

Exchange Rate Exposure on Indonesian Firms Listed in Indonesian Stock Exchange (Study on Indonesian Super USD Phenomenon)

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Abstract

This research aims to investigate whether the exchange rate exposure of Indonesian firms are significant within the issue of Super USD phenomenon occurring in 2015. The exposure measured using symmetric and asymmetric models to analyze daily data of Indonesian firms from May 2015 to September 2016 in sectoral and individual levels. The firms selected from mining, agriculture, consumer industry, and basic industry sectors. The result of this research shows that the issue does not significantly affect Indonesian firms, in general. It is only small percentage of Indonesian firms affected and only the mining sector constantly comes with significant result of the exposure specifically with symmetric exposure. The results also shows that Indonesian firms have more possibility to be exposed asymmetrically but it is not significant. The exposure results are positive in average as the significant increases did not occur and the firms are stimulated with the good condition of Indonesian economic.

Keyword: *exchange rate exposure, sectoral and individual levels, Super USD.*

1. Introduction

The strong correlation between exchange rate movements and firm value are predicted in multinational companies or international firms, but recent studies such as (Jorion, 1990; Bodnar & Gentry, 1993; Dominguez & Tesar, 2001; Chiang

& Lin, 2008; and Lestano, 2015) found that the strong relationship is hard to be found even using other countries or models. The information of relationship between exchange rate movements with firm value is quite important for some parties, the investors will use this

information to hedge their portfolio or for managers to make the correct decisions.

Some researchers try to combine the exchange rate exposure measurement with other studies in order to find a better estimation of exchange rate exposure. The first model developed by Adler & Dumas, (1984) used to measure the total exposure of exchange rate to firm value. After several researches had a difficulty to find the significance, Jorion, (1990) adding return market portfolio as a control variable to remove other macroeconomic factors, the results are better in estimation.

Other researchers such as Brooks et. al., (2010) and Bodnar & Marston, (2002) are also developed new models such as time varying exposure and cash flow model. The time varying exposure is still hard to find the significance and the cash flow model are only applicable for firms with complete data of foreign revenue and expenses.

After several new models in estimating exchange rate exposure, Koutmos & Martin, (2003) discover that there are asymmetric responses and creating asymmetric model, this model creates the exposure are varies among countries, Oh & Lee, (2004) and Chiang & Lin, (2008) show that Koreans and Taiwanese firms are exposed asymmetrically but Solakoglu & Demir, (2009) and Brooks et. al., (2010) finds that Turkey and Australian firms are

not significantly exposed with the asymmetric. However, this model also had difficulties to find significance.

The difficulties in finding the firm's exposure creating a possibility that there are some weaknesses of the measurement or there is a puzzle in this study, but some studies such as Glaum et. al., (2000) and Baur & Miyakawa, (2014) successfully finds significant result of the exposure. The significant results are rarely to be found and the searching of the missing puzzle in this study performed by Bartram & Bodnar, (2007), they show that there is no puzzle found to explain the differences result in exchange rate exposure studies; they argued that the different results are determined by the endogeneity of operative and financial hedging in the firm level. However, the exchange rate exposure studies are still interestingly to be performed as there are some differences results among various countries and rates.

The recent world economic condition are unstable as there are some world issues such as the increasing of terrorism activities in developed countries or the increasing tensions between USA and Russia. The World Bank also predicts that the world economic development will decrease. This issues are causing developing countries are affected with the decreasing of developed countries. In example is Indonesia which have

dependencies to developed countries, the recent issues of world crisis urge the governor of central bank of Indonesia in August 2015 to announce that Indonesia have to aware of the significant increases of USD exchange rate or known as Super USD for 2 years in the future.

The significant increases of exchange rate could affect firms significantly, Glaum et. al., (2000) and Lestano, (2015) found that within the significant increases of exchange rate would result in significant exposure to the firms but it found in the crisis before 2000. Lestano, (2015) finds that at the significant increases in 2008 the Indonesian firms are not significantly affected with the exchange rate movements.

Within the issue of significant increases of exchange rate the market will respond to this issue and probably will not only affect the foreign exchange market but also the capital market. Therefore, the significant result of exposure on Indonesian firms is possible to be significant with this issue.

The rest of the paper is organized as follows. Section 2 will explain some literature related with exchange rate exposure and will presents hypotheses. Section 3 describes samples and data. Section 4 show the methodology and discusses the exchange rate exposure

results and the last section will conclude this paper.

2. Literature Review

According to Adler & Dumas, (1984) and Eiteman et. al., (2010), the definition of exchange rate exposure could be defined as the firm's risk in facing the exchange rate problem and possibility of affecting the firm profitability, net cash flow, or market value. There are some types of exchange rate exposure, they are transaction exposure, translation exposure, and economic exposure. Both of the transaction and translation exposure only slightly affect the firms but the major of the exposure is in economic exposure.

Jayasinghe & Premaratne, (2004) shows that firms are attempt to exploit opportunities and avoid adverse exchange rate risks, their study result in some responses of exchange rate exposure.

2.1. Responses of exchange rate exposure

As Koutmos & Martin, (2003) discovered the responses of exchange rate exposure. The responses on the firms could be different one with the others as the different firm's behavior. Not only by their behavior but every country also have their own characteristics, it will also determine firms in a country which exposure are they more exposed.

There are two responses of exchange rate exposure, symmetric and asymmetric. Previously the symmetric exposure was

the common assumption of previous researches that the firms behave similarly and happened when the firms are passively in international activities such as import or export. However, there are also some behaviors that could affect the firm's exposure. The asymmetric exposure is the exposure for firms with different behaviors, the firms are mostly active in export and import. Koutmos & Martin, (2003) conclude that the behaviors that possible to affect the exposure are Price-To-Market, hysteresis, and asymmetric hedging.

The concept of pricing-to-market (PTM) defined by Krugman, (1987) was one thing that known affects the exposure of firm value as market share objectives would induce greater PTM during domestic currency appreciations (Knetter, 1994). PTM involves in adjusting the export prices based on the degree of competition in foreign markets. It indicates the phenomenon of foreign firms maintaining or even increasing their export price when the currency of the importer country rises. It can also be interpreted as export firms set price of trading goods in local currency instead of adjusting the price according to the exchange rate.

In the economics science the word hysteresis arises when a single disturbance affects the course of the economy. It pertains to effects that persist after the

original causes of the effects no longer exist, hysteresis in International trade first discovered by Baldwin, (1988). Logically, some new export competitors are enticed to enter the market when the domestic currency depreciates, which means that the behavior of exporters may be considers hysteretic if they remain in the market once the currency appreciated. Mostly hysteresis drives firms to maintain high sunk cost investments, such as entry costs, when the domestic currency appreciates (Ljungqvist, 1994).

Hedging performed in order to protect the firm value against the exchange rate uncertainty and this activity obviously affecting how much the firm had the exposure. The hedging activities assume symmetric response but as there is one-sided hedging such as currency option, there is an asymmetric response to exchange rate movements. This asymmetric instrument used to provide downside protection with the opportunity of upside potential. Firms with net short positions such as net importers may be inclined to hedge against domestic currency depreciation; it also happen with the net long positions, which result in inclined to hedge against the domestic currency appreciations (Ware & Winter, 1988).

2.2. Indonesian Super USD

Some developing countries had severe from the significant increases of USD exchange rate as the countries have dependencies to US. The increases number of countries using USD or usually called as dollarization also resulted in increasing the power of USD. Dollarization according to Fourcans & Franck, (2003) is a monetary arrangement in which a country abandons its domestic currency and replaces it by the currency of a foreign country then serves as the legal tender. The USD itself almost is used in every economic data as the denomination, it is the most accepted currency in the exchange rate market, and its extreme appreciation was monitored by developing countries as an alert.

In the extreme or significant increasing value of USD in Indonesia, it is called as Super USD by the Indonesian mass media. In example a headline news in Detik, (2015) "Super USD phenomenon is an impact of the increasing of The Fed interest rates and the recovery of United States. The use of word Super means something that unusual and refer to huge significant. The term of Super USD means a significant increase of USD to IDR exchange rate.

2.3. Hypotheses

Indonesia in the world perspective known as cheap labor country, has a high

consumption as the high number of population, and Indonesian firms mostly use USD as their international transactions currency. Those reasons are attracting International firms to open their business in Indonesia or use Indonesia for production in distribution of their products in Asia. International firms are operating their business in Indonesia via local firms as the regulation from the government, however it increase the export and import activity of Indonesian firms. Actively in exporting and importing activities increases the possibility of the firms to be affected by the exchange rate especially within the issue of significant increase exchange rate.

H₁: Exchange rate movement affects Indonesian firm value within the issue of Super USD.

In Indonesia, Lestano, (2015) found that Indonesian firm value exposed with the exchange rate movements asymmetrically on the Indonesian crisis on 1998, but even with the condition nowadays, the similar result is highly possible that the firm value affected by the exchange rate movements asymmetrically. This result predicted as the Indonesian firms already enhanced after experiencing several significant increases of exchange rate and the management will try to avoid the exchange rate risks with several strategies.

H2: Exchange rate movement affects Indonesian firms asymmetrically.

3. Sample & Data Description

The population is Indonesian firms listed in Indonesian Stock Exchange (IDX) and this paper will use daily data in sectoral and individual levels to test whether the exposure is significant. Samples selected from 4 sectors, the sectors selected according to Indonesian export data and previous researches. The sectors selected are Agriculture, Mining, Consumer Industry, and Basic Industry sectors and in total there are 145 firms taken. The periods covered from May 2015 or three months before the announcement of Super USD until the latest data September 2016.

The data used to estimate the exchange rate exposure are stock returns (R_{it}), market portfolio return (R_{mt}), and exchange rate changes (R_{st}). The stock return data acquired from Yahoo finance and the market portfolio are using value-weighted of JKSE or the composite index of Indonesian firms, and the exchange rate used between USD to IDR. This rate also preferred as Indonesia have dependencies to USD, economic reports are denominated in USD, and most international transactions using this rate, and to test the effects of the Super USD issue.

Table 1 in the following page presents the summary of statistical tests of market portfolio return (R_{mt}) and exchange rate changes (R_{st}). It presents descriptive statistics, normality test using Jarque Bera test, and unit root test using Augmented Dickey Fuller test. The results of those statistics shows that the normality test is failed to pass, but as the data are quite large the normality test is not quite important. The unit root test is used in time series data showing both variables doesn't have unit root.

Table 1. Statistics summary of daily data on market portfolio return (R_{mt}) and exchange rate return (R_{st})

	R_{mt}	R_{st}
Observations	333	333
Mean	0.0002	-0.0001
Median	0.0010	-0.0004
Maximum	0.0455	0.0282
Minimum	-0.0397	-0.0216
Std. Dev.	0.0106	0.0069
Skewness	-0.08	0.02
Kurtosis	4.84	3.79
Jarque-Bera	47.34	8.76
ADF test	-17.170***	-18.606***

Notes: *, **, and *** indicates the ADF test is statistically significant under 0.1, 0.05, and 0.01, respectively.

4. Methodologies, Results, & Discussions

In estimating the exchange rate exposure of sectoral and individual levels

the author uses the symmetric model and asymmetric model in 4 sectors and 145 firms.

4.1. Exchange rate exposure in symmetric model

The measurement in symmetric model are using the traditional measurement model by Adler & Dumas, (1984) and modified by adding return on market portfolio as control variable as in Jorion, (1990). The time series regressions used for each sectors and firms with standard errors corrected from Newey-West method. The equation is shown below.

$$R_{it} = \beta_0 + \beta_1 R_{mt} + \beta_2 R_{st} + \varepsilon_{it}$$

R_{it} is the stock return for i firms or i sectors in period t ; R_{mt} is the return on market portfolio in period t ; R_{st} is the exchange rate return in period t ; ε_{it} is the error term in period t ; β_0 , β_1 , and β_2 are the regression coefficients, the exchange rate exposure will be determined by the value of regression coefficients of exchange rate return or β_2 .

From the regressions of 4 sectors and 145 firms, there are two sectors had significant exposure and 25 firms have significant exposure, the result of the estimated exchange rate exposure using symmetric model shown below.

Table 2. Summary of exchange rate exposure results using symmetric models in sectors and firm levels

	Coeff.	Sign	Sig. Firms	Total
Agriculture	0.24*	+	2	2
		-	0	
Mining	0.35*	+	11	12
		-	1	
Consumer Ind.	-0.65	+	2	3
		-	1	
Basic Ind.	0.01	+	7	8
		-	1	

Notes: * indicates that the sector have significant results under 0.1.

4.2. Exchange rate exposure in asymmetric model

In estimating the asymmetric exposure, the asymmetric model developed by Koutmos & Martin, (2003) was used, and the equation will be shown below.

$$R_{it} = \beta_0 + \beta_1 R_{mt} + \beta_2 R_{st} + \beta_3 D_{it} R_{st} + \varepsilon_{it}$$

$$D_{it} = \begin{cases} 1 & \text{if } R_{st} \leq 0 \\ 0 & \text{if } R_{st} > 0 \end{cases}$$

The asymmetric model is similar with the symmetric model but the asymmetric adding a variable that only exists when the exchange rate return or $R_{st} \leq 0$. This variable added to estimate the asymmetric exposure which will be explained using nine possible combinations of exchange rate exposure used by Koutmos & Martin, (2003). The table of possible combinations is shown below.

Table 3. Possible combinations of exchange rate exposure

	$\beta_2 > 0$	$\beta_2 = 0$	$\beta_2 < 0$
$\beta_3 > 0$	PTM with MSO or hysteresis (I)	PTM with MSO or hysteresis (II)	PTM with MSO (III)

$\beta_3=0$	Symmetric exposures (IV)	No exposure (V)	Symmetric exposure (VI)
$\beta_3<0$	Asymmetric hedging or PTM with VC (VII)	Asymmetric hedging or PTM with VC (VIII)	Asymmetric hedging (IX)

Notes: Pricing-to-market (PTM), Market Share Objective (MSO), and Volume Constraints (VC)

From the regression results in determining the exchange rate exposure with asymmetric model, there is only 1 sector which has significant result and 20 firms with significant result. The sector with significant result only with the symmetric exposure and most of the firms with significant results only spread in the column III or VII. The results with asymmetric exposure will be provided in the table below.

Table 4. Summary of exchange rate exposure results with asymmetric model explained using table 3

	$\beta_2>0$	$\beta_2=0$	$\beta_2<0$
$\beta_3>0$	I (11 firms)	II Agriculture sector (8 firms)	III Consumer Ind. Sector (41 firms)
$\beta_3=0$	IV (10 firms)	V (8 firms)	VI (2 firms)
$\beta_3<0$	VII Mining and Basic Ind. Sectors (57 firms)	VIII (4 firms)	IX (4 firms)

Notes: The number of firms is in total of firms with all sectors

4.3. Discussions

From the empirical results explained above, it can be seen that within Super USD phenomenon only 17.2% Indonesian

firms that really affected. This number is coming from the Mining sector which actively in the exporting activity and it indicates that this sector is taking benefit from the issue of depreciating IDR.

The issue of Super USD not increasing the possibilities of exposure with significant results, and there is also no real significant increases that create the trend of the exchange rate movements, even some of significant increase occur but the rate is returning to normal. The issue of Super Dollar and the warning from the Indonesian central bank governor does not really happened.

Mining and Agriculture sectors are the sectors with high dependencies with the exchange rate, those sectors have a high number of exporting sales, the movements of exchange rate affects their sectors. This information is interpreted as one significant factor that determined the firm value by the investors. With the increase of USD exchange rate means that the number of the export sales are increasing with this sectors, and it is interpret as positive signal by the investor.

Different results in basic and consumer industry sectors, the information of exchange rate changes is not affecting firm value as this sectors focus are mainly in national scale. The movement of exchange rate is not one of the factors that could affect this sectors performance, this sector

is probably more affected by the domestic condition. Some firms in these sectors are importers, means that it has dependencies to the exchange rate and some firms will be affected by its movement, but the number of importing firms is not large so it does not affect the average of these sectors.

The market does not over react with the issue of Super USD, this condition makes the Indonesian firms insignificantly exposed to the exchange rate movement. The insignificant results might be the possible justification on the performance of Indonesian economic condition which is quite stable and shows a good economic growth in the middle of Super USD issue. This also means that the Indonesia does not face any difficulties domestically and all of the Indonesian firms have a good performance in supporting Indonesian economy.

There are some policies applied in 2015 which support and increasing the economy of Indonesia. In example the economic policies package from the government such as deregulation of business activities regulation to increase its activities, reducing the subsidy for the oil prices in the state budget, and increasing the infrastructure development activities to maximize state budget and stimulate business. Indonesian sunset policy that implemented in 2016 is also quite

successful and it increased the trust of the market to the Indonesian government.

In the sector level result with asymmetric model, Mining have significant with the symmetric exposure, this result caused by tight regulations implemented by the government in this sector such as the limitation of mineral exported, etc. This sector cannot behave creatively with the exchange rate movements. Mining and Basic Industry sectors are probable in doing asymmetric hedging or price to market strategy with volume constraints. However, the conditions of the global market in mining products makes the firms implement volume constraint on their products.

Consumer Industry sector comes with the possibility of price to market with market share objective, this result caused by the high demands from the domestic itself. As this sector firms are mainly focus in the domestic activities, they will not export their products unless the exported products have greater profit for them. So their main market share objective is in the domestic, but when export generates greater profit for them, they will probably export their products. Similarly, Agriculture sector also have the possibility to implement price to market with market share objective or there is a hysteresis effects. The sector prominent exported products CPO. It is almost needed by

every country, as it is daily products. But, when the local rate weakens this sector will allocate their products to other countries which are profitable for them.

With the issue of Super USD, there is no significant exposure of the asymmetric exposure, and with the symmetric exposure only mining sector have significant result. The consumer and basic industry sectors also showing the result of insignificant in asymmetric exposure, different with the previous predictions in the results of Koutmos & Martin, (2003) study on the US firms, those sectors in US mostly have International operation and it is different with Indonesia which mainly focus on domestic.

The asymmetric exposure is not significant in the Indonesian firms even some sectors probably having asymmetric exposure. The significant result is only from the Mining sector. It is reasonable as this sector is quite affected with the exchange rate movements. In summary, there is no significant exposure found in the Indonesian firms and the exposure in positive.

Comparing with the results in the symmetric exposure, the significant exposure found with the asymmetric is lower than the symmetric model and not as predicted in Taiwanese firms in the study of Chiang & Lin, (2008). Indonesian firms are more likely Turkey firms showed by

Solakoglu & Demir, (2009). This result is probably because some of the Indonesian firms other than mining sector are passively in exporting and importing activities or regulation from the government in controlling the exporting activity by controlling the firms to behave creatively and creating similar behavior among firms.

5. Conclusion

The issue of Super USD phenomenon started in the middle of 2015 is a result of going concern in the global market with the recent issues of terrorism and global crises issues. However, the exchange rate data gathered shows even the rate is unstable there are no significant trend of Indonesian exchange rate. The stable economic and a good growth make Indonesian economic survived under this issue. This conditions result in less significant exposure found in the Indonesian firms.

During the issue of Super USD, only 17.2% of firms come with significant result or 25 firms from 145 having significant exposure. We can say that in average, Indonesian firm value not affected with the exchange rate movements. The exchange rate exposure found constantly significant in the Mining sector, but the significant result is only from the symmetric exposure. The other sectors such as Agriculture, Consumer

Industry, and Basic Industry sectors are not significantly exposed.

Most of Indonesian firms are probably perform Asymmetric Hedging and Price to Market with volume constraints or market share objective although it is insignificant as the Super USD effect does not occur. Indonesian firms more likely exposed with

the symmetric exposure than the asymmetric exposure in this era, this condition shows that Indonesian firms are probably exposed with the asymmetric exposure but their behavior doesn't have significant effect to the exposure on their firm value.

References

- Adler, M. & Dumas, B., 1984. Exposure to currency risk: Definition and Measurement. *Financial Management*, 13, pp.41-50.
- Baldwin, R., 1988. Hysteresis on Import Prices: The Beachhead Effect. *American Economic Review*, 78, pp.773-85.
- Bartram, S.M. & Bodnar, G.M., 2007. The Exchange Rate Exposure Puzzle. *Managerial Finance*, 3(9), pp.642-66.
- Baur, D.G. & Miyakawa, I., 2014. No puzzle: The foreign exchange exposure of Australian firms. *International Review of Financial Analysis*, 32, pp.13-22.
- Bodnar, G.M. & Gentry, W.M., 1993. Exchange Rate Exposure: An Industry Characteristics: Evidence from Canada, Japan, and USA. *Journal of International Money and Finance*, 12, pp.29-45.
- Bodnar, G.M. & Marston, R.C., 2002. Exchange Rate Exposure: A Simple Model. *Global Risk Management: Financial, Operational, and Insurance Strategies*, pp.107-15.
- Brooks, R.D. et al., 2010. Asymmetry And Time Variation in Exchange Rate Exposure: An Investigation of Australian Stock Returns. *International Journal of Commerce and Management*, 20(4), pp.276-92.
- Chiang, Y.-C. & Lin, Y.-C., 2008. Exchange rate exposures of Taiwanese firms. *Investment Management and Financial Innovations, Volume 5, Issue 4*, pp.183-84.
- Detik, 2015. *Waspada Fenomena Super Dollar AS*. [Online] Available at: <http://finance.detik.com/read/2015/05/11/080858/2911286/6/waspada-fenomena-super-dolar-as> [Accessed 20 June 2015].
- Dominguez, K.M.H. & Tesar, L.L., 2001. Trade and Exposure. *American Economic Review*, 91(2), pp.396-400.
- Eiteman, D.K., Stonehill, A.I. & Moffett, M.H., 2010. *Multinational Business Finance*. Boston: Prentice Hall. p.282.
- Fourcans, A. & Franck, R., 2003. *Currency Crises: A Theoretical and Empirical Perspective*. Cheltenham: Edward Elgar Publishing.

- Glaum, M., Brunner, M. & Himmel, H., 2000. The DAX and the Dollar: The Economic Exchange Rate Exposure of German Corporations. *Journal of International Business Studies*, 31(4), pp.715-24.
- Jayasinghe, P. & Premaratne, G., 2004. Multiple Asymmetries and Exchange Rate Exposure Management. *Working Paper*.
- Knetter, M.M., 1994. Is Export Price Adjustment Asymmetric?: Evaluating Market Share and Marketing Bottleneck Hypotheses. *Journal of International Money and Finance*, 13, pp.55-70.
- Koutmos, G. & Martin, A.D., 2003. Asymmetric Exchange Rate Exposure: Theory and Evidence. *Journal of International Money and Finance*, 22, pp.365-83.
- Krugman, P.R., 1987. Pricing to Market when Exchange Rate Changes. *Real Financial Linkages among Open Economies*.
- Lestano, 2015. Asymmetric Exchange Rate Exposure in Indonesian Industry Sectors. *Munich Personal RePec Archive*.
- Ljungqvist, L., 1994. Hysteresis in International Trade: A General Equilibrium analysis. *Journal of International Money and Finance*, 13, pp.387-99.
- Oh, S. & Lee, H., 2004. Foreign Exchange Exposures and Asymmetries of Exchange Rate: Korean Economy is Highly Vulnerable to Exchange Rate Variations. *Journal of Financial Management & Analysis*, 17(1), pp.18-21.
- Solakoglu, M.N. & Demir, N., 2009. Exchange-Rate Exposure and the Financial Sector. p.39.
- Ware, R. & Winter, R., 1988. Forward Markets, Currency Options, and The Hedging of Foreign Echange Risks. *Journal of International Economics*, 25, pp.291-302.