. Each variable is based on the individual country year observation.

	IT	CORRUPT	LAW	GOVEFF	VOCACCT	GDPPC	LAGINFLPC	OPENNESS	POPULATION
IT	1								
CORRUPT	0.1317	1							
LAW	0.1153	0.9591	1						
GOVEFF	0.1154	0.9625	0.9675	1					
VOCACCT	0.1990	0.8177	0.8455	0.8149	1				
GDPPC	0.0533	0.7524	0.7470	0.7273	0.5964	1			
LAGINFLPC	-0.0079	0.1082	0.0901	0.0945	-0.0018	0.1118	1		
OPENNESS	-0.1974	0.2557	0.2529	0.3023	-0.0066	0.1257	0.1690	1	
POPULATION	0.0108	-0.3989	-0.3445	-0.3436	-0.3891	-0.3039	-0.0552	-0.3175	1

Estimation Procedure

In order to examine the statistical relationship between the independent variables and the dependent variables of FDI and international trade we run a fixed effects regression analysis. The chi-squared statistic from the Housman test was 0.0024, which is less than 0.05, therefore confirming fixed effects is to be used over random effects. Fixed effects include the country specific effects as regressors rather than assigning them to the error term. In turn, this reduces the omitted variable bias and the sample selection bias (Biswas, 2002). The first dependent variable equation is shown here:

$$FDI_{it} = \beta_1 + \beta_2 IT_{it} + \beta_3 CORRUPT_{it} + \beta_4 LAW_{it} + \beta_5 GOVEFF_{it}$$
$$+ \beta_6 VOCACCT_{it} + \beta_7 GDPPC_{it} + \beta_8 LAGINFLPC_{it} + \beta_9 OPENNESS_{it} \quad (1)$$
$$+ \beta_{10} POPULATION_{it}$$

Where i indexes the nation, and t indexes the year. We complete this same regression for each of the five dependent variables, which were discussed previously in the *Sample* section.

EMPIRICAL RESULTS

In this section we present the main results of the paper. Table 5 shows our primary variable of interest *IT* is significant for six of the nine regressions using some form of FDI as the dependent variable. Using the full sample we see the *IT* dummy is significant in increasing both FDI total, and FDI inflow. When separating the sample into developed and developing economies we find all three FDI variables to be significant and positive for developed nations, while just FDI inflow is significant and positive for developing nations. These results provide support for Hypothesis 1 that adopting the inflation targeting monetary policy helps increase FDI as a percentage of GDP. However, results are stronger for developed nations than developing nations, which is the opposite of hypothesis 2's prediction.

TABLE 5
FULL SAMPLE FIXED EFFECTS RESULTS

Full sample, excluding the variable EDUCATION, fixed effects regression with five measurements of international trade as the dependent variable for three sample groups. ALL NATIONS is the full sample of 50 nations, 27 inflation targeters. DEVELOPED NATIONS is a sub-sample of just the 25 high income nations, 12 inflation targeters. DEVELOPING NATIONS is a sub-sample of just the 25 middle income nations, 13 inflation targeters. FDIT is total foreign direct investment (fdi) as a percentage of gross domestic product (gdp). FDIIN is the total inbound fdi as a percentage of gdp. FDIOUT is the total outbound fdi as a percentage of gdp. IMPG is the annual growth of imports. EXPG is the annual growth of exports. IT is a binary variable where one signifies if the country was an inflation targeter during the observation year. CORRUPT is a measurement of the nation's control over their corruption on a scale from zero to five. LAW is a measurement of the nation's rule of law on a scale from zero to five. GOVEFF is a measurement of the effectiveness of a nation's government on a scale from zero to five. VOCACCT is a measurement of the nation's voice and accountability rights on a scale from zero to five. GDPPC is the gdp per capita based in current US$. LAGINFLPC is the three year lagged average inflation percentage change based on the consumer price index. OPENNESS is the total US$ value of imports and exports as a percentage of gdp. POPULATION is the log value of the nation's total population. Each variable is based on the individual country year observation. P-values are provided in parenthesis, where * indicates significance at the 10% level; ** indicates significance at the 5% level; *** indicates significance at the 1% level.

	ALL NATIONS					DEVELOPED NATIONS					DEVELOPING NATIONS				
	FDIT	FDIIN	FDIOUT	IMPG	EXPG	FDIT	FDIIN	FDIOUT	IMPG	EXPG	FDIT	FDIIN	FDIOUT	IMPG	EXPG
IT	2.9447**	1.4745**	1.5545	-2.9196*	-2.7187**	5.4940**	2.2758**	3.2009**	-3.3581	-1.3821	0.0139	0.7715*	-0.2586	-4.2876*	-3.5965**
	(0.078)	(0.011)	(0.136)	(0.054)	(0.025)	(0.032)	(0.025)	(0.044)	(0.125)	(0.308)	(0.977)	(0.068)	(0.167)	(0.063)	(0.020)
CORRUPT	2.9674	1.7311	0.8415	1.4144	3.0359*	5.8762*	3.4834*	2.4436	2.5984	3.9916**	0.9669	1.3131	-0.3383	-4.2732	0.4481
	(0.201)	(0.135)	(0.468)	(0.633)	(0.060)	(0.063)	(0.067)	(0.101)	(0.414)	(0.030)	(0.325)	(0.103)	(0.360)	(0.444)	(0.890)
LAW	4.6058	1.7457	2.0760	-6.4007**	-2.9916	2.8298	1.1234	1.6760	-4.0297	-0.9125	0.7740	0.1162	-0.1419	1.4202	1.0182
	(0.106)	(0.137)	(0.230)	(0.027)	(0.171)	(0.668)	(0.686)	(0.674)	(0.367)	(0.817)	(0.487)	(0.913)	(0.729)	(0.711)	(0.741)
GOVEFF	-3.8019	-2.3569*	-0.6471	-0.0867	-4.6895**	-7.3147	-4.3128	-2.6764	5.7657	-4.0653*	1.0438	0.0104	1.7842***	-4.1631	-3.7384
	(0.183)	(0.062)	(0.665)	(0.979)	(0.015)	(0.175)	(0.110)	(0.369)	(0.179)	(0.088)	(0.134)	(0.988)	(0.000)	(0.356)	(0.201)
VOCACCT	-2.6577	-0.5735	-1.3961	6.7264***	2.8431	-3.9901	-2.2043	-1.8662	-2.7380	-1.7869	0.7337	0.9429	0.2139	7.5605**	3.1062
	(0.334)	(0.611)	(0.373)	(0.002)	(0.174)	(0.530)	(0.505)	(0.601)	(0.332)	(0.326)	(0.531)	(0.289)	(0.550)	(0.035)	(0.293)
GDPPC	0.0000	0.0000	0.0001	-0.0002**	-0.0001***	0.0001	0.0000	0.0001	0.0000	-0.0001	0.0001	0.0000	0.0001	0.0001	-0.0006***
	(0.671)	(0.804)	(0.336)	(0.042)	(0.007)	(0.629)	(0.918)	(0.364)	(0.962)	(0.125)	(0.230)	(0.962)	(0.151)	(0.881)	(0.008)
LAGINFLPC	-0.0167	-0.0638	0.0413	-0.4244**	-0.2446**	-0.0752	-0.0856**	0.0218	-0.2834***	-0.1505***	0.0163	0.0022	-0.0366	-1.7585*	-1.0316
	(0.747)	(0.117)	(0.209)	(0.014)	(0.011)	(0.198)	(0.024)	(0.550)	(0.000)	(0.008)	(0.747)	(0.987)	(0.338)	(0.052)	(0.149)
OPENNESS	0.1478***	0.0749***	0.0670**	0.0883**	0.0791***	0.1908***	0.0973***	0.0930***	0.0416**	0.0529***	0.0495*	0.0365**	-0.0013	0.2517***	0.1671**
	(0.002)	(0.000)	(0.022)	(0.013)	(0.005)	(0.002)	(0.001)	(0.006)	(0.050)	(0.002)	(0.078)	(0.048)	(0.900)	(0.002)	(0.014)
POPULATION	-11.7827	-5.4041	-5.3460	13.3547	-5.5225	-38.7274	-14.5191	-24.1188	-96.1196**	-49.6095**	0.8646	-2.9884	5.3668*	37.4686	19.9424
	(0.549)	(0.483)	(0.653)	(0.534)	(0.642)	(0.500)	(0.646)	(0.422)	(0.032)	(0.016)	(0.900)	(0.621)	(0.093)	(0.245)	(0.230)
CONS	74.198	35.308	31.000	-99.693	48.876	265.145	102.922	160.906	671.170**	362.507**	-14.794	17.721	0-44.236*	-294.404	-154.045
	(0.600)	(0.525)	(0.716)	(0.523)	(0.571)	(0.505)	(0.643)	(0.437)	(0.032)	(0.012)	(0.770)	(0.695)	(0.067)	(0.227)	(0.220)
R-Squared	0.101	0.093	0.087	0.044	0.061	0.126	0.115	0.116	0.093	0.076	0.154	0.123	0.278	0.087	0.095
Observations	710	809	710	801	776	387	398	387	402	377	323	411	323	399	399

Looking at the percentage growth of imports and exports, we find *IT* to be significant and negative in the full sample and the developing nation regressions. These results support a substitution relationship between FDI and imports/exports. *Openness* is the most significant control variable, having a positive relationship with the DVs in 14 of the 15 regressions.

In Table 6 we use the World Bank's economic classifications to break down the developing nations' sub-sample into upper-middle income and lower-middle income. We find that *IT* has a significant negative relationship with both growth of imports and exports for upper-middle income, yet nothing with FDI. *IT* is found to be significant and positive for FDI total and FDI inflow for lower-middle income nations, which provides support of hypothesis 2. The *IT* relationship is also significant and negative for import growth within both middle-income groups.

In sum, these results provide support that adoption of the inflation targeting monetary policy will positively impact a nation's foreign direct investment activity. At the same time, inflation targeting has a negative influence on imports and exports, suggesting the two international trade variables have a substitution based relationship, not the complimentary relationship suggested by Lipsey (2004). With mixed results, the impact on lesser developed nations may take longer to understand due to the larger risk

that comes from doing business in these nations, and the shorter length of time they have been utilizing the monetary policy.

<div align="center">

TABLE 6
DEVELOPING ECONOMIES FIXED EFFECTS RESULTS
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Sub-sample, excluding the variable EDUCATION fixed effects regression using the World Bank economic classifications with five measurements of international trade as the dependent variable for three sample groups. UPPER-MIDDLE INCOME is a sub-sample consisting of the 16 (9 inflation targeters) more advanced nations from the previously used DEVELOPING NATIONS sample. LOWER-MIDDLE INCOME is a sub-sample consisting of the 9 (5 inflation targeters) less advanced nations from the previously used DEVELOPING NATIONS sample. FDIT is total foreign direct investment (fdi) as a percentage of gross domestic product (gdp). FDIIN is the total inbound fdi as a percentage of gdp. FDIOUT is the total outbound fdi as a percentage of gdp. IMPG is the annual growth of imports. EXPG is the annual growth of exports. IT is a binary variable where one signifies if the country was an inflation targeter during the observation year. CORRUPT is a measurement of the nation's control over their corruption on a scale from zero to five. LAW is a measurement of the nation's rule of law on a scale from zero to five. GOVEFF is a measurement of the effectiveness of a nation's government on a scale from zero to five. VOCACCT is a measurement of the nation's voice and accountability rights on a scale from zero to five. GDPPC is the gdp per capita based in current US$. LAGINFLPC is the three year lagged average inflation percentage change based on the consumer price index. OPENNESS is the total US$ value of imports and exports as a percentage of gdp. POPULATION is the log value of the nation's total population. Each variable is based on the individual country year observation. P-values are provided in parenthesis, where * indicates significance at the 10% level; ** indicates significance at the 5% level; *** indicates significance at the 1% level.

	UPPER-MIDDLE INCOME					**LOWER-MIDDLE INCOME**				
	FDIT	**FDIIN**	**FDIOUT**	**IMPG**	**EXPG**	**FDIT**	**FDIIN**	**FDIOUT**	**IMPG**	**EXPG**
IT	-1.0391	-0.9598	-0.1687	-7.6856**	-6.4374***	1.1990**	1.4386*	0.0240	-5.9179**	-3.4605
	(0.636)	(0.398)	(0.878)	(0.040)	(0.001)	(0.011)	(0.056)	(0.811)	(0.029)	(0.111)
CORRUPT	0.5797	1.1480	-1.3762	3.3294	10.1017***	2.0416	1.5355	0.4188*	-16.4138	-11.7653
	(0.877)	(0.423)	(0.477)	(0.739)	(0.005)	(0.159)	(0.343)	(0.083)	(0.267)	(0.242)
LAW	3.4862	1.8642	1.2030	7.4373	7.1288*	-0.6016	0.8246	-1.5929**	-0.6897	-2.2788
	(0.315)	(0.228)	(0.592)	(0.280)	(0.086)	(0.749)	(0.428)	(0.016)	(0.955)	(0.819)
GOVEFF	-5.4968	-2.1711	-2.7079	-4.1576	-5.3550	1.6515	1.8455	1.3121	-4.2181	-8.4788
	(0.370)	(0.411)	(0.412)	(0.609)	(0.159)	(0.508)	(0.223)	(0.131)	(0.631)	(0.327)
VOCACCT	2.0833	1.7403	0.1835	6.5755	-1.5867	-2.4826***	0.4944	-0.0457	4.9192	6.0889
	(0.267)	(0.139)	(0.877)	(0.297)	(0.566)	(0.003)	(0.436)	(0.871)	(0.213)	(0.166)
GDPPC	0.0013	0.0005	0.0007	-0.0007	-0.0007**	0.0006**	0.0003	0.0002	0.0056**	0.0004
	(0.147)	(0.174)	(0.152)	(0.211)	(0.023)	(0.014)	(0.338)	(0.204)	(0.031)	(0.832)
LAGINFLPC	0.1218	0.0597	0.0106	-1.6110	-0.1647	0.6032**	0.0787	-0.0181	-4.5270***	-4.6812**
	(0.795)	(0.674)	(0.965)	(0.139)	(0.568)	(0.033)	(0.826)	(0.787)	(0.002)	(0.012)
OPENNESS	0.2011*	0.1110**	0.0751	0.3407**	0.2529***	0.0682***	0.0337***	0.0099*	0.1819	0.1248
	(0.099)	(0.032)	(0.281)	(0.006)	(0.008)	(0.001)	(0.010)	(0.063)	(0.211)	(0.255)
POPULATION	-69.7537	-30.7345*	-36.7228	125.1393**	43.5778**	-8.9992	0.0690	-2.2842	-28.8255	24.6126
	(0.187)	(0.074)	(0.243)	(0.033)	(0.036)	(0.147)	(0.991)	(0.433)	(0.558)	(0.495)
CONS	518.086	221.727*	280.233	-993.420**	-359.305**	64.403	-10.877	16.298	232.569	-158.051
	(0.198)	(0.089)	(0.239)	(0.029)	(0.029)	(0.201)	(0.827)	(0.462)	(0.551)	(0.572)
R-Squared	0.175	0.149	0.179	0.109	0.151	0.397	0.400	0.250	0.151	0.206
Observations	214	250	214	249	249	103	144	103	133	133

CONCLUSION

This paper provides the first analysis of the impact of inflation targeting on foreign direct investment and imports/exports. The majority of previous empirical research on inflation targeting has focused on, and found a significant impact in both control and reduction of inflation. Inflation targeting has also been found to reduce and control exchange rate fluctuations, while having a positive influence on GDP growth. While controlling for these previously tested macroeconomic variables, we find similar positive results using FDI and negative results with imports/exports as the dependent variables.

Overall, from a sample of 830 country-year observations including 27 inflation targeting nations and 23 control nations from 1996 to 2012, the inflation targeting monetary policy was found to have a positive significant influence on attracting FDI. These results show strong support for Hypothesis 1. However, when analyzing only developing nations, which have greater potential to benefit from the inflation targeting policy (Calvo and Mishkin, 2003; Fraga et al., 2004; Goncalves and Salles, 2008), we do not see as big of improvements as with developed nations. This result is possibly influenced by the shorter time frame for which developing nations have been practicing the inflation targeting policy. Brazil was the first developing nation to adopt inflation targeting in 1999, while nine developed economies preceded them. These results do not provide support for Hypothesis 2.

Although the full sample results suggest the inflation targeting influence is stronger for developed than developing nations, table 6 provides partial support for Hypothesis 2, that less developed economies

have a stronger relationship between inflation targeting and FDI. Imports and exports tend to decrease more in the upper-middle income nations from inflation targeting, while it helps lower-middle income attract more foreign direct investment. The comparison in these regressions is between lower and higher levels of solely developing nations, as opposed to developing versus developed which table 5 provides. These interesting results suggest that further studies separating developing nations into multiple groups can provide better insight into inflation targeting's potential value, which we show is best suited for the least developed nations.

The substitution relationship between FDI and imports/exports suggests that as a nation becomes more integrated with the global economy, their international trade shifts from imports and exports to FDI, which requires a larger commitment and accepting greater risk.

As young as the inflation targeting policy is, we may not have a sufficient amount of data to properly analyze the relationship at this point in time, especially for the more recent adopting nations, which are primarily developing economies. As countries continue practicing, and more countries join the trend, new research will be critical for further analysis of the inflation targeting policy. Future research may also explain if there is a plateau and/or eventual reversal of the initial positive impacts. Future regressions for more specific sample groups may also be useful, such as separate regressions for the cluster groups previously discussed.

In sum, we find that: (i) inflation targeting has a positive impact on attracting FDI; (ii) the attraction is stronger for developed nations over developing nations; (iii) the attraction is stronger for lower-middle income developing nations over upper-middle income developing nations; (iv) the relationship between FDI and imports/exports is that of a substitute, not of a compliment.

ENDNOTES

1. Hammond (2012) provides both formal and informal adoption dates for Ghana, Israel, Republic of Korea, Serbia, and Sweden. Consistent with the majority of inflation targeting studies, we use formal adoption dates.
2. In unreported regressions, removing China and India from the sample did not significantly change the results.
3. During the sample period Finland, Greece, Ireland, and the Slovak Republic, each adopted the Euro as their currency. In unreported regressions, removing these control nations from the sample did not significantly change the results.
4. The World Bank Data Bank defines FDI as the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows total net, that is, net FDI in the reporting economy from foreign sources less net FDI by the reporting economy to the rest of the world. Data are in current U.S. dollars.
5. From 1996 to 2002 the Worldwide Governance Indicators were only collected during the even numbered years. For this reason, we use an average of the two surrounding years to provide a statistic for the odd numbered years.
6. Kaufmann, Kraay, and Mastruzzi (2011) provide more in-depth definitions for each governance indicator.

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