

Currency Controls' Consequences for Companies

A case study on Ericsson Argentina

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Abstract

This paper aims to study the implications of the implementation and relaxation of currency controls in Argentina for multinational firms, using a case study on Ericsson Argentina. Firstly, a qualitative analysis is conducted covering the impacts of currency controls for firms with foreign exchange exposure, ways to cope with the restrictions, and implications of the relaxation. Secondly, multivariable regressions are used to support the qualitative analysis by studying impacts on firm value. This is analyzed with respect to theories on the Exposure Puzzle to see how firm value fluctuates with movements in the exchange rate. The foreign exchange exposure is categorized as transactional, translational and economic. External data is collected from the World Bank, Bloomberg and Ambito, combined with internal data from Ericsson's Latin American headquarter in São Paulo, Brazil. Findings show that there was a negative impact on firm value originating from the implementation of currency controls, as well as increased transaction, translation and economic exposure. The paper contributes to existing research on foreign exchange exposure, and guides managers of multinational firms to cope with fiscal and monetary policies as efficient as possible.

Keywords: Currency controls, Developing economy, Exchange rate risk, Exposure Puzzle, Argentina

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Table of Contents

1. Introduction.....	3
2. Related Literature.....	6
2.1 Currency Crisis	6
2.2 Exchange Rate Exposure	6
2.3 Research Gap	7
3. Methodology and Hypothesis Development	8
3.1 Methodology	8
3.2 Hypothesis Development	8
4. Data	10
4.1 Data Sources	10
4.2 Sample Selection.....	10
4.3 Variable Selection.....	10
4.4 Regressions	12
4.5 Supplementary Economic Tests.....	13
5. Background	15
5.1 Argentina’s Economy and Currency Controls	15
5.2 Case Study: Ericsson Overview	16
6. Currency Controls	17
6.1 Artificial Exchange Rate.....	17
6.2 Dollar Limit	17
6.3 Impacts of Currency Controls.....	18
6.4 Coping with Currency Controls	21
6.5 Impacts of Relaxation of Currency Controls	27
7. Results and Analysis	29
7.1 Transaction Exposure.....	29
7.2 Translation Exposure	30
7.3 Economic Exposure	30
8. Recommendations	32
8.1 Financial Strategies	32
8.2 Reduce Foreign Exchange Exposure	33
8.3 Management Strategies	34
9. Limitations and Suggestions for Future Research.....	36
10. Implications and Conclusion.....	37
11. References.....	38
12. Appendix.....	41

1. Introduction

This paper studies multinational firms in Argentina, a country that within the last century has gone from being the world's 10th wealthiest nation per capita, to experiencing a hyperinflation of 5,000%, a tax-paying rate at 0.1% of its population, and the largest sovereign default in history. In the last decades, Argentina has experienced several episodes with scarcities of foreign currency caused by capital flight, provoking an implementation of drastic fiscal and monetary policies.

In November 2011, currency controls were imposed to limit the flow of foreign currencies and tackle the ongoing capital flight. In practice, this meant the creation of an artificial exchange rate that consensus deemed as an overvaluation of the Argentine peso, ARS, and a limit on the amount of US dollars the private sector could access. The controls were relaxed in December 2015 to generate inflow of dollars and catalyst growth. The ARS lost 26% of its value against the USD on the first day of trading.

This paper will analyze the currency controls' effect on multinational firms. It will be studied on a qualitative and quantitative level, based on a case study on Ericsson's Argentina unit. Ericsson, from now on EAB, is a Swedish firm that provides communication technology and services, operates in 180 countries and employs 115,000 people worldwide. The Argentina unit is entitled, officially and in this paper, as CEA.

As multinational firms' cash flows are affected by movements in foreign exchange rates, and firm value is the present value of future cash flows (Berk and DeMarzo, 2013), FX fluctuations have an impact on firm value. However, the impact has been debated in previous research, giving rise to the Exchange Rate Exposure Puzzle (Bartram et al., 2009). This bewilderment is extra complex in Argentina as it includes an artificial exchange rate. This paper adds to research on operational and financial hedging as it studies ways to cope with currency controls. The main research gap identified is the effect of FX fluctuations on individual firms, as the preponderance of previous research studies the effects on a country or industry level.

The analysis in this paper will be organized after three types of exchange rate exposures: Transaction, translation and economic, as suggested in previous research (Shapiro 1996, Madura 1989, Jacque 2006, Papaioannou 2006). Transaction exposure is implications from FX fluctuations from entering into trade contracts. Translation exposure is the risk that the value of the balance sheet will change as a result of exchange rate movements. Economic exposure involves risks regarding future cash flows caused by FX rate changes. The purpose

of this paper is to study the impacts currency controls had on multinational firms. Firstly, it will analyze if the dollar limit had a negative impact on firm value with regards to transaction exposure. Secondly, the paper will study if currency controls increased the translation exposure. Thirdly, it will analyze if the controls increased the economic exposure.

External data is collected from the World Bank, FactSet, Bloomberg and Ambito, and internal information is collected from Ericsson. The data is analyzed over three periods, pre: Jan 2008-Oct 2011, during: Nov 2011-Dec 2015 and past: Jan 2016-Mar 2016, referring to the currency controls. *Change in Total Assets* and *Change in Current Assets* are chosen as dependent variables to reflect firm value, as CEA is not separately listed and thus a stock price approach cannot be used. The event study is conducted with a qualitative analysis over the three time periods, and a quantitative study on the pre and during periods. The regressions are performed using three multivariable regressions; the first one covering transaction and translation exposure, and the latter two focusing on economic exposure.

Results from the qualitative analysis state that there was a negative impact on CEA from implementing currency controls as it generated excess cash in ARS, restricted dividend payments, hindered imports, financial losses from FX fluctuations, a decline in capital turnover, and difficulties to raise debt. The main impact was on factors related to transaction exposure, specifically from large accounts payables in USD while carrying trapped cash in ARS. Secondly, identified ways to cope with the controls included strategies to handle excess cash by buying government bonds, using letters of credit, hedging activities, a restructured operations model, and altered number of credit days. Thirdly, the analysis shows a two-sided impact of the relaxation of currency controls; the abandonment of the artificial exchange rate led to immediate losses to CEA's balance sheet, but the relaxation of the dollar limit facilitated the transfer of cash from CEA to EAB. Alike the qualitative analysis, the regressions show that the currency controls had a negative impact on CEA's assets, and had an unfavourable impact on transaction, translation and economic exposure. The most significant variable was *Change in Exchange Rate* as this caused the losses on foreign accounts payables, mentioned above. Collectively, the analysis shows that the largest impact was related to transaction exposure. Translation exposure was limited as the only foreign assets or liabilities CEA held was government bonds and a cash account in the US. Finally, economic exposure represents the effect on future cash flows, and since the controls have been lifted, this exposure is believed to be limited in the post period, but had an effect on the pre and during periods.

Recommendations for the future is that CEA should keep several of the strategies undertaken while the controls were in place. This includes letters of credit, improve capital efficiency, reduce foreign accounts payables with cash from operating activities, natural hedging strategies and keep the restructured operations model.

Finally, it is observed that the implications currency controls had on Ericsson were negative from several aspects and led to severe costs. However, the effect on EAB's stock price was limited as CEA generated 0.3% of the group's total sales in 2015. Going into the future, there is an overall positive outlook for Argentina, and CEA specifically, as the market is expected to move toward a more open and transparent future.

The paper is organized as follows. First, related literature and gaps are outlined. Secondly, methodology and theoretical framework are described and hypotheses developed, all with regards to transaction, translation and economic exposure. Then, data, variables and regressions are presented. This is followed by a brief background on the macroeconomic situation in Argentina, and an overview of Ericsson. Thereafter, a qualitative reasoning regarding currency controls is conducted, split into three parts: Impacts of implementation, coping strategies, and impacts of relaxation. Thenceforth, an analysis is carried out using multivariable regressions to see if data supports the preceding reasoning. These then create the base for a section on recommendations for the future, implications and conclusions.

2. Related Literature

Research on exchange rate exposure has evolved along with the world's development towards an increased globalization. Jacque (2006) refers to the definition that foreign exchange risk is the additional variability experienced by a multinational firm in its worldwide consolidated earnings, resulting from unexpected currency fluctuations.

2.1 Currency Crisis

On the topic of currency crisis, Gaggero, Gaggero and Rúa (2015) study factors that catalyzed capital flights in Argentina and found that capital outflow was taking place in the context of trade deficits, decline of foreign reserves, and problems accessing international credit markets. Factors presented by Breuer (2004) also include poor institutional variables. Additional research by Garber and Svensson (1994) showed that speculative attacks are commonly preceded by a real appreciation of the currency, coupled with a declining trade balance caused by an upward pressure of real wages and higher interest rates. A latter addition to the research on currency crisis, by Chionis and Liargovas (2002), suggests political risks and black market premiums as paramount drivers.

2.2 Exchange Rate Exposure

There is extensive research on the phenomenon known as the Exposure Puzzle. Bartram and Bodnar (2007) describes it as the fact that models and researchers believe that exchange rate movements affect the value of nonfinancial firms to a larger extent than can be shown empirically. In addition to discussing the lack of empirical evidence of exchange rate effects, Bartram et al. (2009) discuss how firms may reduce their exposure by the use of hedging. Effective hedging would make total cash flows unaffected by currency fluctuations, Bartram (2008). Also, Linck (1999) shows evidence that operational hedging is more effective than financial due to the fact that currency changes have a relatively small effect on net cash flow.

Doidge et al. (2002) show that exchange rate fluctuations have a significant impact on firm value. However, there is sparse evidence related to its impact on total assets or cash flows. This is, according to Bodnar and Wong (2003), due to unavailability of suitable data. Thus, stock returns are typically used when analyzing exchange rate exposure.

Garner and Shapiro (1984) studied how subsidiaries pose an FX exposure to their parents by analyzing a UK subsidiary's exposure to the USD/GBP. They found that the operational FX exposure was close to zero, as both of their sales and costs were stable against

the USD, even though they have sales and production solely in the UK. Oxelheim and Wihlborg (1995) made another case study analyzing macroeconomic implications on firm level. The exposure analysis on Volvo Cars was conducted by investigating changes in sales, revenues, as well as total and commercial cash flow. The study found that a 1% appreciation of effective exchange risk causes a 2% decrease in real sales revenue.

Operational and financial hedging is often used complementary in companies' currency risk management (Pantzalis et al., 2001). By using both strategies, it is believed that firms are more likely to manage the currency exchange risk on a long-term perspective (Allayannis, Ihrig and Weston, 2001).

In accordance with previous literature, the direct exchange rate risk has been divided into three categories: Transaction, translation and economic exposure (Shapiro 1996, Madura 1989, Jacque 2006, Papaioannou 2006).

2.3 Research Gap

Previous studies on foreign exchange exposure have primary been done on an industry, region or country level, by applying the stock price approach. However, a manager, investor or stock analyst is generally not interested in the effect on an aggregated level, but rather company-specific. Thus, this paper contributes to existing research by practicing a firm-specific approach, even analyzing an individual unit. Moreover, due to the simplified method of using stock returns as a proxy for firm value, there is limited research on foreign exchange exposure's impact on balance sheet items and cash flows.

Additionally, a reason for limited research on currency controls in Argentina could be since the policies are very complex and hidden by transparency issues. Also, the limited official information available is not completely consistent with how it actually worked. Even data on the Central Bank of Argentina's website are deemed as questionable by the market.

As the relaxation of currency controls is a recent development, there is limited research so far on the implications of this event. Thus, this paper aims to facilitate future research, as well as aiding managers to cope with the changes as effective and efficient as possible.

3. Methodology and Hypothesis Development

3.1 Methodology

This paper aims to analyze the impacts of currency controls, implemented in November 2011 and lifted in December 2015. An event study methodology is considered the most appropriate in these kinds of occurrences, where drastic changes are expected as a result of a catalyst (Fama, Fisher and Jensen 1969). The event study is based on Ericsson's Argentina unit since they were affected by the controls as they are involved in foreign activities and have dual currencies on their balance sheet. Firstly, a qualitative analysis is executed on three areas: Impacts of implementation, coping strategies, and impacts of relaxation. Secondly, regressions are used to see how the controls have affected firm value. The results from the regressions are then used to support the arguments from the qualitative analysis. The currency controls had two implications that will be analyzed on Ericsson Argentina: 1. An artificial exchange rate, and 2. A dollar limit affecting the access to foreign currencies.

3.2 Hypothesis Development

Studies indicate that there is a significant relationship between a company's exchange rate exposure and the level of foreign operations (Jorion, 1990). The approach in this paper originates from previous literature and categorizes exchange rate risk into three subsections: Transaction, translation and economic exposure (Madura, 1989; Jacque 2006; Shapiro, 1975; Papaioannou 2006). This paper consists of three hypotheses, one within each section.

3.2.1 Transaction Exposure

Transaction exposure is the exchange rate risk caused by timing differences between signing a contract in a foreign currency and the payment date, shown in foreign receivables and payables, as well as repatriation of dividends. In this paper, foreign currencies refer to those other than ARS, mainly USD. This is affected by the dollar limit as it can increase the timing differences as CEA might be unable to pay foreign suppliers on time or pay out dividends. Thereupon, this paper wants to test the following hypothesis:

H₁ The imposition of a dollar limit has a negative implication on multinational firms

3.2.2 Translation Exposure

Translation exposure is the exchange rate risk faced by companies who have assets or liabilities in different currencies, or when consolidating a foreign subsidiary to the parent company's balance sheet. This risk is amplified since Argentina had an artificial exchange rate. This paper will analyze if the currency controls had an effect on the balance sheets of firms with an exposure to foreign exchange rates. By exchange rate, this paper refers to the official USD/ARS rate, i.e., the one artificially created by the Argentine government. The second hypothesis to be tested is:

H₂ Currency controls increase the translation exposure on total assets

3.2.3 Economic Exposure

Economic exposure originates from currency fluctuations' effect on future cash flows. In previous research this risk has been the most troublesome to quantify as it includes future cash flows, some consider it a risk that can solely be managed strategically (Shapiro, 1975). Since firm value is calculated as the present value of future cash flow, this will also have an impact on the value of the firm (Doukas et al, 2003). Thirdly, this paper wants to test the hypothesis:

H₃ Currency controls increase the economic exposure on total assets

Notably, these exposure categories only incorporate direct risks. There is also an indirect risk caused by exposure from suppliers and customers that will have an effect on the company's operations (Dumas and Adler, 1984). However, this paper solely focuses on the direct exchange rate risk.

4. Data

4.1 Data Sources

There are two parts of data: Internal covering the activities of Ericsson, and external consisting of macroeconomic data for Argentina and exchange rate figures. Internal data was collected from the treasury department at Ericsson's Latin American headquarter in São Paulo, Brazil. Internal data on a global level was collected from Ericsson's headquarter in Stockholm. Finally, several interviews were conducted at the Latin American headquarter's treasury department and at the global headquarter in Stockholm. Furthermore, external data was collected from the World Bank, FactSet, Bloomberg and Ambito. These were chosen as lack of transparency is an issue in Argentina, and the Ericsson treasury department views these sources as most reliable. Data collected includes inflation, lending and borrowing rates, capital flight levels, trade balances, as well as official and unofficial exchange rates.

4.2 Sample Selection

The case study is based on Ericsson since it is a global corporation with activities in Argentina. Data has been collected on a monthly basis, and totals to 96 observations from January 2008 to December 2015. The timeframe has been divided into three parts: Pre, during and post period, referring to the currency controls. Regressions are executed on the pre and during periods as these are covered by accounting reports. The post period is analyzed using mainly a qualitative approach. This period is substantially shorter than the other two.

Table 1. Timeframe Specification

Variable Definition	Pre	During	Post
Time Period	Jan 2008 - Oct 2011	Nov 2011 - Dec 2015	Jan 2016 - Mar 2016
Total Time	3 years, 10 months	4 years, 2 months	3 months

4.3 Variable Selection

Variables have been selected based on those believed to have been impacted from the currency controls. These are then compared to variables representing firm value. As the main analysis will be executed on data from CEA, the variables mentioned here come from said unit's balance sheet and refer solely to that business entity.

4.3.1 Dependent Variables

In order to study firm value without having a stock price, *Change in Total Assets* and *Change in Current Assets* will be used as dependent variables. The main advantage with this approach is that it more directly measures transaction, translation and economic exposure. However, it does not cover market expectations as a stock price approach would do.

Table 2. Dependent Variables

Variable	Denotation
Change in Total Assets	$(\text{Total Assets}_t - \text{Total Assets}_{t-1}) / \text{Total Assets}_{t-1}$
Change in Current Assets	$(\text{Current Assets}_t - \text{Current Assets}_{t-1}) / \text{Current Assets}_{t-1}$

4.3.2 Independent Variables

The selection and analysis of independent variables is split into the same three parts as the hypotheses are: Transaction, translation and economic exposure.

4.3.2.1 Transaction Exposure

Transaction exposure is best represented by foreign sales and foreign costs in relation to total sales, respectively total costs. These are represented by foreign accounts receivables and payables in relation to the total amount of said items. This is because CEA does not specify the proportion of sales and costs that are foreign. However, this is specified for receivables and payables, thus they are used as proxies. Moreover, the dollar limit is used as a dummy variable and represents the division between the pre and during periods. Lastly, change in the exchange rate is used as an independent variable.

Table 3. Independent Variables: Transaction Exposure

Variable	Denotation
Foreign Sales	Foreign Accounts Receivables / Total Accounts Receivables
Foreign Costs	Foreign Accounts Payables / Total Accounts Payables
Dollar Limit	Dummy: 1 if Dollar Limit in Place, 0 otherwise
Change in Exchange Rate	$(\text{USD/ARS}_t - \text{USD/ARS}_{t-1}) / \text{USD/ARS}_{t-1}$

4.3.2.2 Translation Exposure

Translation exposure is analyzed by testing the implication of holding foreign non-current assets and foreign financial debt. These factors are put in relation to total assets and total debt. Thirdly, the gain/loss of FX on cash will be evaluated as this represents the risk of holding current assets.

Table 4. Independent Variables: Translation Exposure

Variable	Denotation
Foreign Non-current Assets	Foreign Non-current Assets / Total Assets
Foreign Financial Debt	Foreign Financial Debt / Total Debt
G/L of FX on Cash	G/L of FX on Cash & Cash Equiv / Total Cash & Cash Equiv

4.3.2.3 Economic Exposure

Economic exposure captures risks on future cash flows and is analyzed by studying the trends in foreign sales and cost. The rationale is that trends in foreign sales and costs will work as an indicator for future cash flows as these are correlated over time. Alike the previous section, accounts receivables and payables are used as proxies for sales and costs.

Table 5. Independent Variables: Economic Exposure

Independent Variable	Denotation
Foreign Sales Trend	$(\text{Foreign AR}_t - \text{Foreign AR}_{t-1}) / \text{Total Accounts Receivables}_{t-1}$
Foreign Costs Trend	$(\text{Foreign AP}_t - \text{Foreign AP}_{t-1}) / \text{Total Accounts Payables}_{t-1}$

4.4 Regressions

The regressions are set up with regards to the components of FX exposure: Transaction, translation and economic. The variables on transaction and translation exposure are run collectively in Regression (1), as these can be correlated, e.g. firms with foreign debt are expected to have foreign costs. In contrast, economic exposure is tested in Regression (2), as this has been hard to quantify a separation inhibits these results from interfering. Regression (2) is run with both *Change in Total Assets* (2a) and *Change in Current Assets* (2b) as dependent variables. The reason is that the composition between current and non-current assets has changed significantly, and as this will remain both is used when analyzing future cash flows. Moreover, regressions are run with both nominal and real values as inflation was significant over studied period. Notable however is that monthly inflation figures were not available for 2014 due to transparency issues, thus an average of the yearly inflation is used.

Regression (1) will test transaction and translation exposure with the independent variables *Foreign Sales*, *Foreign Costs*, *Dollar Limit*, *Foreign Non-Current Assets*, *Foreign Financial Debt*, *Gain/Loss of FX on Cash* and *Change in Exchange Rate*. Regressions (2a) and (2b) will analyze implications of economic exposure using the independent variables *Foreign Sales Trend* and *Foreign Costs Trend*.

Regression 1: Transaction and Translation Exposure

$$\begin{aligned}
\Delta \text{ Total Assets} &= \beta_0 + \\
&\beta_1 * \text{Foreign Sales}_i + \\
&\beta_2 * \text{Foreign Costs}_i + \\
&\beta_3 * \text{Dollar Limit}_i + \\
&\beta_4 * \text{Foreign Non-Current Assets}_i + \\
&\beta_5 * \text{Foreign Financial Debt}_i + \\
&\beta_6 * \text{Gain/Loss of FX on Cash}_i + \\
&\beta_7 * \Delta \text{ Exchange Rate}_i + \\
&\varepsilon_i
\end{aligned}
\tag{1}$$

$$\begin{aligned}
chtotasspc &= \beta_0 + \beta_1 * fsale + \beta_2 * fcost + \beta_3 * dollim + \beta_4 * fncass \\
&+ \beta_5 * ffindebt + \beta_6 * gloffx + \beta_7 * chexrate + \varepsilon
\end{aligned}$$

Regression 2a: Economic Exposure

$$\begin{aligned}
\Delta \text{ Total Assets} &= \beta_0 + \\
&\beta_1 * \text{Foreign Sales Trend}_i + \\
&\beta_2 * \text{Foreign Costs Trend}_i + \\
&\varepsilon_i
\end{aligned}
\tag{2a}$$

$$chtotasspc = \beta_0 + \beta_1 * fsaletr + \beta_2 * fcosttr + \varepsilon$$

Regression 2b: Economic Exposure

$$\begin{aligned}
\Delta \text{ Current Assets} &= \beta_0 + \\
&\beta_1 * \text{Foreign Sales Trend}_i + \\
&\beta_2 * \text{Foreign Costs Trend}_i + \\
&\varepsilon_i
\end{aligned}
\tag{2b}$$

$$chcurasspc = \beta_0 + \beta_1 * fsaletr + \beta_2 * fcosttr + \varepsilon$$

4.5 Supplementary Economic Tests

4.5.1 Seasonality

As the data is observed on a monthly basis there is a risk of seasonality, and therefore, the dependent variables were tested for seasonality by using a dummy variable approach. The test revealed seasonality for December, thus a dummy variable is used to adjust for this.

4.5.2 Winsorizing

Winsorizing is used to limit the occurrence of extreme values, tested by creating histograms for the variables to identify outliers. The histograms revealed outliers in *Foreign Costs Trend*. Thus, a 95% winsorization was performed and a new variable created.

4.5.3 Multicollinearity

Multicollinearity, the occurrence of variables being near linear combinations of one another, is tested by using a Variance Indication Factor. The VIF should be below 4 to be acceptable (Pan and Jackson, 2008). The highest VIF for Regression (1) is 1.33, and the mean is 1.24, implicating a low risk for multicollinearity.

4.5.4 Heteroscedasticity

The regressions are tested to see if the error term is non-constant, and heteroscedasticity is present, by a Breusch-pagan test. Specifically, this is done by regressing the squared values of the residuals on the independent variables. Results imply that homoscedasticity is present.

4.5.5 Finalization of Regression Models

As CEA does not hold foreign non-current assets nor financial debt these variables are dropped. Also, CEA does not have any foreign sales, thus this variable is dropped as well. Lastly, regressions are altered to include winsorized variables and a dummy for December.

Regression 1: Transaction and Translation Exposure

$$\begin{aligned} \Delta \text{ Total Assets} = & \beta_0 + \\ & \beta_1 * \text{Foreign Costs}_i + \\ & \beta_2 * \text{Dollar Limit}_i + \\ & \beta_3 * \text{Gain/Loss of FX on Cash}_i + \\ & \beta_4 * \Delta \text{ Exchange Rate}_i + \\ & \beta_5 * \text{Dec}_i + \\ & \varepsilon_i \end{aligned} \tag{1}$$

$$chtotasspc = \beta_0 + \beta_1 * fcost + \beta_2 * dollim + \beta_3 * gloffx + \beta_4 * chexrate + \beta_5 * Dec + \varepsilon$$

Regression 2a: Economic Exposure

$$\begin{aligned} \Delta \text{ Total Assets} = & \beta_0 + \\ & \beta_1 * \text{Foreign Costs Trend Winsorized}_i + \\ & \beta_2 * \text{Dec}_i + \\ & \varepsilon_i \end{aligned} \tag{2a}$$

$$chtotasspc = \beta_0 + \beta_1 * fcosttrW + \beta_2 * Dec + \varepsilon$$

Regression 2b: Economic Exposure

$$\begin{aligned} \Delta \text{ Current Assets} = & \beta_0 + \\ & \beta_1 * \text{Foreign Costs Trend Winsorized}_i + \\ & \beta_2 * \text{Dec}_i + \\ & \varepsilon_i \end{aligned} \tag{2b}$$

$$chcurasspc = \beta_0 + \beta_1 * fcosttrW + \beta_2 * Dec + \varepsilon$$

5. Background

5.1 Argentina's Economy and Currency Controls

With Argentina's GDP of USD 540 billion, it composes one of the largest economies in Latin America. Financial growth has been stable for the last decade, with a 5.6% yoy increase in GDP. Argentina's series of financial crises may be traced to its questionable economic policies, political instabilities and absence of capitalism (Eiras and Schaefer 2001).

The presence of capital flights have constituted a structural limitation for the development in Latin America since the 1970s. Firstly, capital that is no longer invested in the country does not help the production capacity (Pastor, 1990) and secondly, these entities face challenges in generating investments, amplifying the need for foreign debt (Cuddington, 1986; Basualdo and Kulfas, 2002). This issue has been pressing in Argentina which has experienced several scarcities of foreign currencies in the last decades, starting with two in 1980 and 1989. In 1989, 0.1% of their population of 30 million paid income tax, and they had a hyperinflation at 5,000%. A peso convertibility was implemented in 1991 that pegged the Argentine peso to the US dollar, but this led to a high trade balance deficit. It peaked in 2001 when capital flights were USD 20 billion and culminated when the government failed to meet debt payments on more than USD 100 billion in 2001, making it the largest sovereign default in history. Argentina dropped the peg in 2002, and the peso depreciated over 200%. The years following the collapse were more positive with robust growth, and the Central Bank's reserves were replenished. However, capital flights became an issue again in 2011 with capital flights at USD 25 billion when wide uncertainties were present regarding another currency devaluation. Due to the default in 2002 Argentina's access to international capital markets was limited. The situation became untenable and something drastic had to be made.

In November 2011, the private sector's access to international capital markets was restricted as currency controls were implemented in order to limit the outflow of foreign currencies. Initially, it stated that the Argentine tax bureau had to authorize purchases of foreign currencies, but it quickly amplified hidden behind bureaucracy and lack of transparency. In practice, this meant making it nearly impossible for consumers to buy foreign currencies and placing limitations on the amount of USD companies could buy. Moreover, it led to the creation of an artificial exchange rate that consensus deemed as an overvaluation of the peso. These measures were effective, capital flight dropped from \$25 billion in 2011, to \$600 million in 2012.

However, the prohibition hindered economic growth as imports got limited when companies had trouble paying their suppliers abroad, and exporters' prices were no longer competitive. Moreover, it created a parallel black market of foreign currency trading, where rates were significantly higher than the official rate created by the government; 14.5 pesos per dollar, compared to the official USD/ARS spot rate at 9.9 in December 2015.

The currency controls were eased on December 16th 2015, which consensus regarded as a favourable move with regards to market development. The almost complete abandonment of the dollar limit and decision to let the peso float is hoped to initiate a wave of foreign investments into Argentina, currently facing low foreign reserves. The first day of trading, the ARS lost 26% of its value against the USD, almost reaching the black market value.

5.2 Case Study: Ericsson Overview

Ericsson is a Swedish multinational corporation providing communications technology and services. Their offerings are categorized in three subsections; hardware, software and services. They have 2.5 billion network subscribers and delivers more than 40% of the world's mobile traffic. Ericsson has a market cap around SEK 190 billion, operates in 180 countries and employs more than 115,000. The company was founded in 1876, is headquartered in Stockholm and listed on NASDAQ Stockholm and NASDAQ New York.

Ericsson has experienced a transformation in the last decade, shifting from a hardware and network business to software and services. In 2006, network was the main sales generator at 60% of the revenue. Today, services and software combined accounts for 66%.

Ericsson's Argentina unit, CEA, was established in 1921. Two key drivers of sales for the unit are mobile broadband and network investments. In 2015, CEA generated 0.3% of Ericsson's total sales.

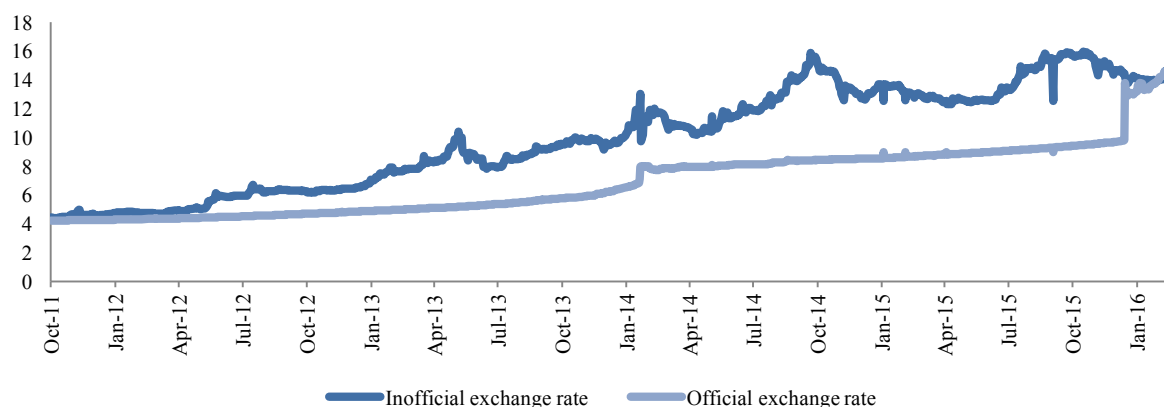
6. Currency Controls

The two main implications of the currency controls for firms included: 1. An artificially created exchange rate, and 2. Restrictions on the amount of USD companies had access to.

6.1 Artificial Exchange Rate

The artificial exchange rate set by the Argentine central bank was remarkably different from the one prevailing on the black market, believed to represent the true value more accurately. As seen below, the dispersion between the two rates grew over the period, revealing an increased overvaluation. The graph also plots the convergence in December 2015 when the artificial exchange rate was released and the official rate approached the black market rate.

Graph 1. Official and Black Market USD/ARS Exchange Rates, 2011-2014



6.2 Dollar Limit

The second implication, the dollar limit, was a regulation on the amount of USD companies could buy. In addition, no other currencies could be bought either. During the period from November 2011 to December 2015, the dollar limit varied considerably. Some restrictions are present as of today, with a complete abandonment announced for June 2016.

Officially, the dollar limit was the same for all companies in Argentina, regardless of size, industry or needs. However, industries that were believed to be crucial for the country's core functions including utility-, healthcare-, energy-, and transportation companies could be allowed higher limits by the government. This did not include Ericsson.

The limit shifted between daily and monthly throughout the period. The primary dilemma when the limit was set daily was that it required precise planning. If one did not utilize its amount one day, it could not be used on subsequent days. Additionally, if a specific invoice exceeded the daily limit, firms had to divide their payments. In 2014, the official

dollar limit was USD 300,000 per firm per day. However, in practice, it was not uncommon that once the firms went to the banks, the limit had just been slashed in half for a couple of days. The same official figure applied to 2015, but even larger reductions were done and at a higher frequency. From mid-2015 and onwards the limitations changed to monthly, at USD 8.5 million, akin to USD 280,000 per day. Even though this was slightly lower than before, the fact that the limit was monthly facilitated for firms and reduced their admin costs.

6.3 Impacts of Currency Controls

CEA was affected by the controls as they were exposed to foreign currencies. The regulations gave rise to numerous implications on their balance sheet, profitability and managerial strategies. Several issues are described below, but one wide-range implication was the admin costs related to coping with these regulations, especially when the limits were daily. In the Latin American headquarter there is usually one manager covering three countries, but in this case two people solely focused on CEA, hinting of the complexity of the policies.

The restriction on dollar access had a severe impact on CEA as they generated revenues in ARS but needed USD to pay its suppliers and transfer money to EAB. Thus, CEA's earnings during the period were locked in Argentina as trapped cash, held in ARS. When managers are endowed with abundant cash it is referred to as the *Free Cash Flow Hypothesis* (Jensen 1986). The risk states that managers might undertake projects with negative NPVs, reducing the value of the firm. This was avoided due to EAB's policy to not allow financial decisions being made without the headquarter's approval.

6.3.1 Restrictions on Dividend Payments

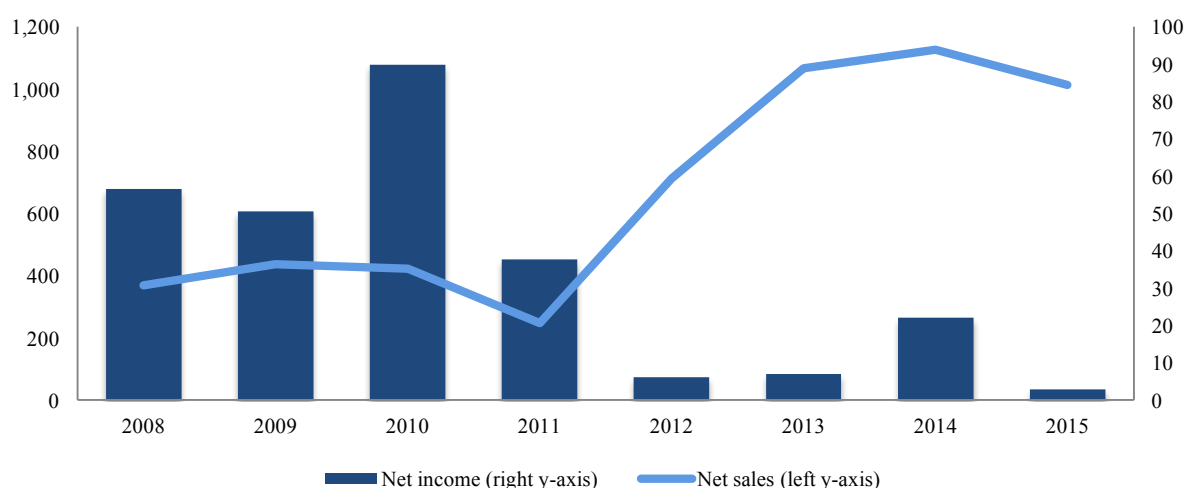
Although there were no direct restrictions on dividend payments per se, CEA was hindered to transfer cash to EAB due to the dollar limit, and therefore indirectly the company's shareholders. As the dollar access had to be prioritized for the use of payments to suppliers, CEA did not use the limited dollar amount to transfer profits to EAB.

6.3.2 Complicating Imports

The controls curbed Argentine companies' possibilities to enter into foreign contracts. After the implementation, CEA had to limit its imports from EAB. The high level of foreign accounts payables still held in December 2015 origins from imports in 2011 that CEA has been struggling to settle ever since, creating a large transaction exposure. Those accounts payables have been rolled forward and payments were realized gradually over the years to

come. When those were gradually paid off, significant losses were realized as the USD/ARS rate had increased considerably. The decline in net income between 2011-2014 was to a large extent caused by FX losses related to accounts payables. As seen below, net sales and income are diverging, driven by increased sales, and even larger increases in costs as a consequence of the currency controls.

Graph 2. Net Income and Net Sales Ericsson Argentina 2008-2015, mARS

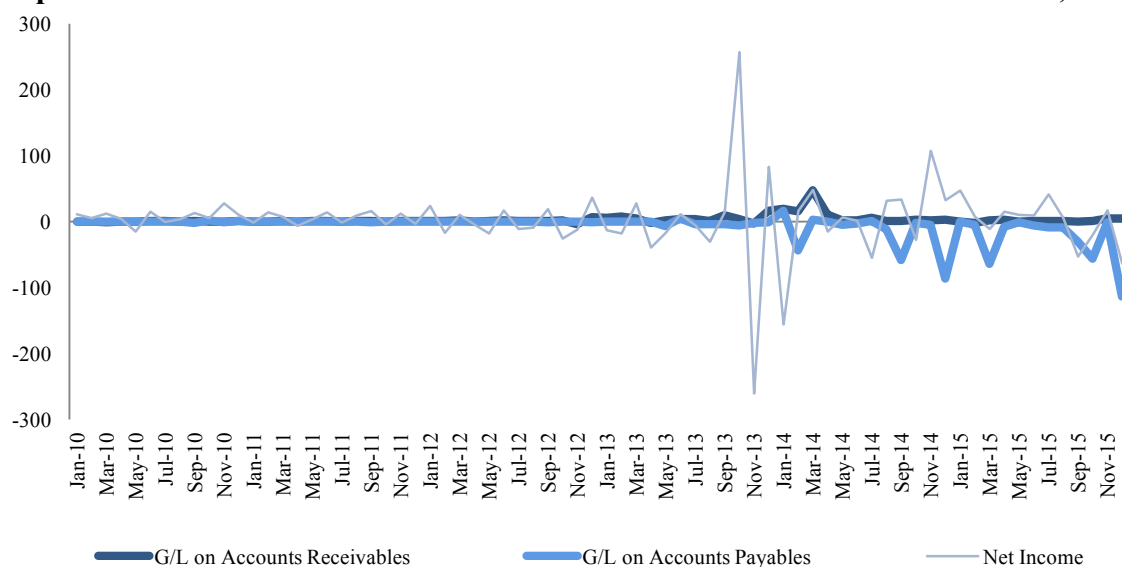


6.3.3 Gains & Losses on Current Assets

As shown below, CEA has experienced significant fluctuations in net income, partly caused by gains and losses on foreign accounts receivables and payables. The gain in account receivables in March 2014 was caused by a domestic sales contract invoiced in USD. The drops in accounts payables is explained by realized losses on bond transaction in September and December 2014, and March 2015. Since the losses were realized gradually it resulted in the volatility showed below. This naturally had an impact on net income and partly explains the fluctuations in the bottom line profit.

Moreover, some additional losses on current assets were related to internal financing from EAB. When EAB offered CEA an intercompany loan, the USD was converted to ARS using the official rate. Then, when CEA should pay back the loan to EAB, the ARS had to be converted to USD based on the black market rate. Therefore, the incurred loss totaled to $x * (Black\ market\ rate_{t_2} - Official\ rate_{t_1})$ if x represents the size of the financing. Based on those additional costs related to internal financing, this financing method was avoided by EAB.

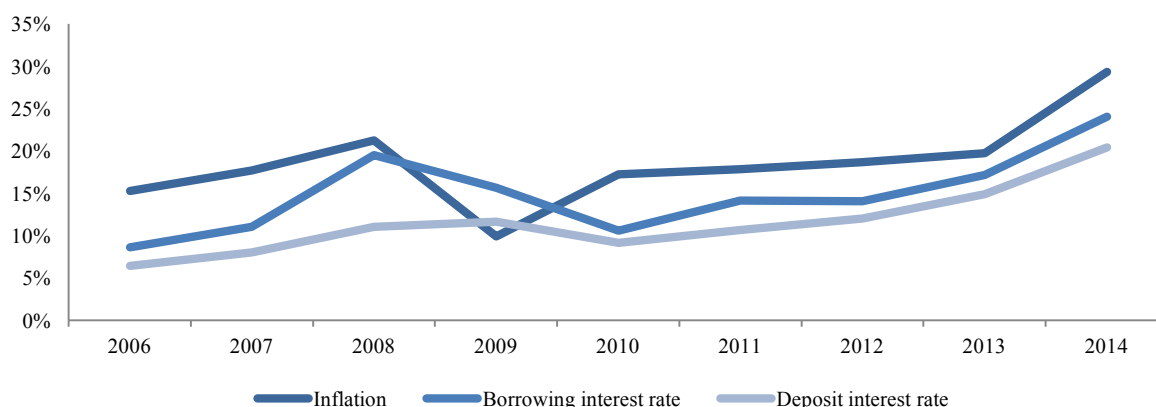
Graph 3. Net Income and Gain/Loss of FX on AR and AP Jan. 2010-Nov. 2015, mARS



6.3.4 Complicating Raising Debt

Currency controls tend to reduce the supply of capital and raise the cost of financing (Forbes, 2005). The borrowing rate in Argentina was 14% in 2011, and climbed to 24% in 2014. CEA was offered borrowing rates around 35% in 2015. Moreover, there was a high risk associated with domestic debt as the Argentine Central Bank faced a risk of default. Also, domestic debt meant receiving ARS, not needed by CEA who was trying to access USD. The option to undertake intercompany loans, usually a low interest rate alternative, was blocked by the government through taxation at 35%. Therefore, CEA held neither intercompany loans nor other foreign debt during the period.

Graph 4. Inflation, Borrowing and Deposit Interest Rates in Argentina 2006-2014



6.4 Coping with Currency Controls

As the controls affected firms' access to foreign currencies, naturally, ways of surpassing these restrictions were explored. Subsequently, the World Bank Residual Model showed capital outflows that were a lot higher than the official limit allowed.

6.4.1 Cash Management

According to Carlos Borges, Manager at the Latin American Treasury Unit, a common use of excess cash among other Argentine subsidiaries to multinational firms was investments in PP&E, usually real estate. However, Ericsson's strategy is to rent and not purchase properties, and all investment decisions are made at the headquarter in Sweden. Furthermore, the property market was mainly priced in dollars, hindering the original idea to use ARS. Thus, the real estate option was not undertaken as decided by EAB. Instead, Ericsson analyzed other local, alternative opportunities to use the excess cash. EAB was considering investments into unrelated businesses such as vineyards and shipping in order to create exports and thus access dollars. However, due to risks and lack of competence within these areas, EAB decided to reject these options. Instead, Ericsson chose to make rental payments in advance, usually 12 months, as a way to limit the impact of inflation.

The second strategy to handle excess cash was time deposit contracts on 30 days. The issue in Argentina was that although deposit rates were relatively high, it was lower than inflation. One reason was that domestic banks did not have a need for peso, as they likewise were locked out from capital markets and had an abundant supply of ARS. CEA negotiated deposit accounts with returns around 16%, just enough to cover inflation. However, as sudden fiscal changes are common in Argentina, it was a risk related to the 30 days lock in.

As a long term alternative, CEA bought Argentine government bonds that were bought in ARS but paid in USD at maturity. As there was a shortage in the supply of USD, these were sold in secondary markets at a premium based on the black market value of ARS. However, when the bonds were sold or matured Ericsson received USD whose value was transferred into ARS based on the lower, official exchange rate, thus causing a loss. Also, these were risky as they had long term to maturity, and uncertainty prevailed regarding the government's ability to pay the principals. Once these bonds were bought, CEA had two options: Hold to maturity and receive the face value in USD, or sell internationally and receive USD immediately. CEA did three bond transactions while the controls were in place. The first bond purchase in August 2014 with a USD 10m principal was sold in capital markets. Purchase price was ARS 120.5m and when sold the official rate transferred

USD 10m to ARS 84.1m, generating a loss at ARS 36.4m. The second bond purchase in December 2014 with face value USD 25m was bought at ARS 296.3m and sold for ARS 213.8m, a loss of ARS 82.5m. The third bond purchase was bought in March 2015 for ARS 313.6m, with a USD 25m face value, and was held to maturity. At maturity the bonds were worth ARS 236.3m, generating a loss of ARS 77.3m.

Table 6. Loss of Bond Purchases

Purchase Date	Face Value	Strategy	Incurred Loss	
28-08-2014	USD 10m	Sold before maturity	ARS 36.4m	USD 4.3m
10-12-2014	USD 15m	Sold before maturity	ARS 92.5m	USD 9.7m
10-03-2015	USD 25m	Held to maturity	ARS 77.3m	USD 8.2m
USD 50m			ARS 206.2m	USD 22.2m

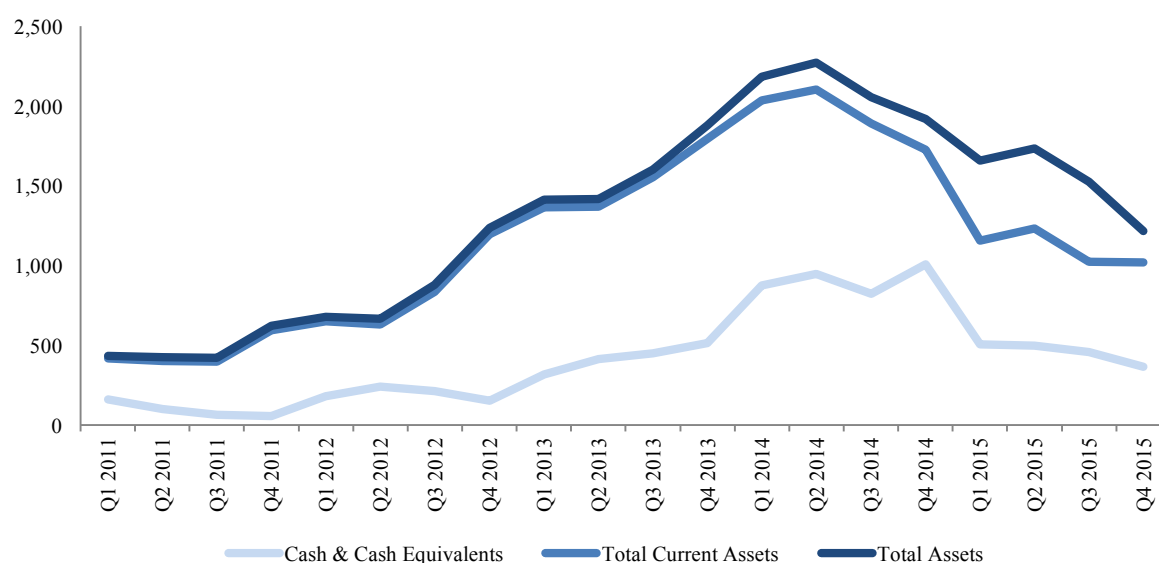
Bonds were a costly alternative because of haircuts and FX losses if held to maturity. The three transactions resulted in a loss of more than USD 22m or an overpayment of 44.4%, which could be regarded as a result of excess cash as described in the *Free Cash Hypothesis*. However, this was one of the few ways to access dollars above those allowed, and the bonds generated USD 50m, used to reduce foreign accounts payable. Also, Ericsson regarded it as beneficial to take a known loss upfront instead of risking it becoming even more severe. Even though the overpayment was substantial, it was still less than the difference between the black market and official exchange rate. As described below, the loss would have been ARS 78 million, or 37.8%, larger if the bond purchases would have not been made. The “Difference Today’s Rate” is calculated using the USD/ARS rate on April 25th 2016.

Table 7. Loss not Incurred Because of Bond Purchases

Purchase Date	Face Value	USD/ARS at Purchase Date	Difference Today’s Rate	Loss not Incurred due to Bond Purchases
28-08-2014	USD 10m	8.4032	14.3209-8.4032=5.9177	ARS 59.2m
10-12-2014	USD 15m	8.5521	14.3209-8.5521=5.7688	ARS 86.5m
10-03-2015	USD 25m	8.7823	14.3209-8.7823=5.5386	ARS 138.5m
				ARS 284.2m

As seen below, CEA’s assets increased considerably when the controls were in place, in nominal terms. Total assets grew more than 300% from the beginning of 2011 to mid-2014, and cash & cash equivalents expanded sixfold. The main drivers were an increased cash balance and a rise in sales, generating larger accounts receivables. The observable drop in cash in Q4 2014 represents the time when Ericsson initiated the strategy to buy bonds. Another strategy that inflated the decline was a new split market model, more on this in section 8.4.

Graph 5. Cash, Current Assets and Total Assets, Ericsson Argentina 2011–2015, mARS



6.4.2 Hedging

Hedging is used to limit exchange rate exposure by stabilizing cash flows and volatility (Chang, Hong and Kuan, 2005). However, as stated in the M&M proposition, it should not be possible to increase firm value by hedging in perfect markets (Miller and Modigliani, 1958). However, the dollar limit and artificial exchange rate embody two market imperfections violating the M&M theory, thus hedging can increase firm value (Froot et al, 1993).

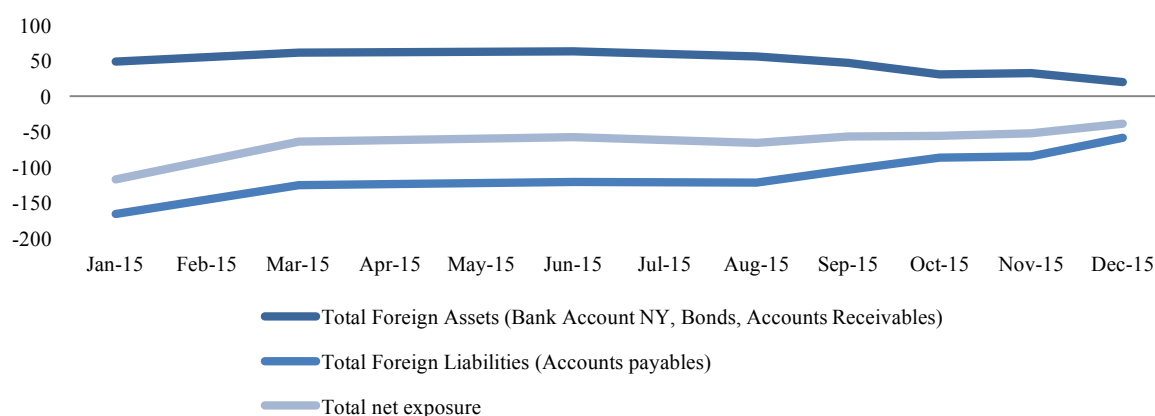
EAB is exposed to 109 currencies, and the hedging is done on an aggregated level by the headquarter in Sweden. The Argentine government has prevented hedging instruments for ARS, so the only way to hedge the currency is by trading non-deliverable forwards, NDFs, offshore. A NDF is a currency swap in which parties agree to an initial exchange rate, and then the settlement value is the net difference between the initial exchange rate and the one at maturity. NDFs were used at the pre and after periods, but throughout the during period this option was not available on financial markets.

As the financial hedging is done by EAB, CEA could only influence natural hedges. CEA is principally an importer, thus foreign costs exceed foreign revenues, correspondingly foreign accounts payables are larger than receivables. A strategy undertaken to increase foreign accounts receivables and reduce the exposure was to change the currency of certain invoices. When a deal was done, the price was set in ARS, but the invoice was sent in USD. When the payment was due, that day's exchange rate was used to calculate the ARS amount that should be transferred. This way, inflation did not have an effect on the deals between the invoice and payment days, severely reducing the transaction exposure. This was valuable as

inflation averaged at 10% between 2011-2014, and spiked at 25% in 2014. This strategy only applied to contracts affected by FX rates, so service contracts could be denominated in ARS as the costs also were in peso, i.e., salaries, whereas hardware and software were sold using this strategy. This created a natural hedge; from invoice date to payment date CEA had a USD asset on accounts receivables that reduced their exposure in accounts payable. On the other side of exposure, accounts payables, CEA did operational hedging by using domestic suppliers even though this was more expensive, as they could pay them in ARS.

Foreign accounts payables were considerable in size causing an FX exposure and corresponding costs. If CEA undertook investments or held cash in USD, this created a natural hedge and the impact on the income statement was lessened. This was done by buying the government bonds that paid in dollars at maturity, mentioned previously. When the bonds were realized, the principal was transferred to a bank account in US, cancelling out part of the exposure, and then used to systematically pay off accounts payables. As can be seen below, the net exposure was significantly reduced in 2015.

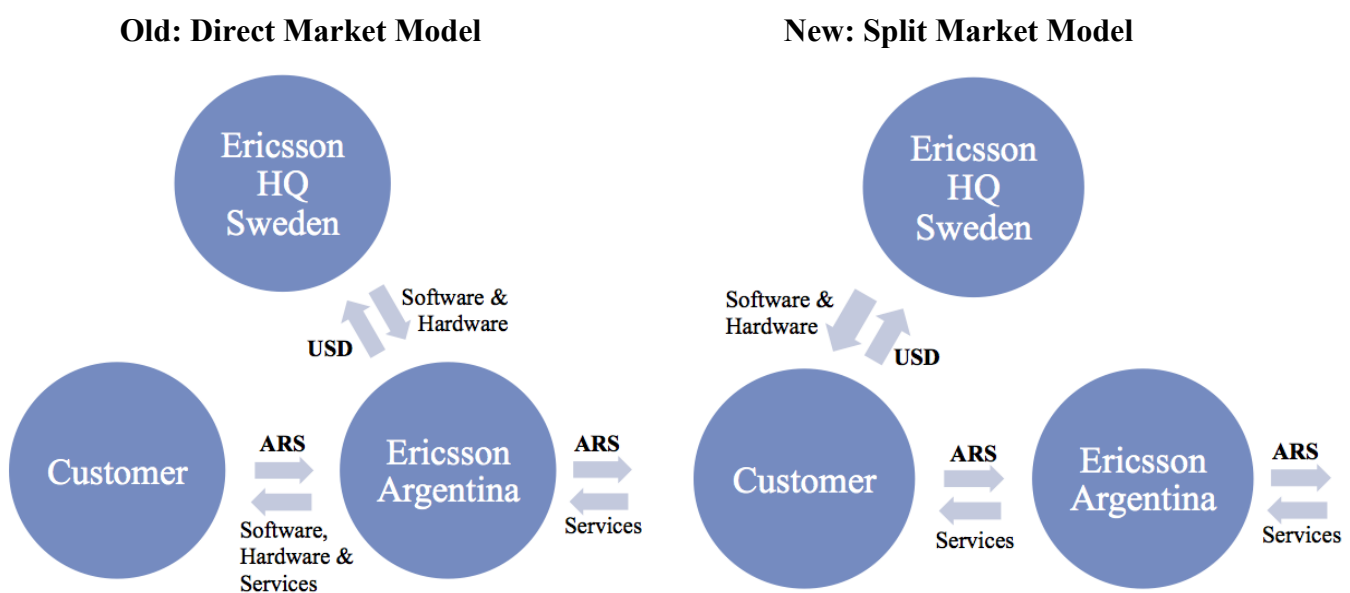
Graph 6. Natural Hedge, Ericsson Argentina 2015, mUSD



6.4.3 Restructured Operations Model

In order to reduce Ericsson's transaction risk, the business was operationally changed in a foreign exposure perspective, by implementing a split market model in the beginning of 2014. The former direct model meant that all contracts CEA engaged in were invoiced in ARS and held on their balance sheet, regardless of business area; hardware, software or services. However, software and hardware was bought from EAB and paid in USD, creating a currency mismatch in revenues and cost. Contrary, the new split market model meant that contracts regarding software and hardware were created with EAB as counterpart, denominated in dollars. Thus, CEA only held service contracts denominated in ARS on their

balance sheet as the related costs were wages denominated in ARS as well. This resulted in a limited transaction exposure for CEA and the currency exposure was instead held on EAB's balance sheet, but now in USD/SEK. Moreover, as this will have an impact on future cash flows, this also reduced their economic exposure. One caveat with this model is that they must convince customers to pay EAB in USD, instead of paying CEA in ARS. The reason this was doable was because some of the customers that underwent this shift were those that by its industry area were seen as crucial for the country's core functions, mentioned previously, and therefore given a special access to the dollar market by the government.



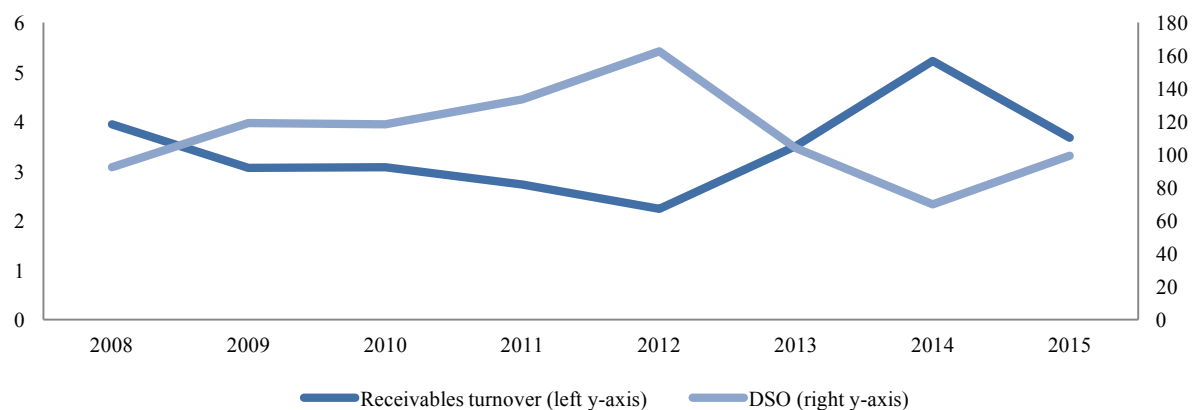
6.4.4 Adjusting Financial Strategies

As firms struggled to be profitable during the currency controls, CEA used services by Exportkreditnämnden, EKN, an agency commissioned by the Swedish government to insure export companies and its subsidiaries against the risk of non-payments. The way this works is that they provide a guarantee on a specific contract, and if the customer is not able to meet its payments, EKN will cover. Riskier deals are more expensive, and if clients are deemed too risky EKN will not accept the application. This service was priced at LIBOR + ca 3% of the deal. For deals that EKN would not accept, CEA used letter of credits, L/C, where banks guarantee that the buyer's payment will be received on time and in the specified amount. CEA, as the seller, pays for EKN and L/C, and the latter is more expensive. However, a part of the cost was added to the sales price and thus affecting customers as well.

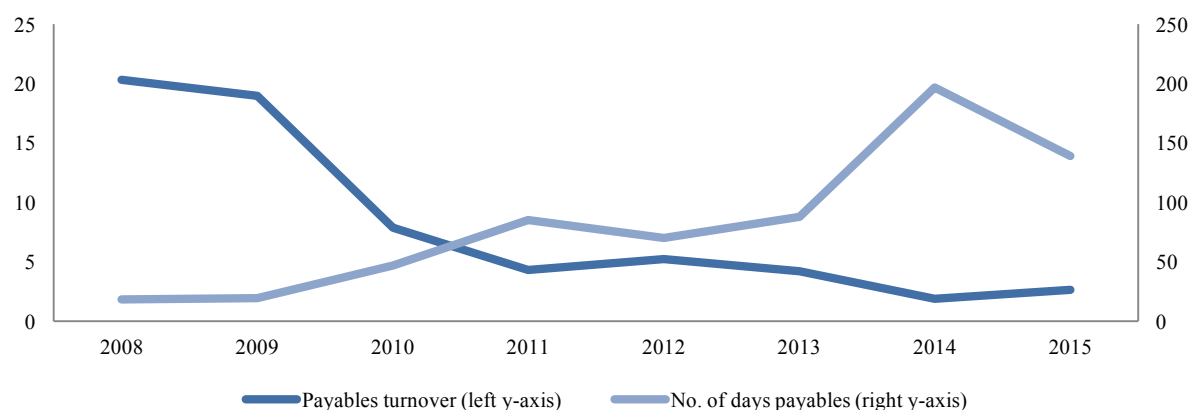
In order to cope with the policies, the number of credit days were adjusted. When the costs were related to foreign, external suppliers, CEA usually payed 60-180 days in *advance* to keep prices fixed and reduce the cost of inflation. Although, when payables were contracts with EAB, those tended to be extended further due to limited access to dollar. Contrary, in the interest of attracting clients, CEA extended the number of credit days for sales. Because of the time value of money (Berk and DeMarzo, 2013), CEA was worse off when increasing days of sales outstanding. However, extended credit terms related to payables benefited working capital. Altogether, this favoured CEA as they import more than export.

When analyzing the cash conversion cycle, inventory levels can be disregarded as this item was minimized due to the shift into a service unit. When studying receivables and payables, it is observable that turnover rates have been experiencing a downturn throughout the period. The trapped cash in ARS grew gradually, causing a decline in turnover rates. Overall, it was observed that the cash conversion cycle was declining as a result of extended credit terms, mainly driven by a limited inventory and large payables relative to receivables.

Graph 7. Receivables Turnover Ratio and Days of Sales Outstanding, 2008-2015



Graph 8. Payables Turnover Ratio and Number of Days of Payables, 2008-2015



6.5 Impacts of Relaxation of Currency Controls

The main effects from the relaxation of currency controls on December 15th 2015 were: 1. Drop of the artificial exchange rate, and 2. A relaxation of the dollar limit, with a full lift announced for June 2016. This development was viewed as positive since it leads to an increased access to international markets and a more predictive government that will aim to reduce the costs of market imperfections. The modified dollar limit effective from January to June 2016 does not affect Ericsson's daily operations.

6.5.1 Dropped Artificial Exchange Rate

When the government dropped the artificial exchange rate, it quickly approached the prevailing black market level as the peso lost 26% of its value on the first day of trading. As mentioned, CEA did not hold foreign debt nor non-current assets, therefore limiting the translation exposure. However, in spite of strategies to reduce this, they had a transaction exposure mainly caused by foreign accounts receivables and payables. Foreign accounts payables totaled ARS 465 million (USD 48 million) as of November 30th 2015. This meant that when the peso dropped 26%, CEA had an immediate loss of FX from accounts payables over USD 12 million. As CEA is a predominant importer, the devaluation of the peso will make future imports from EAB more expensive.

Moreover, a risk associated with the floating rate is increased and more volatile inflation. As the foreign exchange rate is floating it complicates the ability to control inflation, and since its relaxation the inflation has climbed to 33% in February 2016.

Finally, it is important to note that the exchange rate prevailing in early 2016 might not reflect the true long term market value. There is still limited liquidity in foreign exchange markets, coupled with a large demand to buy USD, thus driving up the USD/ARS rate.

6.5.2 Relaxed Dollar Limit

The main complication from the dollar limit was that CEA's foreign accounts payables grew substantially as they were not able to pay its suppliers, mainly EAB. Therefore, the relaxation enables CEA to access dollars to pay of this debt, which has created a large currency exposure and associated losses from FX fluctuations. The main issue they face now regarding this is that they do not have enough cash on hand to pay off the debt.

Another issue from imposing the dollar limit was that it inhibited trading activities, for CEA this mainly meant imports as they could not access dollars to pay EAB. Thus, the relaxed dollar limit enables them to bring back imports to levels that they were before the

controls were imposed. However, one way to cope with the limit was the split market model, something that has been proved effective. Thus, they will keep this and CEA's importing levels will remain low, making it clear that Argentina's fiscal and monetary policies will have a long term impact on Ericsson's business model.

Another implication is that CEA will be able to send dividend to EAB as it is no longer trapped. In regards to dividend payments from subsidiaries to EAB, no requirements on amounts are specified. Thus, there are no obligations to compensate for previous dividends that could not be paid out due to the restrictions.

Moreover, as mentioned, there was a large cost associated with currency controls, e.g. accessing dollars through bond purchases, or having a FX exposure. Thus, there should be a positive impact on profits from not having to incur these costs. Finally, this development opens up the opportunity to take on debt, if financing needs would occur at CEA.

7. Results and Analysis

This section will disclose empirical findings from the multivariable regressions. Transaction and translation exposure is tested using Regression (1), and economic exposure is analyzed in Regressions (2a) and (2b). The main focus will be on the results using real values as inflation was substantial over studied period.

7.1 Transaction Exposure

As mentioned, transaction exposure covers the risk associated with trade contracts, in this paper analyzed with the variables *Foreign Costs*, *Dollar Limit* and *Change in Exchange Rate*. The aim is to test the following hypothesis:

H₁ The imposition of a dollar limit has a negative implication on multinational firms

The regression revealed a positive 0.47 correlation between *Change in Total Assets* and *Foreign Costs*. As *Change in Total Assets* is regressed with its percentage values, this means that when there is a 1% increase in foreign costs in proportion to total costs, it will generate a 0.0047% positive increase in the change in total assets. However, the t-value and accompanying p-value, cannot reject the null hypothesis that the parameter is 0. The reason for this is, as mentioned in the qualitative analysis, this correlation is twofold. When CEA increases imports, i.e., has higher foreign costs, there should be a positive impact on total assets since the official rate overvalued the ARS, making it relatively cheap to buy goods from abroad. Contradictory, there was a cost associated with foreign purchases as it was expensive for CEA to obtain USD to pay for imports. Thus, it is in line with the qualitative analysis that the coefficient lacks significance, but has a slight predominance of the benefit of importing. Secondly, there is a negative correlation between *Change in Total Assets* and *Dollar Limit* (dummy), also in line with the analysis conducted above, with a coefficient at -0.36. The implication from this is that when the dollar limit was in place, this had a 0.0036% negative impact on the change in total assets. However, this variable also has a p-value that is not significantly different from zero. This result was the most surprising as a strong correlation was expected, but the reason for this was that the dollar limit did not have an immediate impact on total assets. Instead, it led to gradual complications over time as CEA accumulated large foreign accounts payables that could not be paid off due to the dollar limit. Thus, this gradual development was hard to capture completely with a dummy variable, and consequently the significance is rather low. Finally, there is a significant negative correlation

between *Change in Total Assets* and *Change in Exchange Rate* at -77.84. When the exchange rate increased by 1%, this led to a decrease in the change in total assets by 0.7784%. This is also in line with the qualitative analysis as this is most attributable to CEA's foreign accounts payables that led to severe losses as the spot rate increased. With respect to transaction exposure, there is high correlation coefficients, but the significances of the first two are affected by twofold effects and gradual developments. Collectively, the regression combined with the analysis above supports the first hypothesis, and corresponding null hypothesis of no negative implications is rejected. According to this paper, there is a negative implication on multinational firms' total assets from imposing a dollar limit, if data from a case study on Ericsson Argentina is used.

7.2 Translation Exposure

Translation exposure is associated with changes in the balance sheet as a result of exchange rate fluctuations. As CEA does not hold any foreign non-current assets nor financial debt, the translation exposure is from foreign cash held in a US bank account and government bonds, analyzed by the variable *Gain/Loss of FX on Cash*. Thus, one variable is used for the analysis of the second hypothesis.

H₂ Currency controls increase the translation exposure on total assets

There is a correlation between *Change in Total Assets* and *G/L of FX on Cash* with a correlation coefficient at 44.15. This entails that the gains or losses that CEA realizes has an effect on total assets, implying that they were considerable in size as they affected the whole firm. The most common situation was losses on this account, and a 1% loss of FX on cash led to a 0.4415% decrease in the change in total assets. Compared to *Foreign Costs*, it is visible that *G/L of FX on Cash* had a more significant impact, mainly caused by losses on bonds. Thus, when using data on CEA, this paper rejects the null hypothesis and confirms the second hypothesis that the currency controls increased the translation exposure on total assets.

7.3 Economic Exposure

Regressions (2a) and (2b) are used to test economic exposure associated with future cash flows, and are tested with *Foreign Costs Trend*. The first regression (2a) uses *Change in Total Assets* as dependent variable, whereas regression (2b) uses *Change in Current Assets*. These regressions are used to test the third and final hypothesis:

H₃ Currency controls increase the economic exposure on total assets

Both regressions (2a) and (2b) show that there is a significant correlation between *Foreign Costs Trend* and CEA's assets, with positive correlation coefficients at 8.90 and 9.43 respectively in relation to *Change in Total Assets*, and *Change in Current Assets*. This shows that when analyzing the economic exposure by studying future implications, there are positive implications from having foreign costs, i.e., importing goods. This would mainly include intercompany imports that are beneficial because of the overvalued currency, notwithstanding the mentioned difficulty to access dollars. When combining these results with the qualitative analysis conducted above, it is understandable that the data shows that there are positive implications for CEA by importing goods. However, this is a variable that proves the importance of conducting a qualitative analysis in combination with the regressions. Because although the regressions state that CEA should increase imports, there are still predominant benefits of keeping the split market model as it reduces their exchange rate exposure, even after the relaxation of currency controls. This is because the overvaluation of the peso was due to the artificial rate set by the government and not the correct market rate. As the exchange rate gets closer to the black market rate the benefits from imports will be reduced. Although mentioned points make it complex to analyze the third hypothesis, data in regressions (2a) and (2b) combined with the qualitative analysis show that the null hypothesis can be rejected and that currency controls increased the economic exposure on total assets.

8. Recommendations

In the aftermath of a four-year period characterized by stagnation and declining investment trends, Argentina's economy is expected to continue to recover throughout 2016 catalyzed by relaxed currency controls. The rebound will be driven by increased investor confidence and growth in foreign demand. From February to March 2016, the Argentine equity index climbed 39.5%. The move is expected to gradually close the gap between the official and black market rate, converging fully in June 2016 when the full abandonment of the dollar limit is announced. Although the lift of the artificial exchange rate generated a spike in inflation during the first quarter of 2016, a long-term decline in inflation is expected as a result from a gradual depreciation of the USD/ARS rate, a slower growth of monetary aggregates, and a fall in energy prices. The primary fiscal deficit is projected to deteriorate from 5.8% of GDP in 2015 to 4.8% in 2016 and 3.3% in 2017. Recent legal changes have recovered investors' confidence and improved the investment climate, leading to regained access to international financial markets and thus obtaining external financing at lower rates. The president replacement in December 2015 has brought a positive impact to the market. However, although market experts deem the relaxation as a favourable move macroeconomically, it may lead to short term hardships with potential layoffs flagged for. Thus, there are no guarantees that the attitude towards the president will remain positive. This being said, there is a positive outlook for the Argentine economy, even though challenges still remain.

8.1 Financial Strategies

8.1.1 EKN and Letter of Credit

CEA is still facing issues with high inflation and interest rates, thus demanding long term financing solutions. As mentioned, Ericsson used EKN and L/C to secure payments and costs were incurred for this risk reduction. As the controls have been relaxed, this can be an incentive to drop the strategies as most companies have increased payment abilities. Customers have expressed that they want CEA to abandon this as it implies a cost for them as well. However, there are some risks with such a move since the situation is still quite unstable and dollar limitations are still, to a limited extent, in place. The main benefit with the strategy is that it reduces the risk of missed payments, whereas the obvious cost is the price EKN or the bank charges, and reduced price competitiveness as some of the cost is transferred to the

sales price. However, as Ericsson's unique selling point is not its prices, but its technological knowledge, it is believed that customers will remain although EKN and L/C are in use. Therefore, the recommendation is to keep these strategies for a while as they take away the risks of missing payments in a still turbulent region.

8.1.2 Improve Working Capital Efficiency

Due to Ericsson's sizable business and strong position in the telecom market, the company has a bargaining power to increase the overall efficiency and short-term financing. By adjusting the firm's credit terms, the balance sheet can be used more efficiently. Since the controls have been lifted, the number of credit days for customers, mentioned previously, may be reduced. Furthermore, the days of payables outstanding can be negotiated.

Also, CEA should minimize translation exposure occurring when EAB sends financing in USD to CEA. Instead, if CEA uses domestic debt denominated in ARS, no exchange rate exposure is created. Moreover, this limits their economic exposure. By having local financing, interest payments will match the revenues currency wise, and thus the impact on exchange rate movements on future cash flows will be reduced.

8.2 Reduce Foreign Exchange Exposure

8.2.1 Foreign Accounts Payables

One issue CEA faces today is how to handle their transaction exposure in foreign accounts payable. When the artificial exchange rate was relaxed, the loss of FX on AP was over USD 12 million, although not realized. As the limit was released, the possibility to reduce AP is facilitated. However, there is now a shortage of liquidity caused by strategies to handle excess cash while the controls were in place. One option is to borrow ARS domestically, convert it to USD and pay off foreign AP. The borrowing rate CEA has been offered is around 35%. Suppose Ericsson takes a loan amounting to a value of ARS x , corresponding to the value y in USD, $(USD/ARS) * x = y$, using the USD/ARS spot rate. The yearly cost from undertaking a loan would be $c_D = 0.35x$. Thus, it would be profitable to borrow and pay off foreign AP as long as the otherwise incurred loss from FX on AP is larger than cost of debt. The cost from loss of FX can be described by $c_{FX} = \Delta(USD/ARS) * AP$. So, this strategy is profitable if it is expected that $c_{FX} = \Delta(USD/ARS) * AP > c_D = 0.35x$. Assuming the loan equals total AP, then $x = AP$ and if $\Delta(USD/ARS) * x > 0.35 * x$ it is profitable. This shows that if the USD/ARS rate increases *more* than 35% in a year, it *would*

have been profitable to have borrowed to reduce foreign AP. Notable though, the interest rate will be known, whereas it is impossible to predict FX fluctuations. However, as the market stabilizes in 2016 it does *not* look like a profitable strategy to reduce foreign AP by taking a loan in peso as the USD/ARS rate is believed to increase less than 35%. Instead they should gradually pay this off with cash generated from its operating activities.

Another strategy is to write off their foreign accounts payables and do a settlement or credit note with EAB, as this would severely limit their risk of bankruptcy, costs of FX and transaction exposure. The main loser from such a strategy would be EAB who is the creditor.

8.2.2 Hedging

As mentioned, since all hedging is done by EAB, the way CEA could reduce exposure was through natural hedging. This primarily included sending domestic invoices denominated in USD, described previously, reducing the exposure caused by a high balance in foreign accounts payable. The strategy is still beneficial as their foreign accounts payables remains high, and CEA uses this to create a natural hedge, reduce the foreign exchange exposure, and limit the effects of inflation that has spiked since December 2015. This method is advantageous as long as they have an exposure against the USD caused by accounts payables, and should therefore be kept to reduce transaction and economic exposure.

Currently, all financial hedging is done on an aggregated level by EAB. However, there are some benefits from executing it locally. Mainly, local hedging brings CEA closer to the market as it can match the strategies of its suppliers and customers. Otherwise, when FX rates moves CEA might have to adjust prices, but the rest of the value chain might have hedged this and want to keep prices stable, causing a risk of mismatch. The main cons are the extra local cost to have someone in Argentina responsible, as well as a loss of the overall picture for EAB. Local hedging is an option that could be considered in order to potentially reduce the effects from FX volatility and exchange rate exposure.

8.3 Management Strategies

8.3.1 Decentralized Organization

As of today, it can be observed that the decision power allocated from EAB to local units is limited. By making the organization more decentralized, local units have an ability to react quicker to regional changes. Also, by allowing them to act more independently regarding investment decisions related to acquisitions, financing and hedging, this may increase their

efficiency. Moreover, a correlation between incentivized managers and decentralized organizational structures has been observed in management literature.

8.3.2 Keep New Business Model

The split market model Ericsson implemented, where contracts regarding hardware and software are made with EAB, and CEA holds contracts with services, is beneficial. As Ericsson is transforming from a hardware business to software and service-related business, the local units are expected to continue benefitting from the split market model. It reduces CEA's transaction and translation exposure caused by currency fluctuations as there is no longer a mismatch between revenues and costs. Moreover, as this is a long term strategy affecting future cash flows, it will also reduce their economic exposure.

9. Limitations and Suggestions for Future Research

As the currency controls were lifted recently, there is a limitation to analyze the impacts of the relaxation. Therefore, the regressions are done with regards to implications of the controls for the pre and during periods. Suggestions for further research would be to analyze quantitatively how the relaxation of currency controls affected firms with foreign exchange exposure. Moreover, a suggestion for further research would be to benchmark firms within Argentina with foreign exchange exposure and see how different strategies to cope with the controls affected firm values. The main issue faced, and the reason this is not done in this paper, is transparency issues and hardships in accessing data. In addition, since Ericsson is listed on a consolidated level, no studies could be conducted related to stock price as a proxy for firm value, a method frequently used in previous literature. This also hindered the possibility to use an index as a benchmark for performance.

A limitation for this paper is prevailing transparency issues in Argentina. Therefore, some professional approximations have been used where the official figures are deemed as questionable. Some figures do not exist, as the actual dollar limit which could be one number officially and another once the companies wanted to exercise their rights, as well as exact inflation rates.

Additionally, one limitation is that most of the information gathered for the writing of this paper was obtained internally from Ericsson. Therefore, it was presented from their point of view, and it could be a challenge to keep an objective view on undertaken strategies.

10. Implications and Conclusion

This study found support for all three hypotheses, implying that the currency controls had an increased effect on transaction, translation and economic exposure. More specifically, it is seen that it had the greatest impact on transaction exposure. Translation exposure is somewhat hard to back with data as CEA held limited foreign assets and liabilities. Moreover, economic exposure is hard to quantify as the currency controls were lifted, thus the controls' effects on future cash flows are hard to predict.

The main driver was the mismatch between revenues in ARS and accounts payables in USD, i.e., a large transaction exposure. Moreover, when analyzing how CEA coped with this it is observable that many strategies were on the topic of transaction exposure; government bond purchases, operational hedging, new operations model, and extended credit days. The regressions show that the variables having the largest significance were *Change in Exchange Rate* and *Foreign Costs Trend*. Finally, when analyzed with regards to the Exposure Puzzle theory it can be observed that the effect on firm value was less than could be expected based on exchange rate fluctuations, as a result of CEA's operational hedging.

This paper adds to the limited existing literature on Argentine currency controls as it can be beneficial to policymakers to see how these types of controls affect firms, as well as for managers who can study how to best cope with currency controls.

In conclusion, the general outlook for Argentina is promising. Thus, it is crucial that CEA monetizes on this development and leverages their capabilities to grow in parallel with the market. Looking at Argentina's historical performance it is characterized by high booms and low busts, coupled with frequent cyclicity. Thus, CEA should benefit from this upswing while it lasts by gradually pay off foreign accounts payables, keep EKN and L/C, adjust number of credit days, use local financing in ARS rather than USD from EAB, keep natural hedging strategies, and continue with the split market model.

Finally, it is observed that the currency controls had a negative effect on Ericsson Argentina, mainly by increasing their costs. However, in spite of this they managed to substantially increase sales during this period. Thus, their strong potential as a profitable business unit, relaxed currency controls, and Argentina's positive outlooks all predicts a positive future for Ericsson Argentina as a subsidiary of a multinational firm.

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12. Appendix

Appendix Table 1. Descriptive Statistics

VARIABLE		Obs	Mean	Std. Dev.	Min	Max
Date	<i>date</i>	96	19006.8	847.8067	17562	20453
Change Total Assets %	<i>chtotasspc</i>	96	2.425493	8.285625	-20.526	24.51077
Change Total Assets % Real	<i>chtotasspcreal</i>	96	2.266344	8.395211	-20.13749	24.2734
Change Current Assets %	<i>chcurasspc</i>	96	2.473229	9.623351	-30.15458	25.61241
Change Current Assets % Real	<i>chcurasspcreal</i>	96	2.286763	9.427859	-29.27638	25.37293
Foreign Sales	<i>fsale</i>	96	.0180199	.0177177	0	.062878
Foreign Costs	<i>fcost</i>	96	.5129114	.1456033	.103168	.7354438
Dollar Limit	<i>dollim</i>	96	.5104167	.5025156	0	1
Foreign Non-current Assets	<i>fncass</i>	96	0	0	0	0
Foreign Financial Debt	<i>ffindebt</i>	96	0	0	0	0
G/L of FX on Cash	<i>gloffx</i>	96	.006591	.0239335	-.1362242	.0956178
Foreign Sales Trend	<i>fsaletr</i>	96	1.437975	12.53891	-1	122.6999
Foreign Costs Trend	<i>fcosttr</i>	96	.0442467	.3913217	-.6104122	2.762904
Change Exchange Rate	<i>chexrate</i>	96	.0158311	.0447025	-.02524	.35855

Appendix Table 2. Descriptive Statistics: Winsorized Variables

VARIABLE	Obs	Mean	Std. Dev.	Min	Max
Foreign Costs Trend Winsorized	96	.0230844	.2422751	-.4000408	.7359596
Foreign Costs Trend	96	.0442467	.3913217	-.6104122	2.762904

Appendix Table 3. Regression (1), (2a) & (2b) Output, Real and Nominal values

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	chtotasspc	chtotasspreal	chtotasspc	chtotasspreal	chcurasspc	chcurasspreal
fcost	-1.314 (6.396)	0.466 (6.164)				
dollim	-0.399 (1.892)	-0.362 (1.824)				
gloffx	33.74 (37.12)	44.15 (35.78)				
chexrate	-45.11** (21.13)	-77.84*** (20.37)				
m12	9.233*** (3.111)	10.47*** (2.999)	5.908** (2.970)	5.534* (2.994)	5.124 (3.510)	4.776 (3.411)
fcosttrW			7.778** (3.406)	8.904** (3.433)	8.220** (4.025)	9.430** (3.911)
Constant	3.026 (3.103)	2.281 (2.991)	1.754** (0.844)	1.600* (0.851)	1.856* (0.998)	1.671* (0.969)
Observations	96	96	96	96	96	96
R-squared	0.109	0.194	0.107	0.116	0.076	0.091

Appendix Table 4. Pairwise Correlation: Regression (1)

VARIABLE	ΔTotal Assets	ΔTotal Assets Real	Foreign Costs	Dollar Limit	G/L of FX	ΔExchange Rate
ΔTotal Assets	1.0000					
ΔTotal Assets Real	0.9465	1.0000				
Foreign Costs	-0.0330	-0.0049	1.0000			
Dollar Limit	-0.0622	-0.0772	0.4582	1.0000		
G/L of FX	-0.0139	-0.0192	-0.0487	0.0035	1.0000	
ΔExchange Rate	-0.1276	-0.2770	0.0250	0.2017	0.3513	1.0000

Appendix Table 5. Pairwise Correlation: Regression (2) Winsorized

VARIABLE	ΔTotal Assets	ΔTotal Assets Real	ΔCurrent Assets	ΔCurrent Assets Real	Foreign Costs Trend
ΔTotal Assets	1.0000				
ΔTotal Assets Real	0.9465	1.0000			
Δ Current Assets	0.9217	0.8384	1.0000		
Δ Current Assets Real	0.9032	0.9191	0.9533	1.0000	
Foreign Costs Trend	0.2630	0.2898	0.2335	0.2676	1.0000

Appendix Table 6. Testing for Seasonality: Total Assets & Current Assets, Real and Nominal values

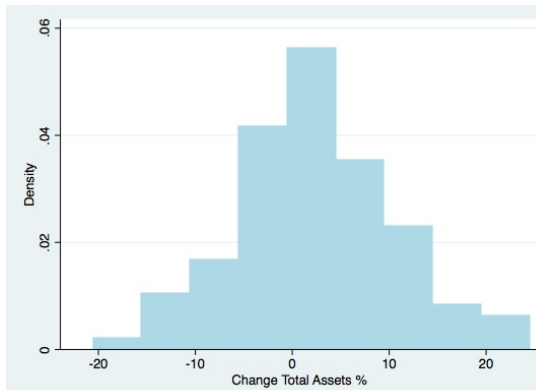
VARIABLES	(1) chtotasspc	(2) chtotasspreal	(3) chcurasspc	(4) chcurasspreal
m1	1.668 (2.976)	0.600 (3.030)	3.266 (3.494)	1.893 (3.429)
m2	0.164 (2.976)	0.471 (3.030)	0.208 (3.494)	0.518 (3.429)
m3	2.709 (2.976)	2.829 (3.030)	0.0257 (3.494)	0.112 (3.429)
m4	1.742 (2.976)	1.827 (3.030)	1.986 (3.494)	2.071 (3.429)
m5	-1.204 (2.976)	-1.184 (3.030)	-1.556 (3.494)	-1.535 (3.429)
m6	1.986 (2.976)	1.985 (3.030)	2.028 (3.494)	2.028 (3.429)
m7	0.520 (2.976)	0.479 (3.030)	0.751 (3.494)	0.711 (3.429)
m8	3.823 (2.976)	3.805 (3.030)	3.244 (3.494)	3.226 (3.429)
m9	3.006 (2.976)	3.019 (3.030)	3.055 (3.494)	3.066 (3.429)
m10	1.680 (2.976)	1.672 (3.030)	5.152 (3.494)	5.149 (3.429)
m11	4.056 (2.976)	3.075 (3.030)	3.169 (3.494)	2.184 (3.429)
m12	8.957*** (2.976)	8.617*** (3.030)	8.350** (3.494)	8.018** (3.429)
Observations	96	96	96	96
R-squared	0.160	0.142	0.126	0.117

Standard errors in parentheses

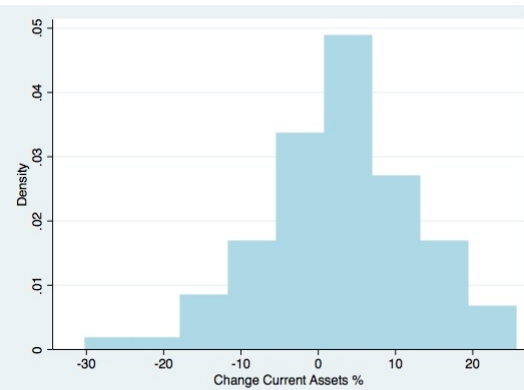
***** p<0.01, ** p<0.05, * p<0.1**

Appendix Table 7. Histograms for variables before Winsorizing

Change in Total Assets



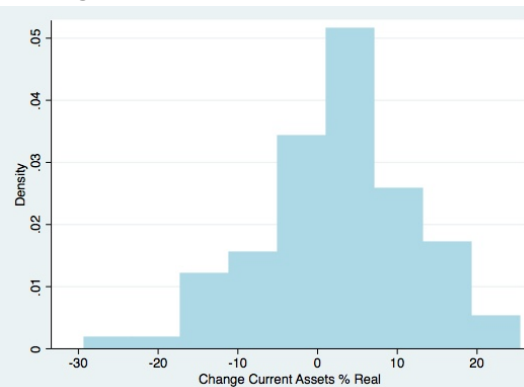
Change in Current Assets



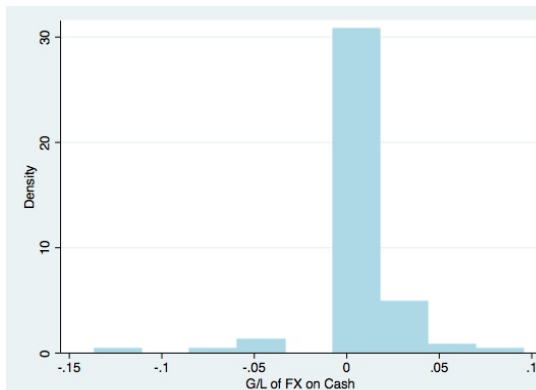
Change in Total AssetsReal



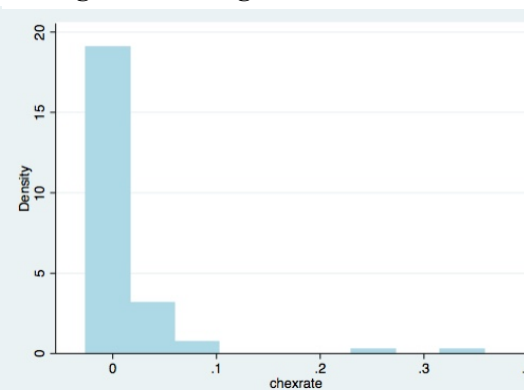
Change in Current Assets Real



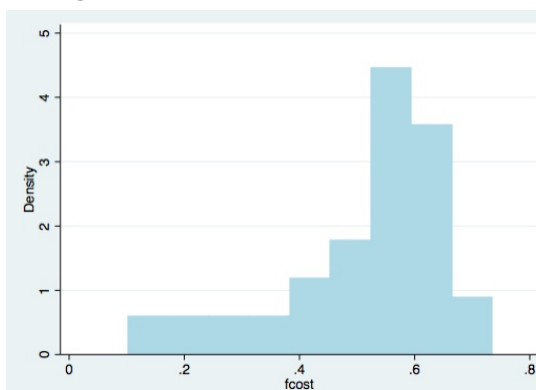
G/L of FX on Cash



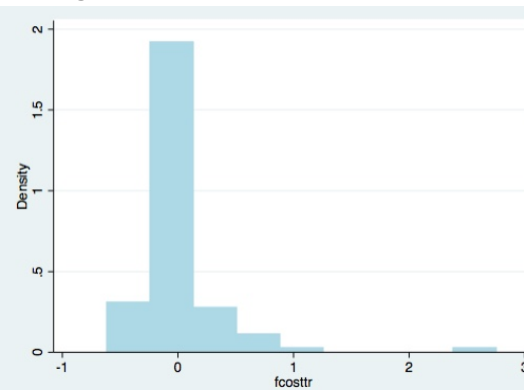
Change in Exchange Rate



Foreign Costs



Foreign Costs Trend



Appendix Table 8. Testing for Multicollinearity: VIF - Regression (1)

VARIABLE	VIF	1/VIF
dollim	1.33	0.751865
fcost	1.27	0.784556
chexrate	1.20	0.833252
gloffx	1.15	0.871045
Mean VIF	1.24	

Appendix Table 9. Testing for Heteroscedasticity: Breusch-pagan test Nominal Values

VARIABLE	Chi2	Prob > chi2
Regression (1)	0.22	0.6426
Regression (2a) Total Assets	0.00	0.9458
Regression (2b) Current Assets	0.17	0.6833

Appendix Table 10. Testing for Heteroscedasticity: Breusch-pagan test Real Values

VARIABLE	Chi2	Prob > chi2
Regression (1) Real	0.81	0.3683
Regression (2a) Total Assets Real	0.06	0.8114
Regression (2b) Current Assets Real	0.09	0.7663

Appendix Table 11. Ratio of Capital Flight to GDP

Period	Capital Flight (Millions of US\$)	GDP (Millions of US\$ PPP)	Ratio of Capital Flight to GDP (PPP)
2002	12879	384912	3.35%
2003	2826	427744	0.66%
2004	1414	478672	0.30%
2005	-659	539657	-0.12%
2006	2695	602826	0.45%
2007	8617	668163	1.29%
2008	20777	702219	2.96%
2009	11771	707905	1.66%
2010	8892	784280	1.13%
2011	25628	867601	2.95%
2012	662	890259	0.07%
2013	-2875	929594	-0.31%
2014	1317	948573	0.14%