

Cross-border M&A, Exchange rates and its implications for Fire Sale Acquisitions

Mattias Fransson*

Major in Finance

Stockholm School of Economics

ABSTRACT

There is limited research of the commonly expressed notion that foreign firms acquire assets abroad at cheap prices during periods of weak currency, often referred to as foreign direct investment (FDI) fire sales. I study this phenomenon empirically by collecting transaction data and acquisition pricings for mergers and acquisitions (M&A) in and between the Euro area, United Kingdom (UK), United States (US) and Sweden during 1999-2009. Few studies have investigated the link between a weak exchange rate and increased M&A inflow for multiple countries and for such recent data. In addition, I study the flows and acquisition prices for distressed firms that are more likely to accept a foreign bid at a discount. I find mixed evidence of any relationship between M&A inflow and the exchange rate, mainly the Euro area and the UK show evidence of increased M&A inflows when the currency is weak, while there are some signs of the opposite relationship for the US and Sweden. Overall, I find little support for any asymmetries between domestic and foreign firms due to changes in the exchange rate, as suggested by the imperfect capital market theory of Froot and Stein (1991). I suggest that the link between cross-border M&A, exchange rates and relative wealth may not be as apparent as the theory predicts. Studying my sub-sample of distressed firms, I find only weak, and far from robust, evidence of any increase of foreign acquisitions of firms with weaker bargaining positions during depreciations. Moreover, there are no indications of lower acquisition prices for these types of firms neither in normal nor depreciated periods. I conclude that firm-specific distress does not lead to any FDI fire sales and that foreign competition may well be a source of additional wealth for shareholders of firms with weaker bargaining power.

*20438@student.hhs.se

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Discussants: Jonas Andersson and Anders Johansson

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1. Introduction

”The value of the Swedish krona has fallen with 26 percent in seven months. This is a larger fall than during the autumn of 1992. The weak currency enables those who have assets in Euros or US dollars to acquire Swedish companies for a pittance – with a 26 per cent discount. Therefore, there is a possibility that financially strong Euro and US dollar holders soon seize the moment and launch a wave of takeovers of Swedish companies.”¹

Despite the fact that foreign direct investments (FDI) is often the subject of a debate in media and among politicians, theoretical and empirical studies regarding patterns and motives for FDI have been far from extensive. Even less studied are the financial implications of foreign takeovers of domestic firms, and the existence of FDI fire sale. Cross-border mergers and acquisitions (M&A) as a percentage of total merger activity has continued to grow rapidly. During 1998, foreign acquirers represented about 30 percent of the world merger volume. In 2007, the peak-year so far, it reached close to 40 percent.

This raises several questions, not the least related to the theory of asset-specificity, first presented by Williamson (1988) and Shleifer and Vishny (1992). The theory suggests that foreign firms may not run firms as efficiently as domestic firms due to higher adverse selection and moral hazard costs. The traditional corporate finance explanation for these “extra costs” is that a foreign firm does not possess the same degree of information about the firm vis-à-vis a domestic competitor. Additionally, the foreign firm may to a larger extent rely on others to run the firm. This has several implications and consequences. One view is that it may be welfare reducing for the whole society to allow FDI. For various reasons it may also be politically sensitive and harm domestic interests to lose control of “national champions”. Graham and Krugman (1995) even raise the question whether or not FDI can be a threat to national security, especially in high-tech sectors. In the case of FDI fire sales, there may be significant wealth transfers from domestic shareholders to foreign firms. As Folkpartiet (the Liberal Party of Sweden) argued in the debate article cited above, a weak exchange rate may further increase the risk of this phenomenon. A contradictory view is that the benefits of FDI outweigh the potential disadvantages since it contributes to economic growth, international trade and transfer of knowledge. Another argument is that shareholders gain from increased foreign competition in a globalized market.

Dinc and Erel (2009) provide evidence of a “nationalistic behavior” and a resistance among governments towards cross-border M&A. They find that governments tend to support the merger of domestic firms and oppose cross-border deals. The governments’ resistance tends to negatively affect the likelihood of a cross-border deal to be completed. In addition, they find that reduced competition when

¹ Schmidt and Hamilton representing Folkpartiet (the Liberal Party of Sweden), Dagens Industri, 2009-03-18

governments oppose the takeover attempt often results in large direct losses for shareholders. One of many illustrative cases discussed in the paper by Dinc and Erel is when the German truck-maker, MAN, bid for the Swedish company Scania in 2006. The reaction from Swedish Prime Minister Fredrik Reinfeldt was distinct when he expressed his government's opposition by saying he wished the Swedish "crown jewel" to remain Swedish and that he supported those who wanted to maintain the ownership in Sweden (Dinc and Erel (2009)).

Previous studies of the exchange rate's effects on FDI have resulted in very mixed outcomes. Under the conditions of perfect markets and no-arbitrage, many economists find it difficult to understand why any potential "discounts" of foreign assets should at all matter to the acquisition investment decision. They argue that once the profits are repatriated to the foreign firm's home currency at a lower exchange rate, the rate of return on the foreign assets should decrease, leading to that the price-discount cancels out. The most well-known theory of why there should be a relationship is the one of Froot and Stein (1991). Their model suggests due to imperfect capital markets, foreign firms receive a smaller premium on raising capital for a cross-border acquisition since they get relatively richer than domestic firms when the currency depreciates. This, according to the theory, would explain the relationship between currency depreciations and increased FDI inflows (i.e. acquisitions of domestic targets from foreign buyers, as opposed to FDI *outflows* when domestic firms acquire foreign targets).

In this paper I study these relationships on a data set consisting of transactions in and between the Euro area, United Kingdom (UK), United States (US) and Sweden after the introduction of the Euro in 1999 until the end of 2009. Most other papers within this field tend to only study the in- and outflows of the United States and typically for older data that do not cover the Euro currency². This paper is especially interesting when it comes to testing the implications of the imperfect capital market theory (or relative wealth theory) of Froot and Stein (1991) in a more generalized way under the existing currency regimes. In some other papers focus has been on emerging markets that have suffered from huge economic crises and devaluations³. Rather than studying emerging markets and the mechanisms of economic crises in particular, I investigate the relationship between exchange rates and FDI for large industrialized countries with floating exchange rates. The periods of weak currency in my sample are not necessarily related to economic crises, even though I include the recent financial crisis of 2008-2009. In contrast to studying emerging markets, I therefore capture the potential effects on FDI that are linked to less extreme swing in the exchange rates during the various economic cycles having prevailed in the Western world over the last ten years. This proves to be an important distinction since not all currency

² See for example Froot and Stein (1991) and Klein and Rosengren (1994)

³ See for example Mody and Negishi (2000) and Ogawa and Sasaki (1998)

devaluations are linked to economic crises or periods when domestic acquirers are financially constrained. Take the Euro as an example. After it was first introduced it experienced a large decrease in value even though the economy of the Euro area was booming. Sweden during this recent financial crisis is another example. Despite the fact that Sweden performed relatively better than most other economies in Europe, a large depreciation of the Swedish krona against the Euro was still a fact in late 2008 and 2009.

In addition to investigating the M&A flows of developed countries during the last decade, I study acquisition prices in order to draw conclusions regarding potential FDI fire sale discounts arising from valuation differences in the exchange rate. Again, many other studies on FDI fire sales tend to aim in on either the US in particular or on emerging markets during economic and financial crises⁴. One of the reasons why economists find it interesting to study periods of economic and currency crises is due to the fundamental theories and empirical findings regarding the existence of FDI fire sales. One example of such a theory is the one provided by Shleifer and Vishny (1992). Based on both previous and new findings, they list several conditions that have to be met for a fire sale to occur. These include the level of “redeployability” of a firm’s assets as well as the existence of liquidity constraints both on a firm-specific and on an industry level. Shleifer and Vishny (1992) suggest that periods of general distress will increase the likelihood of fire sale. I have a somewhat different focus and approach in this paper. A period of weak currency as defined in this paper is not necessarily accompanied by liquidity crises of a whole industry during which domestic acquirers to a large extent are financially constrained in the same way as the target firm. Instead, I focus on firm-specific distress and construct a sub-sample of firms that are likely to be fire sale candidates due to their distress characteristics. If foreign firms tend to buy distressed firms in devalued times, at lower prices, this would be a strong indication that foreigners utilize their potential exchange rate advantage to get access to cheap and potentially undervalued assets abroad. To the best of my knowledge, apart from looking at financial crises in particular, there are no studies explicitly examining the relationship between currency depreciation, distressed firms and FDI fire sale in this manner. This is despite the fact that the notion of FDI fire sale is often referred to by media as well as politicians also in the Western world.

My empirical findings provide little support for the perception that a weak exchange rate has any positive relationship with M&A inflows. Studying each currency region separately, it is mainly UK inflows that show consistently higher levels when the British Pound (GBP) is weak. I find some evidence suggesting that the Euro area would have a similar relationship, especially when the Euro is severely depreciated. Interestingly, there are indications of a negative relationship with regards to US inflows, especially during severe depreciations of the US dollar (USD). This implies that a depreciated currency

⁴ See for example Aguiar and Gopinath (2005) and Acharaya and Shin (2009)

leads to fewer foreign acquisitions of domestic targets. This result contradicts other studies covering US data. Similar contradicting result is found for Swedish inflows, however one should bear in mind that there are much fewer observations for Swedish inflows in the sample. On an aggregate level, i.e. when I include all cross-currency transactions, I find a significant negative relationship with the exchange rate after controlling for acquirer and target country fixed effects. This may be explained by the overweight of US transactions in the data set that on a stand-alone basis show a similar relationship.

With some exceptions I therefore find little proof of Froot and Stein's imperfect capital market theory. This raises questions regarding whether or not the theory can be applied to recent data and for a more general and broader data set. My findings indicate that the link between corporate wealth, exchange rates and cross-border M&A may not be as evident and straightforward as indicated by previous studies.

I run similar analysis on a sub-sample of distressed firms. Overall there is only weak, and far from robust, evidence that any depreciation of the currency tends to lead to increased cross-border acquisitions of distressed firms, even though I find some evidence of increased inflows in the Euro area and the US. This has implications for the debate on FDI fire sale since it shows foreign firms generally do not increase its investments in potentially undervalued firms with weaker bargaining position due to temporary currency discounts.

In the second part of the paper I find that transactions involving a foreign firm generally lead to higher acquisition prices, confirming previous research on cross-border M&A. With regards to my research on distress firms, or fire sale candidates, I discover that they tend to receive a higher premium than healthy firms. This indicates shareholders of distressed firms may get some compensation for having a temporarily depressed share price. On the other hand, the price-book ratio is significantly lower for distressed firms, which suggests they receive a discount for having lower quality assets. I find little evidence for any specific discount for distressed firms when acquired by foreign firms. Additionally, I find strong evidence that fire sale candidates do not receive lower acquisition prices during periods of currency devaluations.

The empirical findings in the second part of the paper also contradict the findings of Froot and Stein (1991). My conclusion is that exchange rates play a little role for M&A cross-border pricing in the Western world. Since distressed shareholders do not suffer from any particular discounts during depreciations, the notion of FDI fire sale due to firm-specific distress combined with a weak currency may therefore be questioned. This implies that industry level distress (Shleifer and Vishny (1992)) may in fact be the key driver of any potential FDI fire sales. With regards to periods of less extreme crises, additional competition from foreign firms may therefore instead be a source of extra wealth for shareholders of firms with weaker bargaining power.

The remainder of the paper is structured as follows. In section 2 I review related literature of FDI flows, acquisition prices and fire sales. In section 3 I discuss the theoretical framework and develop hypotheses. In section 4 I describe the data consisting of 8,435 domestic and cross-border transactions. An explanation of the empirical methodology is provided in section 5 and in section 6 I report and analyze the empirical findings before concluding in section 7.

2. Review of literature

2.1 FDI flows and the exchange rate

While some economists provide theories regarding the exchange rates' effect on FDI, others have difficulties understanding the relationship, arguing risk-adjusted expected returns on all assets should be the same independent of currency. It is not only the price of foreign assets that enter into the investment analysis, but also the rate of return once the profits have been repatriated to the home currency. Hence, if the purchasing power parity (PPP) holds, a depreciation of a foreign currency will have implications both from a price and a return perspective. Assuming revenue and costs are exclusively generated within the target's home currency, these effects should effectively cancel out.

One of the traditional theories that have been provided to explain the FDI flows is the theory of relative wage (Caves 1989 and Cushman 1987), which suggests relatively cheaper labor due to currency movements can explain increased FDI inflows during depreciations. Caves (1989) studies bilateral flows for 15 countries during 1978-1986 and his data includes both acquisitions and real estate investments in to the US whereas Cushman (1985, 1987) studies outward bilateral FDI to Canada, France, Germany and the UK during 1963-1978.

The most renowned theories explaining the affects of exchange rates on FDI is the one of Froot and Stein (1991) that builds on an imperfect capital market approach where providers of external financing demand a premium for monitoring costs. Under these assumptions, a devaluation of the target's currency will shift the value of the assets for domestic and foreign firms. This leads to an advantage for the foreign firm who is able to finance more of the acquisition through internal funds, which leads to a lower premium on external credit. Due to differences in the cost of capital, the probability that the foreign acquirer wins the bidding process during devaluations therefore increases relative to domestic firms and conversely. Froot and Stein (1991) look at inbound FDI into the US and differentiate between investments in assets where there is potential information asymmetry (i.e. investments including control rather than just access to cash-flows stakes) and investments where the payoff is "known" (e.g. portfolio investment in stock and bonds, see Acharaya and Shin (2009)). They only find a significant link for the former type of investment, which includes cross-border M&A.

This relative wealth effect offers an important framework for the relationship between FDI and exchange rates. It has often challenged the theory of relative wage. Klein and Rosengren (1994) investigate US inward FDI from Canada, Germany, France, Japan, the Netherlands, Switzerland and the United Kingdom between 1979 and 1991. Besides using bilateral dollar real exchange rates, they also construct variables to disentangle the relative wealth effect from the relative wage hypothesis and include them in the respective FDI flow regressions. Their findings provide evidence for the relative wealth theory but fail to support the relative wage effect. The authors argue that earlier studies of relative wage may have instead picked up relative wealth effects. Dewenter (1995a), on the other hand, finds little support for any relative wealth effects when using a relative stock market performance as a proxy for corporate wealth.

Blonigen (1997) provides a theoretical model based on imperfect goods markets where there are barriers of entry for firms to enter foreign markets. His empirical evidence propose that the underlying motivation for FDI is for firms to get access to transferable firm-specific assets abroad, which over time can generate revenue in other currencies. More specifically, his findings indicate the likelihood of Japanese M&A of US firms during 1975-92 increases during a USD depreciation, especially in industries that have extensive R&D and are more likely to have transferable firm-specific assets. Georgopoulos (2008) results are consistent with Blonigen's asset acquisition hypothesis for a data set on Canadian cross-border M&A.

Erel et al (2009) study cross-border acquisitions worldwide and distinguish between relative wealth and mispricing theories. The latter theory is based on inefficient markets and that firms take advantage of its overvalued share price. Within this context, M&A is originated due to relatively overvalued firms acquiring undervalued firms through stock-based financing. According to Erel et al (2009), changes in exchange rate could result in a relative misvaluation between firms in an international perspective. Despite this economic reasoning, however, Erel et al's empirical research finds stronger support for Froot and Stein's relative wealth hypothesis rather than the theory of mispricing.

Kosteletou and Liargovas (2000) find mixed support for the effect of exchange rates on FDI. Overall, the findings imply that a depreciation do not lead to any increased FDI flows for smaller European countries (the study only covers data prior to the Euro), while on the other hand larger countries like UK, US and Japan did indicate a positive correlation. Other studies that have found little or mixed support for the link between exchange rates and FDI include Danbolt (2004), Ray (1989) and Stevens (1998).

2.2 Acquisition prices and fire sale

If there is some disparity among economists with regards to the effect of exchange rates on FDI flows, it is pale in comparison to the disagreement regarding any potential relation between exchange rates and acquisition prices. Studying a data set of domestic and cross-border M&A deals of US targets during the period 1970-1987, Harris and Ravenscraft (1991) find empirical support that US targets enjoyed higher wealth gains when acquired by a foreign firm after controlling for bid characteristics as well as industry and time fixed effects. In addition, they conclude when the target firm's currency is depreciated this tends to generate higher target gains in cross-border acquisitions. Fleming (2004) and Swenson (1993) find similar results. On the contrary, Dewenter (1995b) does not find any significant difference in exchange rate sensitivity in the target wealth gains between domestic and foreign acquisitions, suggesting the exchange rate may be equally important for both types of M&A. Other studies like Cebenoyan et al (1992) and Eun et al (1996) find little or no significance for the exchange rate on takeover premium.

A large part of the theoretical literature concerning FDI fire sales has focused on the role of fire sales discounts during large currency depreciations and financial crises in emerging markets. Aguiar and Gopinath (2005) study FDI in East Asia during the crisis years of 1996-1998 and find that the probability of being acquired increases noticeably for firms that are financially constrained. They argue that a tightening of liquidity for firms due to a large decrease in equity and debt flows is a highly relevant factor in understanding increased FDI flows and declining acquisition prices. Their approach is based on the liquidity theory of Shleifer and Vishny (1992) whose model provides a basic framework for FDI fire sale with the implication that domestic firms suffering from liquidity constraints have weaker bargaining power due to reduced outside options. Due to limited alternatives, these firms may hence be willing to pay a cost to get access to liquidity. Furthermore, Shleifer and Vishny argue that during an economic crisis, industry peers within an economy are likely to experience a similar type of distress. This provides foreign acquirers with the opportunity to bid for assets without the competition of the target's domestic peers. In addition to that, M&A in emerging markets in particular do not resemble a perfectly competitive market. For these reasons bargaining prices tend to decrease during crises. The empirical findings of Aguiar and Gopinath (2005) include such evidence, especially for distressed firms. Acharaya and Shin (2009) also study takeover patterns in Asian economies, especially around the crisis years in the late 90's. They find evidence of a similar phenomenon and that FDI fire sale is partly associated with a transfer of control to inefficient foreign firms that tend to sell back acquired firms to more efficient domestic firms once the crisis is over.

Pulvino (1998) study asset sales in the commercial airline industry and find evidence of fire sale discounts for distressed airlines. He also finds a stronger effect when airlines are acquired by industry outsiders, particularly in times when the airline industry as a whole is under distress. Ang and Mauck

2009) provide evidence that distressed firms, which are considered “fire sale candidates”, in fact receive higher premiums than other firms. Hence they find weak support for a fire sale discount. This is in line with Mody and Negishi (2001) who, in contrast to above mentioned studies, do not find evidence of fire sales in East Asia. Mody and Negishi (2001) instead find M&A activity remained high even when the currency appreciated back to normal levels.

The first part of the empirical work of this paper will focus on M&A flows in the Euro area, UK, US and Sweden during 1999-2009. Besides finding a link between M&A flows and a weak depreciated currency, any support for the relative wealth theory introduced by Froot and Stein (1991) is of particular interest since there is little literature covering such recent data, especially those including the Euro currency after its introduction in 1999. Additionally, much of the previous literature has been concentrated around in- and outflows in the US exclusively. The approach of this paper allows for a more general test of exchange rate movements in developed countries over several economic cycles, which is preferable for testing theories such as the imperfect capital market hypothesis. The main contribution of this paper is related to the studies of distressed M&A. In general there is very little research regarding FDI fire sales and exchange rates in non-crises periods. I analyze cross-border M&A acquisition prices and investigate whether the concern that foreign investors acquire domestic assets during depreciations at fire sale discounts is justified.

3. Theoretical framework and hypotheses

3.1 Measuring cross-border M&A flows

Some of the previous research within this field has studied all kinds of FDI that is comprised of various types of foreign activity, such as greenfield investment and new plant expansions. I focus on the largest type of FDI in this paper, namely M&A. The advantage of using M&A in testing theories such as the imperfect capital market hypothesis is the presence of information asymmetry between the acquiring firms and its creditors when there is control rather than *just* ownership stakes at play. This has proven to be an important distinction. Georgopoulos (2008), for example, find a significant link between the exchange rate and M&A, but not for greenfield investments. Froot and Stein (1991) come to the same conclusions. According to the Balance of Payments manual of the International Monetary Fund (IMF), M&A is classified as FDI if a foreign firm owns or acquires more than ten percent of a company abroad. This represents a “lasting interest” and an ability to actively affect how the firm is run. If this requirement is not fulfilled the investment is considered a foreign portfolio investment (FPI).

In principal there are two ways to measure FDI or M&A flows. The first method is to study absolute levels of either cross-border transaction values or deal volume. The absolute levels have been

used by for example Blonigen (1997) and Georgopoulos (2008). The second method looks at relative flows, i.e. the transaction values over for example Gross National Product (GNP) or domestic M&A flows. This approach has been used by Froot and Stein (1991) and Klein and Rosengren (1994) among others. Dewenter (1995a) uses both measures and stresses the differences between the two. If the exchange rate has a significant link to absolute flows, this would imply that it is primarily the foreign firms that take the exchange rate into account. Alternatively, if the relative flows increase after a currency devaluation, this is a stronger indicator of an asymmetry between foreign and domestic firms. Increased relative flows are hence stronger evidence for the relative wealth theory since it indicates an asymmetry between domestic and foreign acquirers that may determine who in fact wins the bidding process. Following the methodology of Dewenter (1995a), I study both measures of M&A flow in this paper using primarily M&A transaction values. For robustness, I run all tests also for deal volume.

3.2 Defining a currency depreciation

Apart from investigating bilateral and trade-weighted exchange rates for each region respectively, I divide the sample period into depreciated and “normal” currency periods in order to isolate times of more severe devaluations. Defining a devaluation, however, is a matter of controversy since it involves a high degree of subjectivity (Bussiere et al (2009)). The literature on exchange rate depreciations has mainly studied emerging markets and extraordinary currency devaluations. One of the definitions of a weak currency, presented by Milesi et al (1998), includes a yearly depreciation of the nominal exchange rate of at least 15 percent, which is at least ten percent weaker than the year before and where the rate of change has accelerated compared to the previous year. Another definition out of many is the one of Cooper (1971) who defined a large devaluation at which the annual exchange rate change was at least ten percent. Swenson (1993) define the USD as weak if the current exchange rate was lower than the sample period average.

In this paper I combine Cooper’s and Swenson’s definitions by classifying the currency as depreciated when the exchange rate is lower than ten percent compared to the long-term average. For robustness, I also construct a variable based on the methodology of Swenson (1993). Even though there is a high degree of subjectivity to this, previous papers have shown that the exact cut-off point may not be of critical importance (see Frankel and Rose (1996)). The one factor, which must be taken into account though, is inflation and Cooper’s definition has received some criticism for being misleading in high inflation environments. For the purpose of studying the Euro area, UK, US and Sweden, however, this is a minor problem. Inflation has remained low in the sample countries during the last ten years. It is also for this reason I use nominal exchange rates throughout the analysis.

3.3 Imperfect capital market theory

The main idea of the imperfect capital market theory of Froot and Stein (1991) is that an asymmetry arises between foreign and domestic acquirers due to changes in the exchange rate. The general proposition is that as foreign acquirers get relatively richer they win more auctions. The theory hence predicts that FDI inflows will increase as the currency of the target becomes weaker. In order to try to separate out the wealth effect from the exchange rate effect, recent studies have included other types of corporate wealth shocks. In order to better test the theory, I include a corporate wealth proxy based on changes in relative stock prices in the same manner. This follows the methodology of Klein and Rosengren (1994) and Dewenter (1995a). If the corporate wealth variable is positive this indicates relatively higher foreign wealth is linked with higher M&A inflows to relatively less wealthy countries.

Froot and Stein (1991) provide several different propositions of their model. In one scenario, under the assumption that domestic firms are cash rich and can bid an amount equal to the net present value (NPV) of the assets, the asymmetry between domestic and foreign firms may lead to an increase in the acquisition price since the foreign firm have to raise the bid above the level of the domestic firm. One of the alternative propositions of the model, however, is that FDI can be “welfare reducing”. When firms are credit-constrained, meaning that they are not wealthy enough to bid an amount equal to the NPV of the assets, a depreciation of the exchange rate can lead to a situation where domestic welfare decreases. This is due to (1) the foreign firm gets relatively richer vis-à-vis the domestic firm, (2) the domestic firm cannot increase its bid and (3) the foreign firm’s winning bid after the exchange rate change is at an even lower level in relation to the NPV of the assets if held in the hands of the domestic firm⁵. Hence, under these rather stringent assumptions, the assets are sold at a “fire sale” price after the currency depreciation. The losers include both the shareholders of the target firm that receive a lower price for the assets and the domestic firm that is unable to win the bid. This can be viewed both as a social welfare loss in the home country and a transfer of wealth to a foreign firm.

It should be noted that this outcome can be altered in several ways. As mentioned before, relaxing the assumption that the domestic firm is credit-constrained would allow the domestic firm to bid closer to the NPV of the assets and the foreign firm would have to bid higher than the domestic firm to win the auction. This would in effect remove welfare-reducing FDI. In addition, introducing several foreign bidders into the model could possibly decrease the wealth transfer from domestic shareholders to foreign firms. Dewenter (1995a) makes such a prediction and suggests a weaker currency does not only increase FDI flows but also increases the level of foreign takeover premium since competition between foreign

⁵ For a more detailed clarification see numerical example in Froot and Stein (1991)

firms drive up the bid closer to the perceived NPV of the assets. Swenson (1993) discusses similar arguments.

Consequently, it is not only the M&A flows during periods of weak currency - but also acquisition prices - that test the implications of Froot and Stein's model. Furthermore, studying takeover prices gives indications of the degree of market imperfection within the cross-border M&A market. Evidence of indifferent wealth effects, as opposed to negative wealth effects, for domestic shareholders during devaluations, sends clear signals about the competitiveness of the cross-border M&A market.

3.4 Distress and fire sale

The main focus of the second part of the paper is to examine distressed firms that are more likely to be forced to accept a bid at a discount. Due to the fact that I am focusing on distressed firms, I also study the M&A flows of these types of firms in particular before I shift my attention towards acquisition prices.

Following the methodology of Ang and Mauck (2009), I view distressed firms as potential fire sale candidates and use negative net income during the last year as a proxy for distress. For robustness, I also include negative cash flow from operations (cash flow) as an alternative proxy. The reason why these types of firms make good candidates is based on theories suggesting liquidity-constraints generally lead to a position of reduced bargaining power. Distressed firms may be forced to accept lower bids to get access to capital, avert bankruptcy or loss of control (Ang and Mauck (2009)). Healthier firms, however, are not to the same extent forced to accept a bid at a discount. If the cross-border M&A takeover prices for distressed firms tend to decrease in times of devaluation vis-à-vis periods of normalized exchange rates, then these periods of weak currency may be associated with potential fire sales from foreign acquirers.

FDI fire sales are often characterized either by firm-specific distress or an industry-wide liquidity crisis (i.e. all domestic peers experience a general distress, see Shleifer and Vishny (1992)). One important difference with the approach of this paper compared to other research of FDI fire sale is that I do not study periods of economic crises per se. During economic and financial crises there is evidence that industry peers experience similar kinds of distress and that this contributes to fire sales and transfers of wealth to foreign acquirers (Aguiar and Gopinath (2005)). However, rather than investigating economic crises, I explore whether or not firm-specific distress in itself may be a source of fire sale discounts. In addition, I study what implications the relative wealth hypothesis of Froot and Stein (1991) may have on price levels for those firms that are most likely to be forced to accept lower prices. The key question in this part of the paper is whether or not foreign acquirers take advantage of favorable currency valuations in order to buy distressed assets abroad at low prices. To the best of my knowledge, no

previous studies have looked at the relationship between devaluations, distressed firms and fire sale in this manner.

In order for a fire sale transaction to occur, where there is a transfer of wealth, there are some conditions that need to be met as argued by Ang and Mauck (2009). These assumptions include that the market price of the distressed firm is somehow depressed and that the firm has a weaker bargaining position in relation to the bidder. The traditional ex-ante reference point of a takeover premium is the stock price before announcement, which I will use throughout the analysis⁶. When using the announcement premium to distinguish shareholder wealth effects for distressed firms there is a risk of missing out on any potential effects related to the share price being temporarily undervalued (Ang and Mauck (2009)). However, instead of using any other reference point than the stock price prior to announcement, I use the ratio of offer price to book value of equity (price-book) as a complement to the traditional announcement premium. The reason for this is the price-book ratio is usually more volatile than the premium⁷. One explanation is the denominator, book value of equity, tends to be more stable over time while offer prices move around depending on the stock market's performance. Hence, while the takeover premium may be overstated due to a current undervaluation of the share, a lower price-book is considered a more severe indication of a fire sale discount since it is stated in relation to the book value of the company. For these reasons, I use both price measures throughout the takeover price analysis.

Fleming (2004), Harris and Ravenscraft (1991) together with Swenson (1993) find support for higher target gains in cross-border acquisitions. The explanations of this “cross-border effect” provided in academic research include value creation opportunities based on operational, financial and transaction-based factors. Even though the valuation difference arising from the exchange rate is only one factor out of many that could explain higher general takeover premium in cross-border M&A, it will remain the key factor of interest in this paper. However, various important control variables, which have been identified in previous studies, will be used throughout the regression analysis.

3.3 Hypotheses

Based on previous research and the discussion above, the following hypotheses are obtained. The first three are related to foreign M&A flows (Part 1) whereas the remaining two focus on observed acquisition prices using the premium and price-book measures (Part 2).

⁶ The takeover premium is calculated by taking the offer price over the market value of the shares prior to the announcement.

⁷ See for example Aguiar and Gopinath (2005) for a discussion

3.3.1 Part 1

Hypothesis 1. There is a correlation between M&A inflows and the exchange rate. When the currency of the target is depreciated, absolute and relative levels of foreign M&A transaction values should increase.

Hypothesis 2. If there is a correlation supporting Hypothesis 1, the increase in M&A inflows are also related to a shift in the corporate wealth between the acquirer and target country.

Hypothesis 3. In times when the target's currency is depreciated, foreign firms' acquisitions of distressed targets tend to increase.

Hypothesis 1 expects a positive correlation between M&A and the exchange rate. This would imply foreign firms acquiring more firms when the currency is weak. Hypothesis 2 anticipates a link between increased relative wealth of acquirers and M&A flows. By adding a proxy for corporate wealth, I separate out the wealth effect from the exchange rate effect. In order to find strong evidence of the Froot and Stein model I expect both the exchange rate and corporate wealth variable to be positively correlated with the level of M&A inflow. Additionally, significance for relative rather than absolute flows would be stronger evidence of an asymmetry between domestic and foreign firms.

In Hypothesis 3 I test similar relationships in a sub-sample of distressed firms. Increased inflow of distressed firms during times of a weak currency would indicate foreign firms taking advantage of the currency valuation to buy potentially undervalued assets abroad.

3.3.2 Part 2

Hypothesis 4. Distressed firms receive a lower premium and price-book compared to healthy firms but receive higher takeover prices from foreign compared to domestic acquirers.

Hypothesis 5. Distressed firms that are acquired by foreign firms when their currency is depreciated receive a lower premium and price-book compared to distressed firms that are acquired by foreigners in periods of normal currency conditions.

The hypotheses of the second part of the thesis handle acquisition pricing. Based on previous studies of cross-border M&A I expect to find signs of a cross-border premium, i.e. higher takeover prices when firms are acquired by foreign firms. Distressed firms that face liquidity-constraints and a weaker bargaining position are considered candidates for potential fire sale. I expect these firms to receive lower prices than healthy firms. However, if the cross-border premium exists, this should lead to higher prices also for distress firms when acquired by foreign firms. I test this in Hypothesis 4.

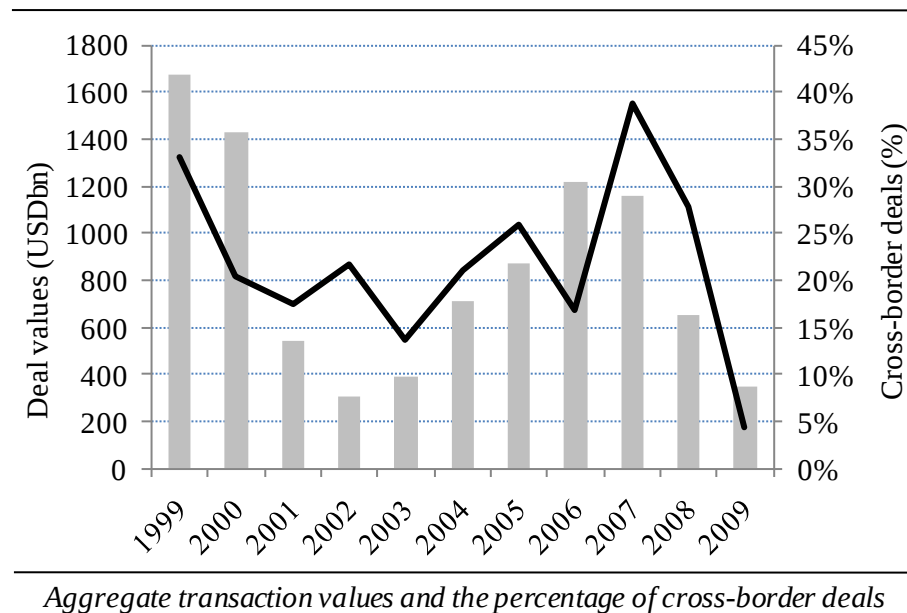
In Hypothesis 5 I lay the final piece of the puzzle and test whether or not periods of weak currency will lead to lower prices for fire sale candidates and hence whether or not foreign firms acquire cheap assets abroad due to favorable currency valuations. As in the first part, this tests the imperfect

capital market theory since the asymmetry between domestic and foreign firms may affect the takeover price. According to one of the propositions of the model, FDI can reduce domestic welfare. I formulate Hypothesis 5 as if prices during depreciations in fact will be lower for distress firms, which would indicate that FDI fire sale exists.

4. Data description

I have collected deal data from the SDC Platinum database consisting of 8,435 domestic and cross-border transactions in and between the Euro area, Sweden, UK and US completed over the period 1999-2009⁸. Since I am interested in both acquisition prices and accounting figures, I only include transactions involving public targets where data is available. In addition, I have excluded those transactions with missing transaction values and observations with likely errors in coding or data entry. The observations with extreme values sum up to 20, 16 and 4 observations with regards to premium and price-book respectively. These observations represent less than 0.5 percent of the total sample. In order to comply with the general requirement of direct investment, I limit the data set to deals where at least ten percent was acquired. Nominal exchange rates and stock market indices for each country have been gathered from Datastream.

Graph 1: M&A transaction values



⁸ Only the eleven original Euro nations (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain) as well as Greece, who joined in 2001, are included in the data set.

The aggregate transaction amounts (deal values) over the ten year sample of M&A deals in and between the Euro area, UK, US and Sweden equals approximately USD 9.3 trillion. The cross-border M&A market represents a substantial part of total M&A in the Western world. As displayed in Graph 1, cross-border deals account for around 20 percent of all M&A's over the sample period. In 2007, the peak year, it reached close to 40 percent. Since then, cross-border transactions have decreased dramatically due to the financial crisis. Graph 1 suggests the overall market for M&A has been highly cyclical during the last decade.

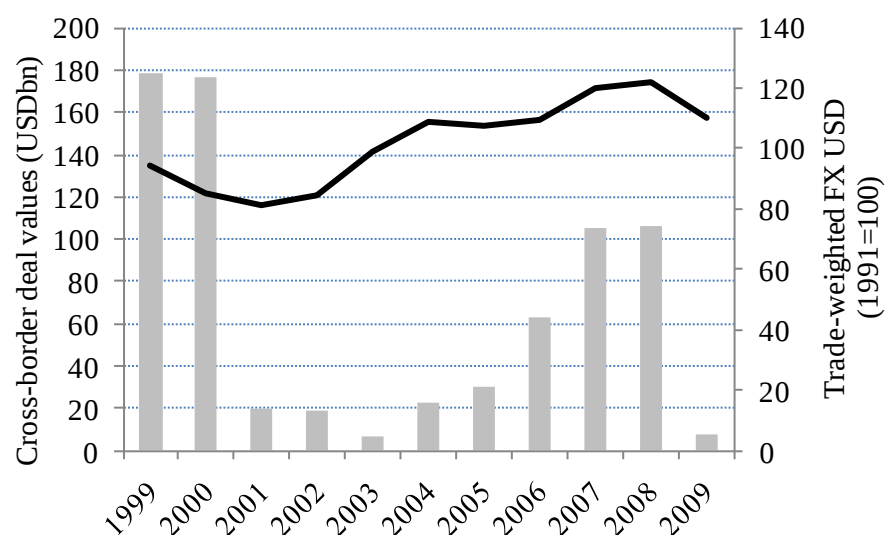
Table 1 shows the split between the different countries/regions. Over the whole sample period, US accounts for about two-thirds, the Euro area for about one fourth, UK for one tenth and Sweden for one percent of the M&A activity. Even though the deal volume was low in 2009, it is interesting to see the US accounting for about 90 percent of the all M&A during that year and that both the Euro area and UK dropped significantly.

Table 1: M&A deal values per country/region

Year	US	Euro area	UK	Sweden	Total
1999	995	513	148	16	1671
	60%	31%	9%	1%	
2000	1072	164	185	11	1431
	75%	11%	13%	1%	
2001	355	131	48	7	541
	66%	24%	9%	1%	
2002	175	98	35	1	309
	57%	32%	11%	0%	
2003	244	96	44	3	388
	63%	25%	11%	1%	
2004	407	178	119	4	707
	58%	25%	17%	1%	
2005	577	179	107	11	874
	66%	20%	12%	1%	
2006	802	294	105	13	1214
	66%	24%	9%	1%	
2007	668	348	132	11	1159
	58%	30%	11%	1%	
2008	401	118	131	6	656
	61%	18%	20%	1%	
2009	317	20	14	1	352
	90%	6%	4%	0%	
Total	6012	2139	1069	83	9302
	65%	23%	11%	1%	

M&A transaction values per country/region in USD billions

Graph 2: Cross-border M&A inflow in the US

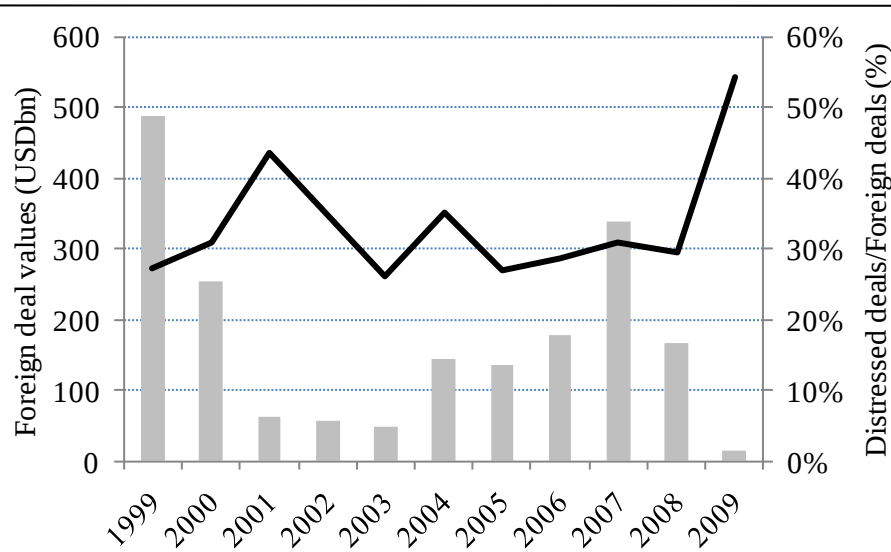


Foreign inflows into the US in USD billions and a trade-weighted exchange rate, weighted based on each country's share of total M&A inflow

Graph 2 displays a potential relationship that is of particular interest in this thesis. It shows US cross-border M&A inflows over the last ten year period and a trade-weighted exchange rate for the USD.

Over the period 2003-2007, the USD has depreciated against the Euro, GBP and SEK while at the same time M&A inflows have increased. Even though this particular graph may suggest there is a relationship, there may be several other factors at play. The first part of this thesis will study such factors for all four currencies in order to isolate any potential exchange rate effect on M&A.

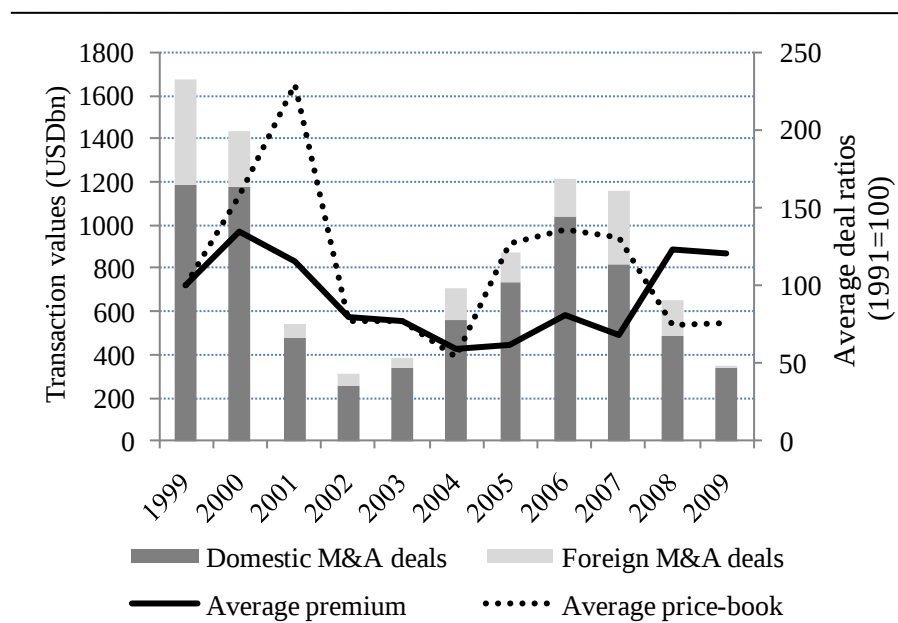
Graph 3: Distressed deals



Foreign deal values in USD billions and the percentage of distressed M&A inflow

Another area of interest of this paper is distressed firms. A reason for this is that they make good candidates for FDI fire sales. Graph 3 shows the aggregate value of all foreign deals⁹ in the studied countries. The percentage of distressed deals in the sample (using negative net income during the last year as a proxy for distress) averages around 30 percent. This is in line with other research on distress such as Ang and Mauck (2009). The number of distressed deals increases dramatically in 2009 as a consequence of the financial crisis. Graph 4 shows the average values of two different takeover ratios that are used throughout the analysis, it clearly shows the price-book ratio is more volatile than the premium.

Graph 4: Deal ratios



Domestic and foreign M&A transaction values and the average premium and price-book respectively.

Table 2 displays some of the characteristics of healthy and distressed firms. On average, distressed firms seem to have more capital expenditure (capex) than other firms. A situation of severe liquidity constraints might therefore be more severe for the operations of this type of firms. Besides from having negative earnings (by definition), distressed firms also seem to have less cash flow from operations as percentage of assets. The CFO/Assets ratio is equal to 6.1 percent for healthy firms compared to 4.8 percent for distressed firms. This justifies the use of cash flow as a complementary proxy for distress in addition to negative earnings.

⁹ For the purposes of studying the effects of the exchange rate in particular, all M&A deals within the same currency area are considered “domestic”, while the rest are referred to as “foreign”, “cross-border” or “cross-currency”.

Table 2: Firm type characteristics

Firm type	Mean Premium	Mean Price-Book	Capex/Assets	CFO/Assets	Total obs
Healthy firms	29.5%	2.3	2.3%	6.1%	5041
Distressed firms	41.7%	2.0	3.2%	4.8%	2134
All firms	33.7%	2.2	2.6%	5.8%	7175

Firm type characteristics for healthy and distress firms respectively

Additionally, shareholders of distressed vis-à-vis healthy firms seem to receive a higher premium (41.7 vs. 29.5 percent) but a lower price-book (2.0 vs. 2.3 times the book value). This may suggest distressed firms receive some compensation for a temporarily depressed share price, but that the bid levels are low in comparison to the firms' book value. I further analyze these relationships later in the paper.

5. Empirical methodology

5.1 Part 1: M&A flows

For the first part of the analysis, which focuses on M&A flows, I include different econometric measures and models to investigate a potential link between M&A and exchange rates. Following the methodology of Dewenter (1995a), I construct Spearman rank correlations¹⁰ for quarterly absolute and relative levels of M&A in each target country and for each applicable bilateral exchange rate. I expect a positive correlation between the level of M&A and the bilateral exchange rate, since a depreciation of the target currency in relation to the acquiring country should be associated with an increase in M&A inflows.

I conduct bilateral ordinary least squares (OLS) regressions with robust standard errors for each of the four target countries' quarterly level of foreign M&A (notation t and q respectively) where I control for quarterly domestic M&A activity ($DOMVALUE$) in each country and year fixed effects (as well as acquirer country fixed effects and target country fixed effects in the Euro area regressions). The variable for the bilateral exchange rate (FX) is matched with each deal's completion date and target country. It is constructed by taking the quarterly average nominal exchange rate using direct quotation, i.e. an increase of the bilateral exchange rate implies a depreciation of the target country's currency. As the dependent variable, I use both absolute and relative quarterly cross-border deal value levels for each target region respectively ($ABSVAL$, $RELVAL$). I also include the corporate wealth variable ($WEALTH$), which proxies for the relative wealth effects between acquirer and target country. The variable is matched with each deal in the same manner as the exchange rate. The corporate wealth proxy has been constructed by indexing the stock market indices for each respective country and dividing the quarterly average index level of the

¹⁰ A non-parametric correlation measure that can capture non-linear relationships between two variables.

acquiring country with the one of the target country¹¹. Using year averages rather than quarterly figures for the wealth proxy gives similar results. The first set of bilateral regressions is referred to as Regression 1 and 2.

$$ABSVAL_{t,q} = \alpha + \beta_1 \text{Ln}(\text{FX}_{t,q}) + \beta_2 \text{Ln}(\text{WEALTH}_{t,q}) + \beta_3 \text{Ln}(\text{DOMVALUE}_{t,q}) + D_1(\text{YEAR}) + \epsilon \quad (1)$$

$$RELVAL_{t,q} = \alpha + \beta_1 \text{Ln}(\text{FX}_{t,q}) + \beta_2 \text{Ln}(\text{WEALTH}_{t,q}) + \beta_3 \text{Ln}(\text{DOMVALUE}_{t,q}) + D_1(\text{YEAR}) + \epsilon \quad (2)$$

In addition to the bilateral regressions I also construct a set of different specifications used to analyze absolute and relative foreign M&A inflows for each target country on an aggregate level. In this case I use a trade-weighted exchange rate (*TWFX*) for each target country. The weights of *TWFX* are based on the aggregate M&A inflow from each of the other countries during the sample period respectively. The trade-weighted corporate wealth variable (*TWWEALTH*) is constructed for each country's stock index using the same weights.

As a complement to using the bilateral and trade-weighted exchange rates, I also conduct another set of regressions with a dummy-variable, *DEVCROSS*, which is equal to one if, in any given quarter, the target's currency in relation to the acquiring country's is more than ten percent depreciated compared to the average exchange rate over the sample period. This variable aims to capture the larger changes in the exchange rate and particularly times when the target's currency is severely depreciated. For robustness I create an additional dummy variable, *WEAKCROSS*, which takes the value of one when the bilateral exchange rate exceeds the long-term average (in line with the methodology of Swenson (1993)). Furthermore, I control for industry, acquirer country and year fixed effects (as well as target country fixed effects in the Euro area regressions). I refer to these as Regression 3-4, where (a) and (b) represents absolute and relative M&A.

$$ABSVAL_{t,q} = \alpha + \beta_1 \text{Ln}(\text{TWFX}_{t,q}) + \beta_2 \text{Ln}(\text{TWWEALTH}_{t,q}) + \beta_3 \text{Ln}(\text{DOMVALUE}_{t,q}) + D_1(\text{YEAR}) + D_2(\text{ACQCOUNTRY}) + D_3(\text{INDUSTRY}) + \epsilon \quad (3a)$$

$$RELVAL_{t,q} = \alpha + \beta_1 \text{Ln}(\text{TWFX}_{t,q}) + \beta_2 \text{Ln}(\text{TWWEALTH}_{t,q}) + \beta_3 \text{Ln}(\text{DOMVALUE}_{t,q}) + D_1(\text{YEAR}) + D_2(\text{ACQCOUNTRY}) + D_3(\text{INDUSTRY}) + \epsilon \quad (3b)$$

¹¹ For robustness, I have also tested a similar wealth variable based on yearly averages, which yields the same results.

$$ABSVAL_{t,q} = \alpha + \beta_1 \text{Ln}(\text{DEVCROSS}_{t,q}) + \beta_2 \text{Ln}(\text{TWWEALTH}_{t,q}) + \beta_3 \text{Ln}(\text{DOMVALUE}_{t,q}) + D_1(\text{YEAR}) + D_2(\text{ACQCOUNTRY}) + D_3(\text{INDUSTRY}) + \epsilon \quad (4a)$$

$$RELVAL_{t,q} = \alpha + \beta_1 \text{Ln}(\text{DEVCROSS}_{t,q}) + \beta_2 \text{Ln}(\text{TWWEALTH}_{t,q}) + \beta_3 \text{Ln}(\text{DOMVALUE}_{t,q}) + D_1(\text{YEAR}) + D_2(\text{ACQCOUNTRY}) + D_3(\text{INDUSTRY}) + \epsilon \quad (4b)$$

5.1.2 Sub-sample of distressed firms

I explore the M&A flows of distressed firms by creating a sub-sample consisting of firms with negative earnings the year prior to the acquisition. I create an absolute measure of distressed cross-border deal values on a quarterly basis in each target region (*ABSDISVAL*) and run regressions including only foreign distressed deals. In addition, I create a relative measure, equaling the percentage of distressed cross-border deal values over domestic distressed deals in each country on a quarterly basis (*RELDISVAL*). As with the above specifications I also run regressions using the *DEVCROSS*-dummy and include the other control variables together with industry (1-digit SIC code), acquirer and year fixed effects (as well as target country fixed effects in the Euro area). The sub-sample specifications, referred to as Regression 6-7, are stated below.

$$ABSDISVAL_{t,q} = \alpha + \beta_1 \text{Ln}(\text{TWFX}_{t,q}) + \beta_2 \text{Ln}(\text{TWWEALTH}_{t,q}) + \beta_3 \text{Ln}(\text{DOMDIS}_{t,q}) + D_1(\text{YEAR}) + D_2(\text{ACQCOUNTRY}) + D_3(\text{INDUSTRY}) + \epsilon \quad (6a)$$

$$RELDISVAL_{t,q} = \alpha + \beta_1 \text{Ln}(\text{TWFX}_{t,q}) + \beta_2 \text{Ln}(\text{TWWEALTH}_{t,q}) + \beta_3 \text{Ln}(\text{DOMDIS}_{t,q}) + D_1(\text{YEAR}) + D_2(\text{ACQCOUNTRY}) + D_3(\text{INDUSTRY}) + \epsilon \quad (6b)$$

$$ABSDISVAL_{t,q} = \alpha + \beta_1 \text{Ln}(\text{DEVCROSS}_{t,q}) + \beta_2 \text{Ln}(\text{TWWEALTH}_{t,q}) + \beta_3 \text{Ln}(\text{DOMDIS}_{t,q}) + D_1(\text{YEAR}) + D_2(\text{ACQCOUNTRY}) + D_3(\text{INDUSTRY}) + \epsilon \quad (7a)$$

$$RELDISVAL_{t,q} = \alpha + \beta_1 \text{Ln}(\text{DEVCROSS}_{t,q}) + \beta_2 \text{Ln}(\text{TWWEALTH}_{t,q}) + \beta_3 \text{Ln}(\text{DOMDIS}_{t,q}) + D_1(\text{YEAR}) + D_2(\text{ACQCOUNTRY}) + D_3(\text{INDUSTRY}) + \epsilon \quad (7b)$$

For robustness I also use negative cash flow from operations (referred to as cash flow) in a different set of regressions (number 8-9) using the equivalent variables for a sub-sample of targets with negative cash flow.

5.2 Part 2: Acquisition prices

I begin the second part by conducting t-tests using two different takeover price ratios. The first is the log of price-book, $\ln(\text{PRICEBOOK})$, and the second one is the one week premium (PREMIUM)¹². As discussed earlier, there seems to be more variation in the price-book measure over time and hence it may capture different effects than the premium. The first t-tests study whether or not cross-border deals tend to generate higher price levels in comparison to domestic transactions assuming unequal variance. I also study distressed firms in the same manner as well as deals that occur in periods of weak currency using both *DEVCROSS* and *WEAKCROSS*.

In the regression analysis I use the trade-weighted exchange rates and corporate wealth proxies, which were created for the M&A flow analysis. *CROSS* is a dummy-variable equal to one if the transaction is cross-border where two currencies are involved and zero otherwise¹³. I also include a dummy variable for distressed firms (*DISTRESS*) primarily based on the negative earnings proxy and in another set of regressions I also use negative cash flow (*DISTRESSCF*). I also construct an interaction term between the two variables *CROSS***DISTRESS* which, together with *CROSS*, isolate the effect on the acquisition price level of distressed firms that are acquired by foreign firms.

Furthermore, I take into account various bid characteristics. These include controlling for cash bids and multiple bids that have proven to be important variables in determining wealth effects, especially in cross-border transactions¹⁴. *COMPBID* is equal to one if there were competing bids and *ALLCASH* takes the value of one if the bid consisted of cash only. Both variables are expected to increase the takeover ratios. Furthermore, I include a dummy-variable for high-tech firms (*HIGHTECH*). This variable captures any effects related to target wealth gains in R&D intensive industries, a factor Blonigen (1997) refers to as firm-specific assets. Following his reasoning, I expect the variable to be positive. *SAMESIC* is a zero-one dummy variable that is equal to one if the acquirer and target are in related industries (measured on the 3-digit SIC level), which I expect to be higher given larger potential for synergies between industry peers. $\ln(\text{ASSETS})$ is equal to the logged assets of the target during the year before the takeover and aims to capture any potential effect related to target size. $\ln(\text{SHARES})$ is the log of the percentage of shares acquired in the takeover, a factor that has been considered important in explaining premiums in papers such as Ang and Mauck (2009). *MGMT* takes the value of one if the management is involved in the takeover.

¹² Note that I have logged the price-book variable but not the premium variable since the latter can take negative values.

¹³ As mentioned before, I do not consider transactions within the Euro area as cross-border/foreign since I focus on the role of the exchange rate.

¹⁴ See for example Harris and Ravenscraft (1990), Swenson (1993) and Fleming (2004).

The above mentioned control variables are included to give further robustness to the results. Additionally, however, I include similar fixed effects as in the regressions conducted in the first part of the paper. These include variations in industry (2-digit SIC code), acquirer and target country as well as year fixed effects. Hence I control for any changes in regulatory, policy, macro or other omitted industry, country or time related factors that can vary over time. The control variables and the fixed effects are summarized in Appendix 9.1 along with definitions and acronyms. The specifications of Regression 10 are listed below, where (a) refers to the premium and (b) to the price-book regression respectively.

$$\begin{aligned} (PREMIUM) = & \alpha + \beta_1 \ln(TWFX_{t,q}) + \beta_2 \ln(TWWEALTH_{t,q}) + D_1 \ln(CROSS) + D_2 (DISTRESS) + \\ & D_3 (CROSS * DISTRESS) + D_4 (HIGHTECH) + D_5 (SAMESIC) + \beta_3 \ln(ASSETS) + \beta_4 \ln(SHARES) + \\ & D_6 (ALLCASH) + D_7 (COMPBID) + D_8 (MGMT) + D_9 (YEAR) + D_{10} (ACQCOUNTRY) + D_{11} (TGTCOUNTRY) + \\ & D_{12} (INDUSTRY) + \epsilon \end{aligned} \quad (10a)$$

$$\begin{aligned} \ln(PRICEBOOK) = & \alpha + \beta_1 \ln(TWFX_{t,q}) + \beta_2 \ln(TWWEALTH_{t,q}) + D_1 \ln(CROSS) + D_2 (DISTRESS) + \\ & D_3 (CROSS * DISTRESS) + D_4 (HIGHTECH) + D_5 (SAMESIC) + \beta_3 \ln(ASSETS) + \beta_4 \ln(SHARES) + \\ & D_6 (ALLCASH) + D_7 (COMPBID) + D_8 (MGMT) + D_9 (YEAR) + D_{10} (ACQCOUNTRY) + D_{11} (TGTCOUNTRY) + \\ & D_{12} (INDUSTRY) + \epsilon \end{aligned} \quad (10b)$$

Using a similar methodology as above I complete the empirical analysis by creating regression specifications that includes the depreciation proxy *DEVCROSS*. This is done in order to study whether or not acquisition prices change for foreign distressed deals due to differences in the currency valuation. Similar interaction terms as in Regression 10 are included as well as the same control variables (excluding *TWFX*) and fixed effects. The last set of regression specifications are listed below and referred to as Regression 11.

$$\begin{aligned} (PREMIUM) = & \alpha + \beta_1 \ln(TWWEALTH_{t,q}) + D_1 \ln(DEVCROSS_{t,q}) + D_2 (DISTRESS) + D_3 (DEVCROSS * \\ & DISTRESS) + D_4 (HIGHTECH) + D_5 (SAMESIC) + \beta_2 \ln(ASSETS) + \beta_3 \ln(SHARES) + D_6 (ALLCASH) + \\ & D_7 (COMPBID) + D_8 (MGMT) + D_9 (YEAR) + D_{10} (ACQCOUNTRY) + D_{11} (TGTCOUNTRY) + \\ & D_{12} (INDUSTRY) + \epsilon \end{aligned} \quad (11a)$$

$$\begin{aligned} \ln(PRICEBOOK) = & \alpha + \beta_1 \ln(TWWEALTH_{t,q}) + D_1 \ln(DEVCROSS_{t,q}) + D_2 (DISTRESS) + D_3 (DEVCROSS * \\ & DISTRESS) + D_4 (HIGHTECH) + D_5 (SAMESIC) + \beta_2 \ln(ASSETS) + \beta_3 \ln(SHARES) + D_6 (ALLCASH) + \\ & D_7 (COMPBID) + D_8 (MGMT) + D_9 (YEAR) + D_{10} (ACQCOUNTRY) + D_{11} (TGTCOUNTRY) + \\ & D_{12} (INDUSTRY) + \epsilon \end{aligned} \quad (11b)$$

6. Results

6.1 Part 1: Empirical findings

A positive correlation between the level of cross-border M&A and the exchange rate would provide support for the hypotheses concerning M&A flows. Following the methodology of Klein and Rosengren (1994), a positive coefficient on the relative wealth variable (*WEALTH* or *TWWEALTH*), together with the exchange rate variable (*FX* or *TWFX*), would be in favor of the imperfect capital market theory of Froot and Stein (1991).

Table 3: Bilateral Spearman ranks

Nationality of acquirer	Nationality of target			
	Euro area	UK	US	Sweden
Euro area				
Absolute	-	-.165*	-0.198***	-0.597***
Relative	-	0,048	0.124**	-0,007
UK				
Absolute	0.158*	-	0.173**	0.613***
Relative	-0,104	-	0.212***	0,05
US				
Absolute	-0,019	-.191***	-	0,007
Relative	-.244***	-.366***	-	0,046
Sweden				
Absolute	-0,248	-0.05	-0,191	-
Relative	-0.589***	0,475	0,042	-
Trade-weighted exchange rate				
All data				
Absolute	-0.27***			
Relative	0.0.25			

Bilateral Spearman ranks between the absolute and relative level of foreign M&A inflow and the bilateral exchange rate for each country pair respectively

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

The output from the Spearman rank t-tests can be seen in Table 3. The t-tests provide a good starting point to determine whether or not there may be a correlation between the level of M&A in each country and the bilateral exchange rate between the acquirer's and target's currency. The t-tests are done based on transaction values, however using transaction volume yields similar results.

At first glance, there is weak evidence of a positive relationship on a country-specific level. UK outflows to US and Sweden is the exception. For these bilateral flows there is a significant positive relationship at the five and one percent level respectively (the Euro area is significant at the ten percent level). Only the UK-US flows are robust when using the relative measure. Instead of a positive

relationship, four of the Spearman coefficients on the absolute level show a negative correlation with the exchange rate (Euro area outflows to US and Sweden as well as US outflows to UK and Euro area), whereas most of the bilateral t-tests are insignificant. When I use the trade-weighted exchange rate for all data combined it also results in a negative coefficient equal to -0.27 on the absolute level of M&A. The coefficient is significant at the one percent level. The coefficient on the relative M&A measure is insignificant when studying all data combined.

In a next step I conduct bilateral regressions (Regression 1 and 2) controlling for domestic M&A activity, year fixed effects as well as target and acquirer country fixed effects in the Euro area regressions. In addition to the exchange rate variable I also include the proxy for corporate wealth. Selected output from the bilateral regressions (1-2) is found in Table 4.

Overall the regression outputs differ from the Spearman rank tests; it is especially Euro area outflows showing a positive relationship with the exchange rate. The bilateral exchange rate variable is significant for UK and US with coefficients of 332.71 and 216.70, significant on the one and five percent levels respectively. The results are similar if regressed on volume rather than transaction values and when using relative M&A flows. Additionally, the US-UK flows has a negative coefficient of -376.77, significant at the one percent level, which implies an inverse relationship to the exchange rate. However, it is not robust when using the relative measure.

While many of the bilateral regressions show insignificant results, the regression outcome for the aggregated data set ("All data" at the bottom of Table 4), including acquirer and target country fixed effects, is significant both for the absolute and relative measure. The coefficient on the bilateral exchange rate is equal to -16.33 and -0.48 in Regression 1 and 2 respectively, supporting the Spearman rank correlation for the absolute measure when using the trade-weighted exchange rate on all data combined.

There is very poor evidence of any corporate wealth effects in the above regressions. Even if the relative wealth is positive at times, e.g. for the Euro area regressions, in none of them do both the relative wealth and exchange rate variable show positive signs. In fact, for both the UK-US and UK-Sweden regressions the coefficients are significantly negative equal to -115.04 and -29.46 respectively. This indicates an opposite relationship than the one suggested by Froot and Stein, i.e. foreign acquirers invest less when they are relatively wealthier. For the regressions where the *WEALTH* variable was significant I excluded the proxy and ran the regression again. In some regressions this increased the t-value of the *FX* coefficients, however in none of the cases did this shift the significance of the exchange rate below the five percent level.

Table 4: Bilateral regressions of foreign M&A inflows

Nationality of acquirer		Nationality of target											
		Euro area					UK						
		Constant	Ln(FX)	Ln(WEALTH)	Ln(DOMVALUE)	R-sq	Obs	Constant	Ln(FX)	Ln(WEALTH)	Ln(DOMVALUE)	R-sq	Obs
Euro area													
(1) Absolute		-	-	-	-	-	-	-1593.806***	332.706***	0,159	-0.283***	0,814	138
(2) Relative		-	-	-	-	-	-	-16.524**	3.212**	-0,105	-0.011***	0,650	138
UK													
(1) Absolute		220,411	-38,284	5,389	-0,023	0,364	141	-	-	-	-	-	-
(2) Relative		-3,242	0,755	-0,092	-0.009***	0,530	141	-	-	-	-	-	-
US													
(1) Absolute		-347,755	82,670	1,256	0,030	0,297	196	1876.565***	-376.771***	-152.346***	-0.249***	0,805	181
(2) Relative		-12.100**	2.610**	0,148	-0.008***	0,528	196	5,869	-1,032	-3.564***	-0.009***	0,547	181
Sweden													
(1) Absolute		4196.267*	-905.039*	-60,949	0,092	0,616	31	1656,010	-368,109	111,320	0,137	0,648	10
(2) Relative		67,634	-14,858	-1,056	-0,005	0,706	31	30,158	-6,941	2,748	-0,007	0,492	10

Nationality of acquirer		Nationality of target											
		US					Sweden						
		Constant	Ln(FX)	Ln(WEALTH)	Ln(DOMVALUE)	R-sq	Obs	Constant	Ln(FX)	Ln(WEALTH)	Ln(DOMVALUE)	R-sq	Obs
Euro area													
(1) Absolute		-948.112* ^a	216.702**	-12,305	0.111***	0,816	255	-1038,510	230,428	5,512	-0,146	0,881	34
(2) Relative		-19.252***	3.928***	-0,154	-0.001***	0,569	255	-45,430	9,905	-0,118	-0.055***	0,912	34
UK													
(1) Absolute		-665,487	153,980	-0,373	0.119***	0,861	154	-408,202	87.564***	-29.457***	0,356	0,815	10
(2) Relative		-12,616	2,423	2,423	-0,317	0,634	154	-44.237***	9.558***	-1.336***	-0.043**	0,657	10
US													
(1) Absolute		-	-	-	-	-	-	476,027	-103,588	-11,590	0,149	0,889	26
(2) Relative		-	-	-	-	-	-	51.525**	-11.339**	-1,391	-0.062***	0,941	26
Sweden													
(1) Absolute		-4,403	10,924	-2,876	0,126	0,908	27	-	-	-	-	-	-
(2) Relative		-22,362	-0,006	0,010	-0,001	0,766	27	-	-	-	-	-	-

All data						
	Constant	Ln(FX)	Ln(WEALTH)	Ln(DOMVALUE)	R-sq	Obs
(1) Absolute	-31.875***	-16.331***	13.953***	0.142***	0,742	1214
(2) Relative	-2.659***	-0.479***	0.388***	0.000***	0,697	1214

Dependent variable in (1) is the quarterly aggregated transaction values per target country Ln(*ABSV*AL) and in (2) the ratio of foreign/domestic transaction values per target country and quarter Ln(*REL*VAL)

Includes year fixed effects, except for Euro-Sweden and Sweden-UK due to insufficient observations. In the regressions involving the Euro area and All data, target and acquirer country fixed effects are taken into account. Robust standard errors correct for heteroscedasticity.

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

In the next set of analysis I use a trade-weighted exchange rate in order to study each target country separately, which increases the number of observations in each regression. Furthermore, I make the regressions more robust by including acquiring country, industry (1-digit SIC code) and year fixed effects (as well as target country fixed effects for the Euro area regressions). As a relative wealth proxy I use a trade-weighted wealth index for each target country, a variable which increases when the target country's stock market performs relatively worse than other countries.

As a complement to the trade-weighted exchange rate variable, I use the depreciation dummy variable (*DEVCROSS*) to capture periods of more severe depreciations. *DEVCROSS* is a zero-one dummy that takes the value of one if the target country is more than ten percent devalued vis-à-vis the acquiring country's currency. The results of Regression 3 and 4 are displayed in Table 5 and 6. In Appendix 9.2 I use *WEAKCROSS* as dependent variable (Regression 5).

The most notable result of Regression 3 (Table 5) is the one for UK targets. The coefficients of both the exchange rate and wealth variable are positive, equaling 217.22 and 166.49, at the five and one percent level respectively. This outcome provides support for the imperfect capital market hypothesis. It should however be noted that the results are insignificant both when using deal volume and regressing relative rather than absolute M&A levels. On the other hand, using *WEAKCROSS* as a proxy for depreciation, provides similar results for UK targets.

For the inflows of the Euro area there is also evidence of an increase in deal values when the currency is weaker. The exchange rate coefficient is equal to 101.06 and it is significant at the five percent level (not robust when regressing volume, relative M&A and *WEAKCROSS*). For Swedish targets, the regression results indicate a reverse relationship. The negative coefficient on the exchange rate variable is equal to -126.03, significant at the five percent level and robust when using relative flows. The wealth variable for Sweden is positive, which together with the exchange rate implies that cross-border M&A inflows into Sweden increase when foreign countries are relatively richer and when the Swedish krona is strong.

The dummy-variable specification in Regression 4 (Table 6), indicate that M&A inflows into the Euro area increases in periods when the currency is particularly weak. The coefficient is equal to 16.43 and it is significant at the one percent level. The results for the Euro area are robust both for volume and relative flows. The UK inflows' correlation with a depreciated currency are insignificant when including the corporate wealth proxy, but running a regression when the variable is excluded leads to a significant coefficient for *DEVCROSS* equal to 0.179 (at the five percent level). The US inflows on the other hand have a negative correlation with a *DEVCROSS* coefficient of -8.85, the results are robust for both volume and relative flows.

Table 5: Regressions on M&A inflows using a trade-weighted exchange rate

Nationality of target	Trade-weighted exchange rate (3)					Obs
	Constant ^a	Ln(TWFX)	Ln(TWWEALTH)	Ln(DOMVALUE)	R-sq	
Euro area						
(a) Absolute	-434.367**	101.061**	5.882	0.018	0.277	368
(b) Relative	-14.396	3.080***	0.121	-0.008***	0.493	368
UK						
(a) Absolute	-1058.084**	217.218**	166.486***	-0.193***	0.809	329
(b) Relative	-18.491*	1.984	3.015***	-0.009***	0.560	329
US						
(a) Absolute	-520.033*	115.420*	-137.139*	0.115***	0.829	439
(b) Relative	2.378	-0.856	1.807	-0.001***	0.576	439
Sweden						
(a) Absolute	587.356**	-126.031**	16.493**	-0.165*	0.873	81
(b) Relative	60.363***	-13.320***	1.222**	-0.062***	0.887	81

Dependent variable in (a) is the quarterly aggregated transaction values per target country Ln(*ABSVAL*) and in (b) the ratio of foreign/domestic deal values per target country and quarter Ln(*RELVAL*). Industry (1-digit SIC code), acquirer country and year fixed effects are included (in the regressions involving the Euro area target country fixed effects are also included).

Robust standard errors correct for heteroscedasticity.

^aThe constant includes the coefficients on the arbitrarily chosen omitted fixed effects dummy variables

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

Table 6: Regressions on M&A inflows using depreciation dummy

<u>Nationality of target</u>	Depreciation dummy (4)				R-sq	Obs
	Constant ^a	DEVCROSS	Ln(TWWEALTH)	Ln(DOMVALUE)		
Euro area						
(a) Absolute	41.408***	16.427***	6.041	0.011	0.298	368
(b) Relative	-0.016	0.416***	0.126	-0.008***	0.51	368
UK						
(a) Absolute	-20.580**	1.004	186.799***	-0.219***	0.793	329
(b) Relative	-1.427***	0.156**	2.997***	-0.009***	0.553	329
US						
(a) Absolute	15.952	-8.851**	-4.732	0.115***	0.829	439
(b) Relative	-1.565***	-0.195**	1.335**	-0.001***	0.581	439
Sweden						
(a) Absolute	2.290	-8.157*	9.493	-0.203***	0.874	81
(b) Relative	-0.240	-0.346	0.153	-0.067***	0.852	81

Dependent variable in (a) is the quarterly aggregated transaction values per target country Ln(*ABSVAL*) and in (b) the ratio of foreign/domestic deal values per target country and quarter Ln(*RELVAL*). Industry (1-digit SIC code), acquirer country and year fixed effects are included (in the regressions involving the Euro area target country fixed effects are also included).

Robust standard errors correct for heteroscedasticity.

^aThe constant includes the coefficients on the arbitrarily chosen omitted fixed effects dummy variables

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

6.1.1 Sub-sample of distressed firms

In addition to studying all cross-border transactions I also research a sub-sample of distressed firms. The dependent variable represents absolute and relative distressed cross-border inflows in each target country separately. Both the trade-weighted exchange rate and the depreciation dummy are used to explore a potential link between foreign distressed M&A and the exchange rate. As with the previous regressions, I include industry, year and acquiring country fixed effects as well as target fixed effects in the Euro area. Negative earnings during the last year function as a proxy for corporate distress and all other firms are excluded from the regressions. The results from Regression 6 and 7 are found in Table 7 and 8.

It should be noted that the number of observations are much lower in this sub-sample. For the Euro area, UK and US the number of foreign distressed deals total 104, 108 and 171 observations respectively. In Sweden there are not enough observations to run any regressions. The results of Regression 6 (Table 7) indicate that US cross-border inflows of distressed transactions decrease when the USD decreases in value. The coefficient on absolute deal values is equal to -304.68 and is significant at the one percent level. These results are robust both for relative flows, deal volume and when excluding the relative wealth variable, which was positive and significant in the US regression. However, it is not robust when using negative cash flow as a proxy for a distress, see Appendix 9.3. Except for relative inflows into the UK, which has a significant trade-weighted exchange rate coefficient of -13.47, none of the other regions provide any significant outcomes. The dominance of US deals in the sample, however, causes the results for the regressions on all data to be significant for the absolute measure, with a coefficient equal to -21.24 on the one percent level.

When I use the depreciation dummy variable *DEVCROSS* in Regression 7 (Table 8), US inflows show a positive relationship to the currency. This indicates that in times of strong devaluations, the value of cross-border distressed deals seems to increase in the US. Despite the fact that there were few M&A deals completed in 2009, US accounted for about 90 percent of all M&A during that year and over half of all deals had distress characteristics. In order to make sure that 2009 is not driving the distressed results for the US, I run a regression for the period 1999-2008 (with 159 instead of 171 observations) and it yields similar results as the original regression. Additionally, the US *DEVCROSS* coefficient is robust when using volume and relative flows, but not when using negative cash flow as a proxy for distress.

Similar findings can be found for the regressions on the Euro area inflows when using the depreciation dummy. The *DEVCROSS* variable's coefficient on absolute distress inflows is equal to 8.15 and is significant at the one percent level. The results for the Euro area inflows are robust when using volume and negative cash flow as a proxy for distress. However, the coefficient is not significant for relative flows (neither for negative net income nor negative cash flow). The regressions for all data using *DEVCROSS* result in insignificant coefficients for both the absolute and relative measure.

Table 7: Regressions on distress M&A inflows using the trade-weighted exchange rate

Nationality of target	Trade-weighted exchange rate (6)					
	Constant ^a	Ln(TWFX)	Ln(TWWEALTH)	Ln(DOMDIS)	R-sq	Obs
Euro area						
(a) Absolute	-337.771*	79.478*	9.000	-0.058	0.653	104
(b) Relative	-371.847	-5.664	82.986	-0.611**	0.429	104
UK						
(a) Absolute	509.773*	-110.998*	11.681	0.123	0.440	108
(b) Relative	55.317*	-13.470***	-11.751*	-0.067***	0.671	108
US						
(a) Absolute	1429.44***	-304.678***	290.863***	-0.070**	0.696	171
(b) Relative	10.881***	-2.301***	2.202***	-0.001***	0.750	171
Sweden						
(a) Absolute	Insufficient observations					13
(b) Relative	Insufficient observations					13
All data						
(a) Absolute	110.782***	-21.235***	9.101**	0.027		396
(b) Relative	-71.418*	14.068*	-2.327	-0.013*		396

Dependent variable in (a) is the quarterly aggregated distressed transaction values per target country Ln(*ABSDISVAL*) and in (b) the ratio of foreign/domestic distressed deal values per target country and quarter Ln(*RELDISVAL*). Industry (1-digit SIC code), acquirer country and year fixed effects are included (in the regressions involving the Euro area and All data target country fixed effects are also included). Robust standard errors correct for heteroscedasticity.

^aThe constant includes the coefficients on the arbitrarily chosen omitted fixed effects dummy variables

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

Table 8: Regressions on distress M&A inflows using the depreciation dummy

Nationality of target	Depreciation dummy (7)					Obs
	Constant ^a	DEVCROSS	Ln(TWWEALTH)	Ln(DOMDIS)	R-sq	
Euro area						
(a) Absolute	10.742**	8.145***	10.543**	-0.058	0.667	104
(b) Relative	-5.095	7.857	-4.111	-0.611**	0.431	104
UK						
(a) Absolute	5.036	2.573	3.678	0.095	0.418	108
(b) Relative	1.852***	-0.049	-13.377***	-0.071***	0.657	108
US						
(a) Absolute	-2.196	10.037***	-29.497	-0.114***	0.638	171
(b) Relative	0.313***	0.064***	-0.192	-0.002***	0.661	171
Sweden						
(a) Absolute	Insufficient observations					13
(b) Relative	Insufficient observations					13
All data						
(a) Absolute	-3.565	0.434	0.233	0.040**	0.522	396
(b) Relative	-5.498*	2.450	0.279	-0.016*	0.148	396

Dependent variable in (a) is the quarterly aggregated distressed transaction values per target country Ln(*ABSDISVAL*) and in (b) the ratio of foreign/domestic distressed deal values per target country and quarter Ln(*RELDISVAL*). Industry (1-digit SIC code), acquirer country and year fixed effects are included (in the regressions involving the Euro area and All data target country fixed effects are also included). Robust standard errors correct for heteroscedasticity.

^aThe constant includes the coefficients on the arbitrarily chosen omitted fixed effects dummy variables

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

6.2 Part 1: Analysis of results

The first part of the paper aim to give answers to the first set of hypotheses, i.e. if M&A inflows increase when the target's currency is weak and whether there is support for the relative wealth hypothesis. The strongest evidence is found for M&A inflow and outflow related to the Euro area and UK. With regards to the UK inflows there is also some support for the relative wealth theory. In particular, the GBP has a positive relationship with Euro area inflows, these results are also consistent when studying more severe devaluations of the British pound using the depreciation dummy. For US and Sweden there are no indications of a positive relationship between M&A and the exchange rate, except for Euro area-US flows. On the contrary, there is some evidence indicating an opposite relationship for the US and Swedish inflows. When regressing all data combined, I find a negative rather than a positive relationship, which can be explained by the overweight of US transactions in the data set that on a stand-alone basis display characteristics of being negatively correlated with the exchange rate.

It is hard to draw any conclusions as to why the M&A flows of some countries seem more sensitive to changes in the exchange rate than others. Over the sample period there are essentially two periods with extensive foreign M&A flows. The first one takes place at beginning of the sample in 1999-2000, peaking in the fourth quarter of 1999. M&A activity then slowed down after the burst of the internet bubble and remained fairly low before picking up again during 2005-2008, with a peak in the second quarter of 2007. The value of the M&A flows in late 2008 and 2009 are close to negligible. One common phenomenon of the exchange rates I study is that the currency valuations during these two periods of high M&A activity differ significantly. Take the EUR/USD as an example. In the fourth quarter of 1999 it averaged 0.96 after the Euro had experienced a large loss in value after its introduction. During the second quarter of 2007, on the other hand, the USD had weakened considerably against the Euro and the average exchange rate equaled 0.74 (representing a gain for the Euro of over 20 percent). A similar pattern can be seen with regards to the USD/GBP exchange rate. In the end of 1999 the exchange rate was equal to 1.63. However, during the second M&A peak, the roles were reversed and the GBP had become much stronger with an exchange rate of 1.98 (also representing a gain of about 20 percent). Hence, none of the major currencies have been strong in both of the high-activity M&A periods. Even though I control for domestic M&A activity in the regressions and this can be considered an advantage for my analysis. None of the exchange rates have an obvious a priori link with M&A activity. This makes the results more interesting, but at the same time difficult to analyze.

As I mentioned, the UK stands out in terms of having a strong relation between the exchange rate and M&A inflows. When I study the characteristics of the UK flows they are very similar to the other countries. For example, even though the average deal size is slightly higher for the UK targets the difference is insignificant. The industry split is to a large extent the same for UK as for the other

countries, albeit the fraction of high-tech targets are slightly lower compared to the US and Sweden. Nor are there any apparent variations between UK's average percentage of cash involved in the transactions or the number of deals that are financed through share-swaps. Similar arguments hold for the inflows into the Euro area, which also show some evidence of having a link to the exchange rate. Since US and Sweden show some signs that a weaker exchange rate drives down the level of M&A inflows, it is hard to draw any general conclusions. Due to this, I consider the first hypothesis to be inconclusive.

The only true empirical support for the imperfect capital market theory is for the UK inflows. The results are significant when using one of the depreciation dummies, but not when looking at relative M&A flows. As pointed out by Dewenter (1995a), relative flows are a stronger indicator of asymmetries between the foreign acquirer and domestic firms, which is the underlying assumption in the imperfect capital market model. A correlation with absolute flows point toward that the exchange rate only enters into the foreign acquirer's investment analysis. Generally, my findings indicate larger effects when studying absolute rather than relative flows. Additionally, there is little unity with regards to the correlation of the corporate wealth variable on a stand-alone basis. In some cases it seems as if M&A outflow increases when a country gets relatively wealthier, which is in line with the theory. However, in other cases there is the complete opposite relationship.

Studying the corporate wealth proxies, i.e. the stock market indices, in detail shows that the link between corporate wealth, exchange rates and M&A flow may not be so apparent in this data set. One example is the UK to Euro cross-border flows during the beginning of the second extensive M&A period in 2004-2005. Even though the aggregate transaction values increased from USD 2.1 billion in 2004 to 11.1 billion in 2005, representing an increase of over 440 percent, the UK stock market lost roughly 14 percent in relation to the Euro stock market, while the exchange rate remained stable. Another example is US inflow from the Euro area increasing from USD 46.9 billion to 61.5 billion in 2006 and 2007 respectively, representing an increase of about 30 percent. During the same period relative corporate wealth decreased by three percent for Euro area firms vis-à-vis their US peers. It should though be noted that the dollar depreciated by approximately ten percent over the one year period. Despite the fact that these examples may not be representative for the whole sample, they together with my empirical findings, do indicate that there might be other mechanisms at play than the ones predicted by the imperfect capital market model. One explanation of why I do not find any strong evidence for these effects may be due to that domestic acquirers are not necessarily in a position of financial constraint during my sample's weak currency periods. The domestic firms may hence be able to place higher bids for targets firms even though foreign firms get an advantage from a depreciated exchange rate. Studying economic crises would probably result in stronger evidence for both the exchange rate and relative wealth effect. However, instead of providing additional support for the relative wealth theory itself, such significant findings

during crises would rather provide evidence of the importance of the illiquidity theory of Shleifer and Vishny (1992).

Unexpectedly, some of my empirical findings suggests that the FDI flows in the data demonstrate a negative correlation with the exchange rate (see for example the regression using all data in Table 4). This has implications of how one may look upon the different characteristics of FPI and FDI. One example of such a difference is presented by Acharya and Shin (2009) who find that while FPI reverse during crises, partly due to higher liquidity, FDI flows tend to increase due to fire-sale opportunities. This “negative juxtaposition”, they argue, is evidence of different patterns and behaviour between FDI and FPI during crises in contrast to normal times when the two types of foreign investments are highly correlated. My findings, on the other hand, rather indicate that the same lack of confidence, which causes FPI to dry up during economical and currency crises, may also be an important factor for FDI flows.

To conclude, this paper provides little support for Froot and Stein’s model when applied to a more recent and general sample covering the Western world. This is in line with other contradictory findings such as Dewenter (1995a), Kostetleou and Liargovas (2000) and Stevens (1998). Although the analysis on acquisition pricing in the second part of the paper may provide some additional insight with regards to the relative wealth theory, I reject the second hypothesis related to the theory of Froot and Stein.

On a more technical note there is a risk that multicollinearity among the independent variables causes the many insignificant exchange rate coefficients. However, the arguments against potential multicollinearity issues in my sample are the fairly high number of observations combined with a large variance in the dependent variable. Additionally, I have tried various different regressions including and excluding certain variables, such as the corporate wealth variable. These have in most cases resulted in similar outcomes. Another issue could be the occurrence of a sample bias since I only include public-public and private-public transactions, and therefore typically larger deals, in the sample. Even though this methodology is similar to previous research, it is still an open issue how well M&A of publicly traded firms proxies for all types of M&A. Erel et al (2009) touch upon these issues and in fact finds some differences between public-public and private-private transactions.

6.2.1 Analysis of sub-sample of distressed firms

With regards to the distressed firms the regressions provide some evidence that US and Euro area inflows of distressed acquisitions tend to increase in times of devaluation. The robustness of these findings can however be questioned. Take the US regressions as an example. When using the trade-weighted exchange rate there seems to be a negative relationship, i.e. fewer acquisitions of distressed US firms when the USD is weak. Similar outcome is found when excluding the relative wealth variable. When using the

depreciation dummy-variable (*DEV CROSS*) on the other hand, the relationship is reversed. This suggests that it is only periods of severe depreciations that increase distressed flows into the US. This relationship is certainly possible, but I do not consider it to be robust. For the Euro area distressed inflows I make similar conclusions since only the absolute and not the relative level is significant. Regressing all data combined indicates a negative relationship for the absolute measure using the trade-weighted exchange rate and insignificant findings for the other regressions.

Due to the lack of robustness and the fact that most results come out insignificant, the bulk of evidence indicates that there is no clear relationship between a currency depreciation and increased acquisition activity of distressed firms. Therefore I reject the third hypothesis.

There is little evidence of any relative wealth effect also in the sub-sample of distress deals. Only in one of the regressions (Euro area absolute inflows using *DEV CROSS*) is there a combined positive effect for the exchange rate and wealth coefficients, however also this finding is far from robust.

6.3 Part 2: Empirical findings

In this section of the paper I study takeover price ratios of foreign and domestic M&A deals, especially for distress firms, to determine if there are any particular wealth effects for target shareholders between the two. To begin with, I conduct t-tests in order to see whether or not there is a difference in acquisition prices between foreign and domestic deals. The results are found in Table 9.

Table 9: T-test of takeover premia and deal type

	All data		Domestic deals			Foreign deals			T-test ^a
	Mean	Obs	Mean	Std. Err.	Obs	Mean	Std. Err.	Obs	Diff
PREMIUM	0.335	6328	0.326	0.007	5372	0.386	0.016	956	-0.061***
Ln(PRICE-BOOK)	0.784	7191	0.749	0.014	6095	0.978	0.031	1096	-0.229***

^aTwo-tailed t-test between domestic and foreign deals assuming unequal variance

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

The mean premium for domestic and foreign deals is equal to 32.6 and 38.6 percent respectively. The difference between the two deal types is significant at the one percent level. The price-book variable shows a significantly higher mean for foreign deals, with a logged mean of 0.978 (equal to approximately 2.66 times the book value), whereas the equivalent for domestic deals is equal to 0.749 (~2.11 times the book value).

Next I construct a t-test between healthy and distressed firms using negative net income as a proxy for distress. The results are found in Table 10.

Table 10: T-test of takeover premia and firm type

	All data		Healthy firms			Distressed firms			T-test ^a
	Mean	Obs	Mean	Std. Err.	Obs	Mean	Std. Err.	Obs	Diff
PREMIUM	0.335	6328	0.295	0.005	4280	0.417	0.017	1854	-0.122***
Ln(PRICE-BOOK)	0.784	7191	0.828	0.013	5041	0.677	0.029	2134	0.151***

^aTwo-tailed t-test between healthy and distressed deals assuming unequal variance

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

Contradictory to what one would expect distressed firms in the sample received a premium mean of 41.7 percent, much higher than that of non-distressed firms at 29.5 percent. The difference of over 12 percent between the two firm types is significant at the one percent level. The price-book variable gives the opposite result. At the one percent level, healthy firms receive a 22 percent higher average price-book with a logged mean equaling 0.828 (~2.29 times book value), whereas distressed firms only get paid 0.677 (~1.97 times book value). Both of the t-tests provide similar results when using negative cash flow as proxy for distress rather than negative net income, see Appendix 9.4.

It is worth noting that foreign deals tend to generate higher prices for all firms. These findings indicate that there is a “cross-border effect”, which is in line with Harris and Ravenscraft (1991) and Swenson (1993) among others. As shown above, the results are mixed for the sub-sample of distressed firms. Using the same methodology as above, I study the difference between domestic/foreign deal types and healthy/distressed firm types. The results are found in Table 11.

Table 11: T-tests of takeover premia and deal/firm type

	PREMIUM			Ln(PRICE-BOOK)		
	Mean	Std. Err.	Obs	Mean	Std. Err.	Obs
Healthy / Domestic	0.283	0.008	3632	0.788	0.016	4279
Healthy / Foreign	0.362	0.019	648	1.051	0.041	762
Difference^a	0.079***	0.021	4280	0.263***	0.025	5041
Distressed / Domestic	0.413	0.029	1561	0.652	0.025	1804
Distressed / Foreign	0.439	0.031	293	0.813	0.059	330
Difference^a	0.026	0.031	1854	0.161**	0.064	2134

^aTwo-tailed t-test between healthy/distress and domestic/foreign assuming unequal variance

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

In line with the above t-tests there is strong evidence that there are significant positive wealth effects for shareholders of healthy firms when acquired by a foreign firm compared to a domestic firm. The premium ratio show that foreign acquirers pay an average premium of 36.2 compared to 28.3 percent for domestic buyers. The difference of 7.9 percent is significant at the one percent level. The equivalent logged means for the price-book ratio for foreign and domestic is 0.788 (~2.20 times book value) and 1.051 (~2.86 times book value) respectively, the difference is significant at the one percent level.

With regards to the premium of distressed firms it is significantly higher than for healthy firms. However, the outcome is inconclusive when studying the difference between those distressed firms that are acquired by a domestic and a foreign firm. Studying the results of the price-book measure, this clearly shows how the cross-border effect presumably plays in also for distressed firms. The logged price-book mean for foreign/distressed equals 0.813 (~2.25 times book value) and for domestic/distressed it equals 0.652 (~1.92 times book value). The difference is significant at the five percent level.

To verify that there are not any other factors affecting the results, I construct a regression model in order to also control for various deal characteristics. The output from Regression 10 is found in Table 12 and a summary of the key interaction terms are displayed in Table 13.

The foreign transaction and distress dummies are constructed in a way to isolate the effect for distressed firms acquired by a foreign firm, leaving the effect of healthy/domestic firms in the constant. The *DISTRESS* variable captures domestic distressed deals. In the premium regression its coefficient is significant and equal to 0.084, which confirms the results of the t-test and the notion that distressed firms in fact receive a higher premium. On the other hand, domestic distressed firms tend to receive a lower price-book as shown by the negative coefficient of -0.251 in Regression 10b. The *CROSS* coefficient captures the effect associated with healthy firms acquired by foreign firms and equals 0.065 in the premium regression, significant at the one percent level. Similar result is found in the price-book regression, giving additional support for the cross-border effect. When it comes to distressed firms acquired by foreign firms, both regressions result in inconclusive findings when studying the joint distressed/foreign effect (*CROSS* and *CROSS*DISTRESS*). This is due to insignificant results of the *CROSS*DISTRESS* coefficient. As in the t-tests, this suggests that there is no specific “premium discount” attached to this type of deals. With regards to price-book, the significant increase in price level for foreign/distress in relation to domestic/distress does not seem to exist when controlling for bid characteristics. Consequently, the otherwise positive cross-border effect does not seem to be as large of a factor for distress firms.

Overall the price-book regression gives more significant results on the various control variables in comparison to the premium regressions. One example is the positive coefficient on the trade weighted exchange rate (*TWFX*) that indicates a relationship between the exchange rate and acquisition pricing. With a significant coefficient of 0.5, a one percent depreciation of the currency results in about a 0.5 percent increase in the price-book ratio. The corporate wealth proxy (*TWWEALTH*) shows a negative relationship with the price-book variable, indicating that when the target country gets relatively poorer than the acquiring country, the price-book falls. Many of the other coefficients on the control variables are of the expected sign, including a positive relationship with the takeover ratio and the number of shares acquired (*SHARES*), as well as a positive relationship if there are competitive bids (*COMPBID*).

Table 12: Regression of takeover ratios on deal characteristics

Regressions	PREMIUM (10a)	Ln(PRICE-BOOK) (10b)
Ln(TWFX)	0.015	0.499***
Ln(TWWEALTH)	-0.027	-0.452***
CROSS	0.065***	0.177***
DISTRESS	0.084***	-0.251***
CROSS*DISTRESS	-0.025	-0.081
HIGHTECH	-0.012	0.274***
SAMESIC	0.007	0.094***
Ln(ASSETS)	-0.021***	-0.028***
Ln(SHARES)	0.101***	0.098***
ALLCASH	0.049***	-0.158***
COMPBID	0.182***	0.108*
MGMT	0.027	-0.310***
Constant ^a	0.112	-2.320***
Obs	6106	7147
Fixed effects ^b	Yes	Yes
R ²	0.078	0.107

Dependent variable in (10a) is the premium and (10b) Ln(price-book). Robust standard errors control for heteroscedasticity.

^aThe constant includes the coefficients on the arbitrarily chosen omitted fixed effects variables

^aIncludes industry (2-digit SIC code), acquirer and target country as well as year fixed effects

*Significant at the 10 percent, **Significant at 5 percent, ***Significant at the 1 percent

Table 13: Interaction terms firm/deal type

		Interaction coef		PREMIUM (10a)		Ln(PRICE-BOOK) (10b)	
				Mean	Std. Err.	Mean	Std. Err.
Healthy / Domestic	Constant ^a			-	-	-	-
Healthy / Foreign	CROSS			0.065***	0.019	0.177***	0.037
Distressed / Domestic	DISTRESS			0.084***	0.018	-0.251***	0.033
Distressed / Foreign	CROSS+CROSS*DISTRESS			0.040	-	0.096	-

Summary of key interaction terms from Regression 10a and 10b

^aInconclusive since it includes the effects of dropped fixed effect dummies among others

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

However, the latter is only significant at the ten percent level in the price-book regression. The sign on the coefficient of the all cash dummy variable (*ALLCASH*) was more unexpected since it indicates that the price-book is lower for all cash deals. All results are robust when using negative cash flows as proxy for distress, see Appendix 9.5.

Table 14: T-tests of takeover premia and deal/firm type

	PREMIUM			Ln(PRICE-BOOK)		
	Mean	Std. Err.	Obs	Mean	Std. Err.	Obs
Healthy / Normal periods	0.359	0.021	531	1.057	0.040	624
Healthy / Devalued periods	0.380	0.045	117	1.025	0.086	138
Difference^a	0.021	0.050	648	-0.032	0.095	762
Distressed / Normal periods	0.428	0.034	210	0.836	0.065	239
Distressed / Devalued periods	0.469	0.063	83	0.752	0.106	91
Difference^a	0.041	0.063	293	-0.084	0.124	330

^aTwo-tailed t-test between healthy/distress in normal/devalued periods assuming unequal variance

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

In this last part of the empirical analysis I study whether or not currency devaluations has any effect on shareholder wealth in distressed firms when acquired by a foreign firm. In Table 14 I carry out t-tests of premium and price-book. By using the *DISTRESS* and *DEVCROSS* dummies I divide the sample into healthy and distress firms acquired in normal or devalued periods.

The premium mean in devalued periods for healthy firms is slightly higher than in normal periods, while the mean for the price-book ratio is lower. This seems to be the case also for distressed firms. The opposite can be said about the price-book ratio, which is higher during normal periods. However, the differences are small and neither of them are statistically significant. This indicates that the depreciations have little effect on pricing in the cross-border M&A market. These findings are robust also when using *WEAKCROSS* to proxy for currency depreciations, see Appendix 9.6.

In other to ensure there are no other factors coming into play, I run a regression on deal premium and price-book controlling for various deal and firm characteristics. The output from Regression 11 (Table 15 and 16) gives similar results as the t-tests.

Table 15: Regression of takeover ratios on deal characteristics

Regressions	PREMIUM (11a)	Ln(PRICE-BOOK) (11b)
Ln(TW WEALTH)	0.138	-0.098
DEVCROSS	-0.006	-0.004
DISTRESS	0.049	-0.324***
DEVCROSS*DISTRESS	-0.002	-0.067
HIGHTECH	0.048	-0.229***
SAMESIC	0.056	0.157**
Ln(ASSETS)	-0.005	-0.047**
Ln(SHARES)	0.078***	-0.015
ALLCASH	0.081	-0.025
COMPBID	0.296***	0.272*
MGMT	-0.173	-0.684**
Constant ^a	-0.233	0.919*
Obs	938	1090
Fixed effects ^b	Yes	Yes
R ²	0.145	0.124

Dependent variable in (11a) is the premium and (11b) Ln(price-book). Robust standard errors control for heteroscedasticity.

^aThe constant includes the coefficients on the arbitrarily chosen omitted fixed effects variables

^aIncludes industry (2-digit SIC code), acquirer and target country as well as year fixed effects

*Significant at the 10 percent, **Significant at 5 percent, ***Significant at the 1 percent

Table 16: Interaction terms firm/deal type

Interaction coef		PREMIUM (11a)		Ln(PRICE-BOOK) (11b)	
		Mean	Std. Err.	Mean	Std. Err.
Healthy / Normal	Constant ^a	-	-	-	-
Healthy / Devalued	DEVCROSS	-0.006	0.075	-0.004	0.095
Distressed / Normal	DISTRESS	0.049	0.045	-0.324***	0.087
Distressed / Devalued	DEVCROSS+DEVCROSS*DISTRESS	-0.008	-	-0.071	-

Summary of key interaction terms from Regression 11a and 11b

^aInconclusive since it includes the effects of dropped fixed effect dummies among others

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

Neither of the two regressions generates any significant results with regards to the currency related variables except for distressed firms in normal periods. The *DISTRESS* coefficient is equal to -0.324 and significant at the one percent level in the price-book regression. However, with regards to devalued periods it does not seem to exist any particular effect, neither for healthy nor distress firms. These results are consistent when using *WEAKCROSS* as a depreciation dummy, see specification and output in Appendix 9.7.

Noticeable in the premium regression is that the effect of a higher premium for distress firms is no longer significant, while the negative effect on price-book is still apparent. According to these results, healthy firms acquired by a foreign firm in depreciated periods do not seem to receive a significant cross-border effect, however there are no indications of any opposite relationship either.

6.4 Part 2: Analysis of results

In the first part of the paper, my empirical studies indicated weak evidence of any increased flows of distressed M&A during devaluations. In the second part of the paper I continued to study firms with weaker bargaining position in order to investigate whether or not they are subject to FDI fire sales.

Foreign deals seem to generate both a higher premium and price-book and hence higher wealth gains for target shareholders, however there are some evidence that this effect disappears for healthy firms in times of depreciation. However, my general conclusion is that there seems to be a cross-border effect, which validates previous research (e.g. Harris and Ravenscraft (1991) and Swenson (1993)) that has studied cross-border M&A. It contradicts parts of Dewenter's (1995b) findings. Many reasons for this effect have been discussed in previous literature and include additional synergy gains, more aggressive bidding from foreign firms, relative labor costs, taxes and differences in cost-of-capital. The key interest in this paper, however, is the asymmetry caused by currency valuations, especially for transactions involving distressed firms.

I find some evidence that distressed firms receive a higher premium than healthy firms, while on the other hand they get paid a lower price-book. The higher premium may indicate that distressed firms receive some compensation for having a temporarily depressed share price and are in line

with the findings of Ang and Mauck (2009). On the other hand, the lower price-book ratio for distressed firms signals that there is a significant discount when comparing the deal prices to accounting figures. This is intuitive and expected since the distress firms are likely to have lower quality assets than healthier firms. In terms of estimating potential FDI fire-sale, the key issue is whether or not any cross-border effect for distress firms outweighs the discounts associated with liquidity constraints and weaker bargaining power.

At a first glance it appears as if domestic distressed deals receive a lower price-book compared to foreign distressed deals, while the effect on the premium is inconclusive. When controlling for bid characteristics the price-book discount for domestic distressed deals is still apparent, but it disappears for distressed firms acquired by foreign firms. As a result, I conclude that distressed firms may not receive an apparent cross-border premium in the same manner as healthy firms. The different factors presented in previous literature trying to explain why foreign firms want to pay more for assets abroad do not seem to apply in the same way for firms in distress. On the contrary, however, there are no indications that distressed firms are worse off when acquired by foreign firms. This is an important conclusion when discussing the existence of FDI fire sale.

Hypothesis 4 expected lower prices for distressed firms in general and higher prices when distressed firms were acquired by foreign firms. In line with the hypothesis, my empirical findings suggest that distressed firms do get a lower price-book than other firms. On the contrary, I find signs that they receive a higher premium than healthy firms. Additionally, I do not find any evidence of a cross-border effect for distressed firms, which is the main reason why I reject Hypothesis 4.

I find significance for the trade-weighted exchange rate coefficient when regressed on price-book (Regression 10b). This implies higher acquisition prices when the currency is weak, which may be indications of an asymmetry between foreign and domestic acquirers. When investigating times of depreciation more rigorously, however, there is little further evidence for any exchange rate effect on distressed firm's acquisition prices. The t-tests find no significant changes in the premium or price-book ratio when a distressed firm is acquired by a foreign firm during a period of depreciated currency. In Regression 11, the majority of the currency related variables come out insignificant. Distressed firms acquired in normal periods, which seem to receive a lower price-book, is the exception. These findings strongly contradict Hypothesis 5 and provide additional evidence against the existence of FDI fire sale based on firm-specific distress.

One of the propositions of the imperfect capital market theory suggests a relative advantage for foreign buyers due to changes in the exchange rate, which on the one hand could result in higher acquisition prices. One of the alternative implications of the model is that FDI instead can lead to lower prices in times of depreciation. Since my results do not find evidence in either direction when studying

fire sale candidates, I interpret it as additional proof against any asymmetry as suggested by the imperfect capital market theory. These findings contradict papers such as Froot and Stein (1991), Harris and Ravenscraft (1991) and Swenson (1993) and are partly in line with Dewenter (1995b).

There are no indications in my research giving support for the notion that foreign acquirers buy assets abroad at fire sale prices. My evidence is particularly strong when studying periods of weak currency during which I do not find any negative welfare consequences for target firms' shareholders when acquired by a foreign firm. Hence, firm-specific distress does not seem to be a source of FDI fire sale discounts in the Western world.

As I lack evidence of FDI fire sale based on firm-specific distress, my findings can be seen as additional support for the illiquidity theory of Shleifer and Vishny (1992), which stresses the importance of industry-wide distress as a key driver of fire sale discounts. Firm-level distress combined with a weak currency may not in itself be a strong factor in the FDI fire sale equation. Additional evidence for this theory is found when I construct a sub-sample of "super-distress" firms consisting of the targets with the 25 percent lowest cash flow to asset ratio. The outcome from running tests of this even more rigorous sub-sample is similar to the ones when the original distress proxies were used.

Another aspect is the one related to high-tech firms. My distress sample consists of 65 percent high-tech targets, while the equivalent percentage for healthy firms is approximately 33 percent. In line with the asset acquisition theory of Blonigen (1997), the high-tech firms can be assumed to have more transferable firm-specific assets, which could drive up the acquisition prices. Additionally, they may be R&D intensive and require large capital spending that potentially could lead to lower earnings and cash flow. Hence, there is the risk that my distress proxy may correlate with other firm characteristics than distress itself. However, when I exclude the highly valued high-tech targets from the distressed sample, I obtain similar results.

My findings have several implications for the debate on FDI fire sale and the international M&A market in general. I argue that my result is an indicator of the effectiveness of Western world's M&A market with regards to potentially undervalued and distressed firms. One interpretation of the lack of a foreign discount for these types of firms is that there is a low degree of market imperfection within the M&A market. This leads to the conclusions that, rather than being welfare reducing, allowing FDI and foreign competition may instead favor shareholders of firms with weaker bargaining power if there is a potential cross-border premium to be gained. This seems to be valid also in periods of weak currency.

7. Conclusion

Practitioners and media tend to support a common view that foreign firms are able to purchase assets abroad at a cheap price when the target currency is weak. In times of devaluation, this often gives rise to political tension and debates in the media. There are considerable welfare and wealth implications of FDI fire sales both from the perspective of the economy and shareholders. The main issue of this thesis is whether this opinion is in any way justified, an area of research where there is little consensus.

In the first part of this paper I study the in- and outflows of foreign M&A transactions in and between the Euro area, UK, US and Sweden over the period 1999-2009 and find mixed evidence of a relationship between the exchange rate and M&A inflows. The most notable results found are for foreign acquisitions of UK targets where a weaker GBP seem to be correlated with higher M&A inflows. I also find some evidence that a severely depreciated Euro tends to increase the number of cross-border acquisitions in the Euro area. Unexpectedly, there seems to be an opposite relationship with regards to Swedish and US targets. These mixed results make it hard to draw any general conclusions regarding the link between M&A and the exchange rate. However, due to weak support for any relative wealth effects, my findings challenge the most prominent theory within this field, namely the imperfect capital market hypothesis of Froot and Stein (1991). The relationship between cross-border M&A, exchange rates and relative wealth does not seem to be as apparent when applied to more recent data covering several countries in the Western world.

Studying the flows of my sub-sample of fire sale candidates, i.e. firms with weaker bargaining positions, I find very weak evidence that a depreciated currency tends to increase the number of acquisitions involving distressed, and presumably undervalued, firms. Surprisingly, there is some proof that distressed firms tend to receive a higher premium than healthy firms, suggesting they receive some compensation for having a temporarily depressed share price. On the contrary, when studying the price-book, fire sale candidates do seem to receive a lower price, indicating they get a discount for having lower quality assets. Overall, there seems to be an extra premium associated with being acquired by a foreign firm and this is in line with prior research. However, I do not find the same cross-border effect for distressed firms. On the contrary, there is no evidence of fire sale candidates receiving a lower price from foreign acquirers, this is true both during periods of normal currency and depreciations.

Since I do not find any indications of lower prices for fire sale candidates when acquired by foreign firms, I conclude that the notion of FDI fire sale due to firm-specific distress and a depreciated currency is false. The lack of a foreign discount for distressed firms can instead be viewed as an acknowledgment that the M&A market in the Western world has low degrees of market imperfections with regards to presumably undervalued assets. I suggest that additional competition from foreign acquirers may instead be of benefit for firms with weaker bargaining power. These findings are not only

relevant for economic and academical research but also have consequences for the political debate regarding exchange rates' effect on FDI.

Interesting topics for future research includes studying the reasons behind why the M&A flows of some countries are more sensitivity to changes in the exchange rate than others. One possible approach would be to analyze different industries separately to see if certain industries are driving the results. In addition, it would be interesting to study the cross-border acquisitions from an ex-post perspective to be able to analyze the welfare effects for the economy and shareholders if assets are sold to less efficient foreign acquirers. Furthermore, one may want to study the qualitative differences in behavior between FPI and FDI flows. Even though the two types of foreign investments have fundamental differences in terms of liquidity and control premiums/discounts, currency depreciations may not cause dramatically different effects on the two types of flows as concluded by for example Acharya and Shin (2009). The broader welfare implications of FDI and the existence of fire sale are still open issues, which require additional research.

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9. Appendices

9.1 Regression variables

Table 9.1.A: Regression variables

Variable	Name/Proxy	Measurement
ACQCOUNTRY	Acquirer country fixed effects	Dummy for each acquiring country respectively
ALLCASH	All cash bids	Dummy = 1 if the bid is paid with cash only
COMPBID	Competing bids	Dummy = 1 if there is a competing bid
CROSS	Cross-border transaction	Dummy = 1 if transaction involves more than one currency
DEVCROSS	Cross-border transaction during times of target currency depreciation	Dummy = 1 if deal occurs when target currency is over 10 percent depreciated compared to the long-term average
DISTRESS (DISTRESSCF)	Firms with liquidity constraints and weaker bargaining power	Dummy = 1 if target has had negative net income (cash flow) during last financial year
DOMDIS (DOMCFDIS)	Domestic distressed M&A	Domestic distressed transaction values per quarter and target country for firms with negative net income (cash flow) during last financial year
DOMVALUE	Domestic M&A	Domestic transaction values per quarter and target country
HIGHTECH	Firms within high-tech sector, likely to have firm-specific assets	Dummy = 1 if target is a hightech firm according to SDC Platinum's definition
INDUSTRY	Industry fixed effects	Dummy for each SIC industry respectively (1 or 2 SIC level)
Ln(ABSDISVAL) (Ln(ABSDISCFVAL))	Absolute value of distressed M&A inflow	Distressed M&A inflow per quarter and target country for firms with negative net income (cash flow) during last financial year
Ln(ABSVAL)	Absolute value of M&A inflow	M&A inflow per quarter and target country
Ln(ASSETS)	Total assets of target firm	Total assets during last financial year
Ln(PREMIUM)	Premiums paid	Offer price to market value
Ln(PRICEBOOK)	Price to book paid	Offer price to book value of equity

Table 9.1.A: Regression variables (cont'd)

Variable	Name/Proxy	Measurement
Ln(RELDISVAL) (Ln(RELDISCFVAL))	Relative value of distressed M&A inflow	Distressed M&A inflow per quarter and target country over domestic distressed transaction values per quarter and target country
Ln(RELVAL)	Relative value of M&A inflow	M&A inflow per quarter and target country over domestic transaction values per quarter and target country
Ln(SHARES)	Shares acquired	The percentage of shares acquired by acquiring country (sample only includes deals where shares acquired is larger than 10 percent)
Ln(FX)	Bilateral exchange rate	Nominal exchange rate based on direct quotation
Ln(TWFX)	Trade-weighted exchange rate	Weights based on FDI inflow in each target country
Ln(TWWEALTH)	Trade-weighted corporate wealth	Weights based on FDI inflow in each target country
Ln(WEALTH)	Corporate wealth	Acquirer country stock market index / Target country stock market index
MGMT	Management involved	Dummy = 1 if management is involved in transaction
SAMESIC	Acquirer and target in related industry	Dummy = 1 if acquirer and target have the same the 3-digit SIC code
TGTCOUNTRY	Target country fixed effects	Dummy for each target country respectively
WEAKCROSS	Alternative proxy for cross-border transaction during times of target currency depreciation	Dummy = 1 if deal occurs when target currency is weaker than the long-term average

9.2 Regression specifications and output using WEAKCROSS as dependent variable

$$ABSVAL_{t,q} = \alpha + \beta_1 \text{Ln}(\text{WEAKCROSS}_{t,q}) + \beta_2 \text{Ln}(\text{TWWEALTH}_{t,q}) + \beta_3 \text{Ln}(\text{DOMVALUE}_{t,q}) + D_1(\text{YEAR}) + D_2(\text{ACQCOUNTRY}) + D_3(\text{INDUSTRY}) + \epsilon \quad (5a)$$

$$RELVAL_{t,q} = \alpha + \beta_1 \text{Ln}(\text{WEAKCROSS}_{t,q}) + \beta_2 \text{Ln}(\text{TWWEALTH}_{t,q}) + \beta_3 \text{Ln}(\text{DOMVALUE}_{t,q}) + D_1(\text{YEAR}) + D_2(\text{ACQCOUNTRY}) + D_3(\text{INDUSTRY}) + \epsilon \quad (5b)$$

Table 9.2.A: Regressions on M&A inflows using WEAKCROSS

Nationality of target	Weak currency dummy (5)				R-sq	Obs
	Constant ^a	WEAKCROSS	Ln(TWWEALTH)	Ln(DOMVALUE)		
Euro area						
(a) Absolute	52.708	-11.510***	7.167	0.037	0.294	368
(b) Relative	0.439	-0.345***	0.159	-0.007***	0.516	368
UK						
(a) Absolute	-23.613***	4.710***	180.842***	-0.215***	0.797	329
(b) Relative	-1.367***	-0.002	3.216***	-0.009***	0.545	329
US						
(a) Absolute	14.442	2.620	-25.589	0.114***	0.828	439
(b) Relative	-1.612***	0.157	0.741	-0.001	0.578	439
Sweden						
(a) Absolute	7.796	0.868	6.505	-0.210**	0.856	81
(b) Relative	-0.262	0.055	0.063	-0.068***	0.844	81

Dependent variable in (a) is the quarterly aggregated transaction values per target country Ln(*ABSVAL*) and in (b) the ratio of foreign/domestic deal values per target country and quarter Ln(*RELVAL*). Industry (1-digit SIC code), acquirer country and year fixed effects are included (in the regressions involving the Euro area target country fixed effects are also included).

Robust standard errors correct for heteroscedasticity.

^aThe constant includes the coefficients on the arbitrarily chosen omitted fixed effects dummy variables

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

9.3 Distressed M&A flow regressions using negative cash flow as proxy for distress

Table 9.3.A: Regressions on distress M&A inflows using the trade-weighted exchange rate

Nationality of target	Trade-weighted exchange rate (using negative cash flow as distress proxy) (8)					
	Constant ^a	Ln(TWFX)	Ln(TWWEALTH)	Ln(DOMCFDIS)	R-sq	Obs
Euro area						
(a) Absolute	-268.673*	66.778*	4.466	-0.073	0.698	77
(b) Relative	51.228	-10.857	2.198**	-0.256***	0.792	77
UK						
(a) Absolute	50.679	-9.862	-16.196	0.068	0.629	64
(b) Relative	25.884	-5.107	-11.150	-0.099	0.707	64
US						
(a) Absolute	560.845*	-119.534*	92.455	0.072**	0.549	135
(b) Relative	2.027	-0.385	0.459	-0.001*	0.523	135
Sweden						
(a) Absolute	<i>Insufficient observations</i>					11
(b) Relative	<i>Insufficient observations</i>					11

Dependent variable in (a) is the quarterly aggregated distressed transaction values per target country Ln(*ABSDISCFVAL*) and in (b) the ratio of foreign/domestic distressed deal values per target country and quarter Ln(*RELDISCFVAL*). Industry (1-digit SIC code), acquirer country and year fixed effects are included (in the regressions involving the Euro area target country fixed effects are also included). Robust standard errors correct for heteroscedasticity.

^aThe constant includes the coefficients on the arbitrarily chosen omitted fixed effects dummy variables

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

Table 9.3.B: Regressions on distress M&A inflows using the depreciation dummy

Nationality of target	Depreciation dummy (using negative cash flow as distress proxy) (9)					
	Constant ^a	DEVCROSS	Ln(TWWEALTH)	Ln(DOMCFDIS)	R-sq	Obs
Euro area						
(a) Absolute	16.200***	8.214**	5.973*	-0.151	0.712	77
(b) Relative	6.790***	1.539	2.241	-0.267	0.796	77
UK						
(a) Absolute	11.601*	-0.212	-18.074	0.068	0.629	64
(b) Relative	2.671***	0.424	-11.268	-0.099	0.713	64
US						
(a) Absolute	4.896	5.730	-37.664	0.049	0.541	135
(b) Relative	0.168***	0.054	-0.042	-0.001***	0.530	135
Sweden						
(a) Absolute	<i>Insufficient observations</i>					11
(b) Relative	<i>Insufficient observations</i>					11

Dependent variable in (a) is the quarterly aggregated distressed transaction values per target country Ln(*ABSDISCFVAL*) and in (b) the ratio of foreign/domestic distressed deal values per target country and quarter Ln(*RELDISCFVAL*). Industry (1-digit SIC code), acquirer country and year fixed effects are included (in the regressions involving the Euro area target country fixed effects are also included). Robust standard errors correct for heteroscedasticity.

^aThe constant includes the coefficients on the arbitrarily chosen omitted fixed effects dummy variables

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

9.4 T-test of takeover premium and firm type using negative cash flow as proxy for distress

Table 9.4.A: T-test of takeover premia and firm type using negative cash flow as proxy

	All data		Healthy firms			Distressed firms			T-test ^a
	Mean	Obs	Mean	Std. Err.	Obs	Mean	Std. Err.	Obs	Diff
PREMIUM	0.335	6328	0.308	0.006	4264	0.423	0.021	1322	-0.114***
Ln(PRICE-BOOK)	0.784	7191	0.804	0.013	4924	0.718	0.033	1541	0.086***

^aTwo-tailed t-test between healthy and distressed deals using negative cash flow as proxy for distress assuming unequal variance

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

9.5 Regression of takeover ratios using negative cash flow as proxy for distress

Table 9.5.A: Regression of takeover ratios using negative cash flow

Regressions	PREMIUM (10c)	Ln(PRICE-BOOK) (10d)
Ln(TW FX)	0.006	0.399**
Ln(TW WEALTH)	-0.039	-0.347**
CROSS	0.045**	0.165***
DISTRESSCF	0.055**	-0.195***
CROSS*DISTRESSCF	0.047	0.008
HIGHTECH	-0.004	0.252***
SAMESIC	0.008	0.085***
Ln(ASSETS)	-0.023***	-0.024***
Ln(SHARES)	0.104***	0.116***
ALLCASH	0.055***	-0.146***
COMPBID	0.175***	0.055
MGMT	0.026	-0.307***
Constant ^a	0.200	-1.952**
Obs	5568	6443
Fixed effects ^b	Yes	Yes
R ²	0.074	0.108

Dependent variable in (10c) is the PREMIUM and (10d) Ln(PRICEBOOK). Robust standard errors control for heteroscedasticity.

^aThe constant includes the coefficients on the arbitrarily chosen omitted fixed effects dummy variables

^aIncludes industry (2-digit SIC code), acquirer and target country as well as year fixed effects

*Significant at the 10 percent, **Significant at 5 percent, ***Significant at the 1 percent

9.6 T-tests of takeover premium and deal/firm type using WEAKCROSS

Table 9.6.A: T-tests of takeover premia and deal/firm type using WEAKCROSS

	PREMIUM			Ln(PRICE-BOOK)		
	Mean	Std. Err.	Obs	Mean	Std. Err.	Obs
Healthy / Normal periods	36.380	2.589	531	1.001	0.050	624
Healthy / Devalued periods	36.087	2.841	117	1.107	0.053	138
Difference^a	-0.293	3.844	648	0.106	0.073	762
Distressed / Normal periods	44.963	3.816	210	0.806	0.073	239
Distressed / Devalued periods	42.602	4.273	83	0.822	0.084	91
Difference^a	-2.361	5.728	293	0.016	0.112	330

^aTwo-tailed t-test between healthy/distress in normal/devalued periods using WEAKCROSS and unequal variance

*Significant at 10 percent, **Significant at 5 percent, ***Significant at 1 percent

9.7 Regression of takeover ratios on deal characteristics using WEAKCROSS

$$\begin{aligned}
 (PREMIUM) = & \alpha + \beta_1 \ln(TWWEALTH_{t,q}) + D_1 \ln(WEAKCROSS) + D_2(DISTRESS) + D_3(WEAKCROSS * \\
 & DISTRESS) + D_4(HIGHTECH) + D_5(SAMESIC) + \beta_2 \ln(ASSETS) + \beta_3 \ln(SHARES) + D_6(ALLCASH) + \\
 & D_7(COMP BID) + D_8(MGMT) + D_9(YEAR) + D_{10}(ACQCOUNTRY) + D_{11}(TGTCOUNTRY) + \\
 & D_{12}(INDUSTRY) + \epsilon
 \end{aligned} \tag{12a}$$

$$\begin{aligned}
 \ln(PRICEBOOK) = & \alpha + \beta_1 \ln(TWWEALTH_{t,q}) + D_1 \ln(WEAKCROSS) + D_2(DISTRESS) + D_3(WEAKCROSS * \\
 & DISTRESS) + D_4(HIGHTECH) + D_5(SAMESIC) + \beta_2 \ln(ASSETS) + \beta_3 \ln(SHARES) + D_6(ALLCASH) + D_7(COMP BID) + \\
 & D_8(MGMT) + D_9(YEAR) + D_{10}(ACQCOUNTRY) + D_{11}(TGTCOUNTRY) + D_{12}(INDUSTRY) + \epsilon
 \end{aligned} \tag{12b}$$

Table 9.7.A: Regression of takeover ratios (using *WEAKCROSS*)

Regressions	PREMIUM (12a)	Ln(PRICE-BOOK) (12b)
Ln(TW WEALTH)	0.158	-0.208
DEVCROSS	-0.005	0.085
DISTRESS	0.066	-0.304***
DEVCROSS*DISTRESS	-0.042	-0.082
HIGHTECH	0.046	0.229***
SAMESIC	0.057	0.155**
Ln(ASSETS)	-0.005	-0.048**
Ln(SHARES)	0.079***	-0.014
ALLCASH	0.081*	-0.026
COMPBID	0.296***	0.276*
MGMT	-0.171	-0.686**
Constant ^a	-0.207	0.820*
Obs	938	1090
Fixed effects ^a	Yes	Yes
R ²	0.145	0.125

Dependent variable in (12a) is the premium and (12b) Ln(price-book). Robust standard errors control for heteroscedasticity.

^aThe constant includes the coefficients on the arbitrarily chosen omitted fixed effects variables

^aIncludes industry (2-digit SIC codes), acquirer and target country as well as year fixed effects

*Significant at the 10 percent, **Significant at 5 percent, ***Significant at the 1 percent