

The Measurement of Currency Risk: Comparison of Two Turkish Firms in the Turkish Leather Industry

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Abstract

Due to the increase in globalization and international trade, there has emerged need for a stable monetary and financial structure in order to remove any kind of currency problems between the trading countries. Today, it has been known that firms are able to minimize the currency risks through risk management techniques. Firms will be able to become more successful in managing their existing risks when the risk management techniques become more strategic and also, when their risk management directors acquire more experience. Risk management has become a very significant topic in our country as well as in the world. It also has been considered as a necessity by firms. In this study, the currency risks between the two Turkish firms, Desa and Derimod, have been measured and commented upon through Value at Risk (VaR) method, which is calculated with the help of parametric, historical and Monte Carlo simulations.

Key words

Currency risk, Value at Risk, Monte Carlo simulation

1 Introduction

Today, changes in exchange rates can cause firms to be unable to pay their foreign exchange debts or to be unable to get paid for the assets on time and in full. It becomes imperative to predict the exchange rates at the time of the payment or the collection of the money in order to minimize the risks in such money transactions. In this study, the focal point is on defining those risks and minimizing the damages that arise from the currency risks.

Firstly, the studies on the currency risk management are analyzed. Then the currency risks between the two Turkish firms, Desa and Derimod, have been measured and commented upon through Value at Risk (VaR) method, which is calculated with the help of parametric, historical and Monte Carlo simulations. In the last part, there are some evaluations on the measured currency risks which are tried to be minimized through some suggestions.

2 Literature Survey

Duffy has made a thorough analysis of the evident dichotomies that arise from the changes in the exchange rates of firms. He analyzed the effect of devaluation on cash flows. He tried to explain the crux of the matter by retracing the existing financial procedures. He has made financial suggestion that could be put in practice. These suggestions are as follows:

The prediction and foresight about devaluation and revaluation are highly significant.

1. Working-capital management should be given more importance.

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2. The possibilities of devaluation and revaluation should be considered when making foreign investment.

3. Possible changes in exchange rates affect financial decisions directly for devaluation and revaluation change the cost of finding funds. [1]

In the studies before Adler and Dumas, currency risks have been analyzed through the point of view of the firm executives. The studies by Adler and Dumas analyze through the perspective of the stakeholders. They point out that risk can be calculated by a regression coefficient and can be directly put in practice. [2]

Ware and Winter, on the other hand, claim that even if currency risk can be hedged in forward markets, this may not be so when it comes to economical effect. In certain situations, when a firm has ex post production flexibility, it can protect itself from financial straits by a portfolio which depends on the currency unit. But in a more general way, if the question is the existence of more than one currency rate uncertainty, then financial risk cannot be hedged without detailed options which are more in number than the usual. [3]

In Lioui's article, which was published in 1998, the aim is to discuss the choice between forward contracts and futures contract to hedge the currency risk when the stochastic interest rates are in question. The two derivative products' hedging activities are compared to each other in the framework of both volatility minimization and risk return along with its tradeoff. The results are as follows: when compared within the volatility minimization, forward and futures contracts give identical results although their prices are not identical. When compared within the framework of risk return, it becomes apparent that the choice between the two contracts depends on the local and foreign structures and the correlation between their dynamics. [4]

Broll, in a time series model, analyzed the effects of currency risk on an international firm, under the hypothesis that there is no forward market on the foreign currency. However, there is a forward asset that its regression is possible. The direction of the regression on the spot and future prices gains importance when the effects of cross hedging are analyzed. In the studies it is shown that if the exporting firms and their future markets work neutrally they have the tendency to underhedge. Moreover, Broll indicates that separation property does not hold; for example, export production and financial decisions cannot be separated. [5]

Miller and Reuer, in their studies, analyzed the organization structure and the strategies of the firms in the face of currency and financial risks. The difference of this study is that they deal with different currency units rather than a single one. According to the results, 13 to 17 % of the firms in U.S have faced losses due to exchange rate movements. Cross sectional researches show that direct foreign investments minimize the damages of currency risk movements. [6]

Broll et al. presented us a model of a situation in which the competitive exporting firm faces the currency risk that stems from using many different currency units. The firm has no future markets in their local currency unit; however it has one between the two countries that it exports goods. In the article, it has been suggested that in situations like this it is advisable to use cross hedging and its applications. It is also shown in the study that cross hedging does not create non-random profits. Moreover, another result has shown that cross hedging affect on the export decisions but not on the amount of total production. [7]

In his study, Adam-Müller analyzed the export and hedging decisions of a firm which faces both a currency risk that can be hedged and an income risk that cannot be hedged. Separation property does not count because export is shaped according to preferences and expectations. Income uncertainty leads the firm to export less. The optimum exchange rate has three components:

1. Expected Income

2. Speculation
3. Income Uncertainty [8]

Adam-Müller analyzed in a different study the optimal hedging of the tradable risks in forward contracts in an untradeable environment. The starting requirements that the optimum forward positions were given in the tradable risk depend on the exposure rates. Nominally, an unbiased forward market generally uses a non-zero risk premium, which means that even if it is a small amount, there is a risk. The study shows that if the untradeable inflation risk is a monotonous function of tradable risk with market noise, cross hedging and speculation on real risk premium become contradictive; relatively the degree of risk aversion determines which component is dominant on the unbiased market. [9]

In a different study, Adam-Müller, in addition to his previous studies, analyzed the optimum production amount, export division and hedging decisions of a firm which exports to many different countries in different currencies and avoids risks. They are analyzed under two different scenarios. In the first scenario, there is a forward market for only one country. In this situation, export division is different from the firm's preferences and currency rate distribution. Contradictorily, total production amount is not separated from them. In the second scenario, there is a forward market for every currency unit. So it becomes possible to separate the total production amount and export division. Hedging changes according to the risk premium and currency rate distribution. If the tradable currency risk is the linear function of the combination of the untradeable currency risk and market noise then it creates a dilemma. A speculative position in a biased forward market can be hedged with a different currency unit in an unbiased forward market. [10]

Aabo in his article, which was published in 2001, analyzed the possibilities of the financial positions of the industrial firms which needed to have optimum hedging strategy. As a potential solution the stock exchange approach was analyzed. However, it was found as fundamentally faulty and statistically problematic. The results from the studies show that the reason for the volatility in real strategies is the competitive environments. Another result shows that some firms have not the systematic currency risk management skills yet. [11]

Dhanani tried to explain the currency risk management in United Kingdom. His focal point is the firms' risk management which is the combination of the three different risk management approaches. This focal point has three topics:

1. Long term financial hedging instruments
2. Operational settings based on real option theory
3. Denomination of the debt in term of currency unit

The firm application becomes a tool to minimize the losses that stem from cash flows. Generally speaking, the study suggests some important applications for the multi-national firms; most especially, it focuses on the operational setting and denomination of the debt in terms of currency unit. [12]

Hsu et al. showed in their previous studies that conventional regressive static approach is not suitable for risk management. They also suggested that there were many alternative dynamic risk protection strategies. In their study, the authors proved the efficiency of GARCH models with respect to other dynamic models in minimizing the variance of hedged portfolios. [13]

3 The Measurement of the Currency Risk

3.1 Value at Risk method (VaR)

There have been a lot of newly-emerging risk management methods due to the fact that risk has been an inevitable part of the financial markets. Value at Risk (VaR) method is one of those methods that emerged in the last 30 years or so. VaR is a well-used method, which is based on statistical structure, to measure the market risk. [14]

VaR is a method that measures the amount of the worst loss possible in the given time series in the nominal market conditions and at a certain reliability level. VaR method presents the users the measure of the market risk. It is the summary of the exposed risk in terms of currency unit. [15]

Although VaR is important for risk control, it has some disadvantages. It might be deceptive due to the calculations used; it might ignore the risks that result from extraordinary conditions and it takes a great deal of experience to use. The results of VaR do not mean anything by themselves, only when they are read within the context of a risk management they become meaningful and useful. [14]

The parameters of a VaR model are the confidence level and holding period. The confidence level measures the confidence level of a risk and the holding period measures the number of days that the exposed risk will stay for. In addition to those, the VaR components are portfolio positions, risk factors and used VaR methods.

3.2 (VaR) Measurement methods

There are many methods to measure the currency risk and every method has its disadvantages and advantages. In this study, it has been mentioned about three methods: parametric VaR, Historical VaR and Monte Carlo VaR.

3.2.1 Parametric VaR

In this method, the behavior of the future risk factors is measured using volatility and the correlation of the previous data. Assumed volatility and correlations are used to calculate the possible changes in a position. The formula used in parametric VaR is as follows:

$$RMD = PV \times \alpha \times \sigma \times \sqrt{t}$$

PV = Present value

σ = Income volatility

α = Confidence level

t = Holding period

3.2.2 Monte Carlo VaR

Monte Carlo is a VaR model that gives accurate estimation on the complex portfolios that include gamma and convexity. If the gamma portfolio value is secondary sensitiveness convexity, then parallel deviation is also secondary sensitiveness in the portfolio's yield curve. [16]

In this model, Monte Carlo Simulation should be applied in order to form a histogram that will show the profits and the losses. This method avoids the model risk that so many other methods do have, however it takes time and effort to use.

3.2.3 Historical VaR

Historical simulation method is an absolute valuation method. Historical VaR is the simplified version of the Monte Carlo simulation. It creates scenarios from historical market data. It makes a portfolio evaluation based on the historical changes of the risk factors.

4 A Comparison of the Foreign Exchange Positions and Currency Risks Between the Firms Derimod and Desa

In this part of the study, where we will reflect the results of the study, the currency risks of that stem from foreign exchange positions of Derimod and Desa have been measured. These measurements have taken by using parametric, historical and Monte Carlo simulation VaR. The results are as follows:

	Present value	Parametric VaR		Historical VaR		Monte Carlo VaR	
		VaR	VaR/PV(%)	VaR	VaR/PV	VaR	VaR/PV
Derimod 2007	-6.294.025	136.307	2,11	200.959	3,19	145.240	2,31
Desa 2007	3.550.563	88.357	2,49	84.438	2,38	84,436	2,38
Derimod 2008	-12.283.978	459.815	3,74	508.886	4,14	439.336	3,58
Desa 2008	3.236.886	150.112	4,64	136.670	4,22	149,841	4,63

Table 1: Derimod and Desa VaR Comparisons

When we look at the foreign exchange positions of the firms, we can see that in terms of Turkish Lira, Desa is positive and Derimod is negative. In other words, Derimod has foreign exchange debts and Desa is the creditor.

When we analyze the VaR values, we can see that both firms became risky in the year 2008. But both firms are doing well in terms of VaR and PV (present value) according to Basel II criteria because that value is measured as below 8 %.

Desa's foreign exchange position is rather risky when compared to Derimod. The ratio of Desa's VaR to its portfolio size is more than Derimod's. This means that it carries more risk in comparison to its portfolio.

Derimod, on the other hand, can lose a great amount because its portfolio size is bigger. Its VaR/PV is relatively low in comparison to Desa, however Derimod's possible amount of loss is much more than Desa.

5 Evaluation and Conclusion

The recent economic crisis shows us once more the importance of risk management for firms. Within this context, banks, intermediary firms, real economy firms – in short, everyone and every institution in the financial markets are exposed to such risks. Especially the international trade firms are exposed to risk not only in their country but worldwide. For such firms, one of the most important risks is the currency risk. For this reason, this study tried to explain the ways in which the firms can protect themselves from these risks and how they can solve the damage caused by them. In the application part of the study, the two real economy firms that exports and imports are taken as an example. Their currency risks have been measured. The data has been gathered from Istanbul Stock Exchange (ISE). According to the reached results, Derimod's 2007 parametric, historical and Monte Carlo VaR are respectively, 136.307 TL, 200.959 TL, 145.240 TL and 2.867.266 TL and in 2008 they are measured as 459.815 TL, 508.886 TL, 439.336 TL and 5.542.559 TL. Desa's parametric, historical and Monte Carlo VaR are in 2007, respectively, 88.357 TL, 84.438 TL, 84,436 TL and 1.525.628 TL; in 2008, they are 150.112 TL, 136.670 TL, 149.841 TL and 383.232 TL. The confidence level in all these measurements is 99 %. It can be observed that the currency risks of the two firms have increased. This stems from the increase in currency volatility back in 2008. The firms can minimize the currency risk losses according to their expectations.

The firms can be more successful in risk management by making the risk management more strategic and their employees more experienced. Risk management has become an important part of the financial markets in our country as well as in the world. It has been seen as a necessity by the firms in Turkey. This will lead to the formation of firms that are skilled and competent and eventually they will become more successful.

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Summary

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