

Josipa Mrša

University of Rijeka, Faculty of Economics, Rijeka, Croatia

Davor Mance

Ministry of Environmental Protection, Physical Planning and Construction, Rijeka, Croatia

Dara Ljubić

University of Mostar, Faculty of Economics, Mostar, Bosnia and Herzegovina

TRANSACTION EXPOSURE HEDGING INSTRUMENTS AND THEIR ACCOUNTING IN THE CROATIAN SHIPBUILDING INDUSTRY*

Key words: currency risk; transaction, translation, and economic exposure; hedging accounting; exposure netting; exposure avoidance; natural hedging

ABSTRACT

The Paper deals with the transaction exposure of the Croatian shipbuilding which has the highest currency risks, the highest currency exposures, and the highest losses incurred by such exposures among all Croatian industries. The losses are mostly due to the non-existent hedging practice of the shipyards against. The paper identifies the currency exposures and enumerates various possible management tools. The exposure avoidance is explained through derivative and non-derivative instruments. Financial derivatives markets do not exist in Croatia. The introduction of hedging instruments in the Croatian economy isn't the only problem; it is also an accounting challenge due to the rather straightforward recognition, measurement, and reporting techniques resulting out of the International Accounting Standards (IAS). The paper explains the implementation of the IAS on the financial instruments used. The proposed solutions include the non-hedging techniques; financial derivatives such as forwards, futures, options, swaps and other; or natural hedges with non-derivative financial instruments as for example offsetting borrowing/lending agreements in the settlement currency. The non-hedging techniques needn't be a second best option. The most advanced financial derivatives may indeed be more expensive than the natural hedging alternatives based on non-derivative financial instruments.

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1. INTRODUCTION

The paper draws on some 30 years of work on the subject of foreign exchange risk, exposure and hedging, starting with Shapiro¹, Adler and Dumas² contribution on the influence of the foreign exchange risk on the firm's value. The valuation of the financial derivative instruments is possible thanks to the valuation techniques pioneered by Merton³, Black and Scholes⁴, as well as their implementation on the foreign exchange markets done by Garman and Kohlhagen⁵. Finally, the work on hedging strategies developed by Babbel⁶, and improved by Smith and Stulz⁷, and numerous other authors, still continues.

Financial derivatives markets do not exist in Croatia and the introduction of hedging instruments in the Croatian economy has been rather slow. How is it possible that in a small open economy (SMOPEC) still not member of the Economic and Monetary Union (EMU) but with high currency exposures, a financial derivative market has still not been developed? It may be argued, that a financial derivatives market would have been created if there was a need for one. The currency risk (or foreign exchange risk) can adversely affect the cash flows and the value of a firm, so it must concern its shareholders, market analysts and portfolio managers, and most importantly the firm's management.

Firstly, non-hedging techniques, such as to agree and settle the accounts receivable and payable in the domestic currency should be used whenever possible. Secondly, financial derivative hedges such as forwards, futures, options, swaps and other were simulated to prove their efficiency. Lastly, natural hedges with non-derivative financial instruments as for example simultaneously import/export and offsetting borrowing/lending agreements in the settlement currency are simulated and compared to the financial derivative hedges. In the case of the shipyards, the positive currency exposure arising from the ship exporting activity is offset by a borrowing agreement in the same currency and maturity as the ship delivery agreement.

There is also an accounting challenge due to the rather straightforward recognition, measurement, and reporting techniques resulting out of the International Accounting Standards.

¹ Shapiro, A. C. (1975), Exchange rate changes, inflation and the value of multinational corporations, *Journal of Finance*, Vol. 30, 485–502.

² Adler, M. and Dumas, B., (1984), Exposure to currency risk: Definition and Measurement, *Financial Management*, Vol. 13, Issue 2 (Summer), 41–50.

³ Merton, R. C. (1973), Theory of Rational Option Pricing, *Bell Journal of Economics and Management Science*, Vol. 4 (Spring), 141-183.

⁴ Black, F. and Scholes M. (1973), The pricing of Options and Corporate Liabilities, *Journal of Political Economy*, Vol. 81 (May-June), 637-659.

⁵ Garman, M. B and Kohlhagen, S. W. (1983), Foreign Currency Option Values, *Journal of International Money and Finance*, Vol. 2 (December), 231-237.

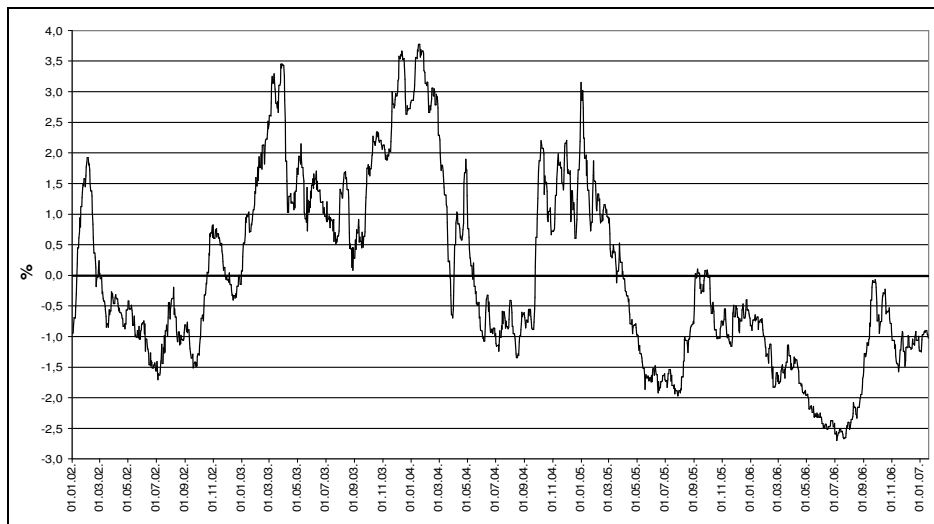
⁶ Babbel, D. F. (1983), Determining the Optimum Strategy for Hedging Currency Exposure, *Journal of International Business Studies*, Vol. 14 (Spring-Summer), 133-139.

⁷ Smith, S. W. and Stulz, R. M., (1985), *The Determinants of Firms' Hedging Policies*, *Journal of Financial and Quantitative Analysis*, Vol. 20, 391–405.

2. FOREIGN EXCHANGE RISK AND EXPOSURE

Although from a macroeconomic point of view the exchange rates are an important stabilising factor, they are also a source of risk and instability for a single firm. The exchange rate changes can have a significant impact on a firm's value regardless of whether the firm is domestically or internationally oriented.⁸ In the latter case this is only exacerbated in a more direct way. To illustrate the level of impact exchange rate changes had in the past, a volatility based on a relative standard deviation time series (in %) of the HRK/EUR exchange rate has been constructed around its 5 year mean value.

Figure 1 Volatility of the HRK/EUR exchange rate



Data source: Croatian National Bank (HNB)

The EUR has been chosen as a model currency because it remains the leading export currency of the Croatian economy, but more importantly, it has also been chosen as the currency in which the transactions are being denominated by several Croatian shipyards. In the accounting sense, the EUR is the main transaction denominating currency of the leading Croatian shipyards but the HRK remains the functional and the reporting currency. After several USD devaluations in respect to EUR and HRK which led to substantial losses by the shipyards due to their open positions in USD the shipyards decided to invoice exclusively in EUR. Nevertheless, although a move toward a EUR as a transaction denominating currency leads to less transaction

⁸ Shapiro, A.C., (1975), *Exchange rate changes, inflation and the value of multinational corporations*, Journal of Finance, Vol. 30, 485–502.

exposure due to the higher correlation of the HRK to the EUR than to the USD; their open positions are still large as the exposures are unhedged.⁹

Exchange rate risk is not equivalent with the exchange rate exposure nor does the existence of a former *ipso facto* imply a parallel and equal presence of the latter. From the economic point of view, an exchange rate risk is the probability that the domestic purchasing power of a foreign currency on a given future date will be different from its expected value. From the accounting perspective the nominal change in the exchange rates suffices. According to IFRS 7 *Financial Instruments: Disclosures*, the currency risk is defined as: “The risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in foreign exchange rates”.¹⁰ For the purposes of the IFRS, currency risk does not arise from non-monetary financial items or from financial instruments denominated in the functional currency. It arises from open positions in currencies different than the functional currency. Currency risk may translate into a smaller or larger exposure (open position) depending on the currencies’ values, inter-currency value correlations, cash flow directions, and term structures (maturities).

A company operating in an international environment and facing the risk of exchange rate changes may face some or all of the following exposures:

1. Translation exposure measures the effect of an exchange rate change on the company’s financial statements. It is a pure accounting exposure not related to cash flows. It is the risk that company's foreign denominated book values of assets, liabilities, revenues, expenses, gains or losses will change as a result of exchange rate changes. It is retrospective in nature.¹¹ Whether translation risk should actively be managed is open to debate.¹² The decision whether to hedge the translation exposure is based on the financial reporting requirements of the individual country and on the incentives in the form of share/options based grants/payments given to the management.¹³
2. Transaction exposure measures the effects of exchange rate changes on the value of cash flows due to contractual delays in outstanding netted foreign currency-denominated cash flows. It involves exchange rate changes after the company has already entered financial obligations. It is measured as saldo of accounts receivable and accounts payable invoiced in a currency not being the company’s functional and reporting currency. It mixes the retrospective and prospective: it is based on past contracts settled at future date.¹⁴

⁹ According to an auditing firm wishing to remain anonymous, the open position of a single Croatian shipyard at one point was larger than the whole Croatian banking industry combined.

¹⁰ IASB (2006), *IFRSs*, IASCF, London, Appendix A, Defined terms, p. 632.

¹¹ Shapiro, A.C. (2003), *Multinational Financial Management*, 7th Int. Ed., John Wiley & Sons, NJ, p. 329.

¹² Marshall, A.P. (2000), *Foreign exchange risk management in the UK, USA, and Asia Pacific multinational companies*, Journal of Multinational Financial Management, Vol. 10, 185-211.

¹³ Hakkarainen, A., Nathan, J., Eero, K., Puttonnen, V. (1998), *The foreign exchange exposure management practices of Finnish industrial firms*. Journal of International Financial Management and Accounting, Vol. 9 (1), 34–57.

¹⁴ Shapiro, A.C. (2003), *Multinational Financial Management*, 7th Int. Ed., John Wiley & Sons, NJ, p. 329.

3. Economic or operating exposure is a long term market risk of exchange rate changes and its influence on the domestic value of the company's international turnover (output), commodity prices (inputs) or equity prices (investments). It is the risk that exchange rate changes will impact the company's market value¹⁵, its earnings values, general cash flow values and foreign investment values in domestic currency in the long run. It is prospective in nature. There is no derivative for managing economic risk,¹⁶ but there are many management methods available.¹⁷

Transaction exposures are being hedged more often than the translation or economic exposures.¹⁸ This is because of the transactions' exposure more evident and direct nature. Accounting information may virtually be of no use for investors if it's not supplemented by cash flow data and market information. To draw a more complete picture, all three exposures have to be included. The firm's transaction and translation exposure is known from the accounting data. Its total exposure may still remain uncertain because it depends on future exchange rate fluctuations, macroeconomic effects and the responsive behaviour of the firm.¹⁹ So, the process of hedging tends not always to be as straightforward as it seems. Because of its direct influence, the transaction exposure hedging only shall be analysed.

3. TRANSACTION EXPOSURE HEDGING

Although currency exchange rate risks can never be completely eliminated (unless the currencies are also eliminated, as is the case in the EMU), the exposures can be successfully managed by well structured hedging strategies.²⁰ The company has at its disposal the financial and non financial, derivative and non derivative, external and internal hedging techniques. Before any of the transaction hedging techniques is used, transaction exposure should be correctly identified through sequential balancing of the cash flows according to currencies and maturities. This is called netting. Accounting data is crucial to the determination of company's transaction exposure. Nevertheless, accounting data may not be sufficient as it does not include all the information regarding future transactions. The transaction exposure in a particular moment in time includes all the present and future open positions derived by sequential netting. So, prospective managerial information on future transactions should be supplemented to the retrospective accounting information.

¹⁵ Shapiro, A.C., (1975), *Exchange rate changes, inflation and the value of multinational corporations*, Journal of Finance, Vol. 30, 485–502.

¹⁶ Duangpoy, O., Bakay, V.H., Belk, P.A. (1997), *The management of foreign exchange risk in US multinational enterprises: an empirical investigation*, Managerial Finance, Vol. 23 (7), 85–100.

¹⁷ Marshall, A.P. (2000), *Foreign exchange risk management in the UK, USA, and Asia Pacific multinational companies*, Journal of Multinational Financial Management, Vol. 10, 185–211.

¹⁸ Khoury and Chan (1988), *Hedging foreign exchange risk: selecting an optimal tool*, Midland Corporate Finance Journal 5, 40–52, and Joseph and Hewins (1991), *Portfolio models for foreign exchange exposure*, International Journal of Management Science, Vol. 19, 247–258.

¹⁹ Dumas, B. (1978), *The theory of the trading firm revisited*, Journal of Finance, Vol. 33, 1019–1029.

²⁰ Muller, A., Verschoor, W.F.C., (2006), *Foreign exchange rate exposure: Survey and suggestions*, Journal of Multinational Financial Management, Vol. 16, 385–410.

Three approaches to avoid losses from the transaction exposure exist:

1. Accounts receivable and accounts payable can be agreed and settled in domestic currency.
2. Hedging with financial derivatives (forwards, futures, options, swaps, and other).
3. Natural hedge with non derivative financial instruments i.e. entering in a simultaneous import/export and borrowing/lending activity. In this case a transaction exposure is being offset by a contrary translation exposure.

Financial hedging strategies include the issuance of foreign-denominated debt and the use of foreign exchange derivatives.²¹ The issuance of foreign denominated debt is a natural hedge because it does away with the usage of financial derivatives. In this case, the exchange rate risk from the primary business transaction is being offset by the secondary debt repayment transaction because the two are denominated in a same currency.²² Two separate cash flow contracts level each other out eliminating the currency risk. Such natural hedges may be more effective in reducing the long-term exposures, which extend beyond the maturity terms of most financial derivative contracts.²³

After several years of disastrous effects of USD plunges, the contracts are now being priced in euros. A typical contract: a tanker, EUR 32 million, due delivery in 16 months, 2/3 of the costs being paid to domestic contractors, the rest to foreign contractors invoiced in EUR. The contract in question has an ex ante profit margin of 2% of the total contract amount. If the euro depreciates from 7,4 HRK to 7,2 HRK; the profit margin would have already been exhausted. So, there is a need for transaction exposure hedging even between such highly correlated currencies as HRK and EUR.

3.1. Internal hedging techniques

Matching inflows and outflows with respect to timing of settlement is the most popular technique among US firms.²⁴ The technique is used to some extent by the Croatian firms for domestic settlements only (up to 90 days). European contractors require shorter settlement periods of around 30 days. So, it is not possible to use this technique on a large scale in the shipbuilding industries.

Inter company netting of foreign receipts and payments has the advantage of the ease of establishing an intra-group settlement program and the potential consequent savings in bank charges and other transaction expenses.²⁵ Nevertheless, the unwillingness to

²¹ Huffman S. P., Makar S. D., (2004), *The effectiveness of currency-hedging techniques over multiple return horizons for foreign-denominated debt issuers*, Journal of Multinational Financial Management, Vol. 14 105–115.

²² Goswami, G., Shrikhande, M.M. (2001), *Economic exposure and debt financing choice*, Journal of Multinational Financial Management, Vol. 11, 39-58.

²³ Chowdhry, B. (1995), *Corporate hedging of exchange risk when foreign currency cash flow is uncertain*, Management Science, Vol. 41, (June) 1083–1090.

²⁴ Joseph, N.L. (2000), *The choice of hedging techniques and the characteristics of UK industrial firms*, Journal of Multinational Financial Management, Vol. 10, 161-184.

²⁵ Marshall, A.P. (2000), *Foreign exchange risk management in the UK, USA, and Asia Pacific multinational companies*, Journal of Multinational Financial Management, Vol. 10, 185-211.

cooperate or to disclose any information on company's transactions is the reason why this technique did not live in practice. A larger company has greater netting capabilities. A cluster of companies (shipyards) even much so.

Domestic currency invoicing transfers the exchange rate exposure to the buyer. In the shipbuilding industry, the transactions are settled in USD or EUR. Also, a large part of inputs imported from the EU is invoiced in EUR. So, domestic currency invoicing is not an option.

3.2. External hedging techniques

Foreign denominated debt (foreign currency lending/borrowing) is a financial non-derivative hedge. It can be assumed to be a perfect substitute for foreign currency derivatives.²⁶ Elliott et al. find a positive relationship between the exposure to foreign currency risk and the level of foreign denominated debt. They also found that foreign denominated debt is negatively related to the use of foreign currency derivatives. They interpret this as evidence that foreign denominated debt is used as a hedge, and substitutes for the use of foreign currency derivatives in reducing currency risk.²⁷ Liability euroisation has long been a favourite way in which banks hedged themselves against currency exposures in Croatia. By denominating their liabilities in EUR, many exporting firms have, deliberately or not, hedged themselves against currency risk too. In a way they have entered what is called a natural hedge. A natural hedge is effectively a simultaneous entry into two different types of financial contracts which offset each other out in risk type, amount, and duration.

Forward exchange contracts can only hedge economic exposure optimally if managerial decisions regarding inputs and outputs are fixed; otherwise, foreign exchange options may be more appropriate.²⁸ The value of a forward F_0 , for a maturity T is given by the following formula:²⁹

$$F_0 = S_0 e^{(r-r_f)T} \quad (1)$$

S_0 standing for the spot exchange rate, r for the domestic interest rate, r_f the foreign interest rate, and T for time to maturity. The initial value of a forward contract at the time it is first entered is zero. Later in time the value of a forward foreign exchange contract is given by f :

$$f = S_0 e^{-r_f T} - K e^{-rT} \quad (2)$$

²⁶ Geczy, C., Minton, B.A., Schrand, C. (1997), *Why firms use currency derivatives*, Journal of Finance, Vol. 52 (4), 1323-1354.

²⁷ Elliott, W.B., Huffman, S.P., Makar, S.D. (2003), *Foreign-denominated debt and foreign currency derivatives: complements or substitutes in hedging foreign currency risk?*, The Journal of Multinational Financial Management, Vol. 13, 123-139.

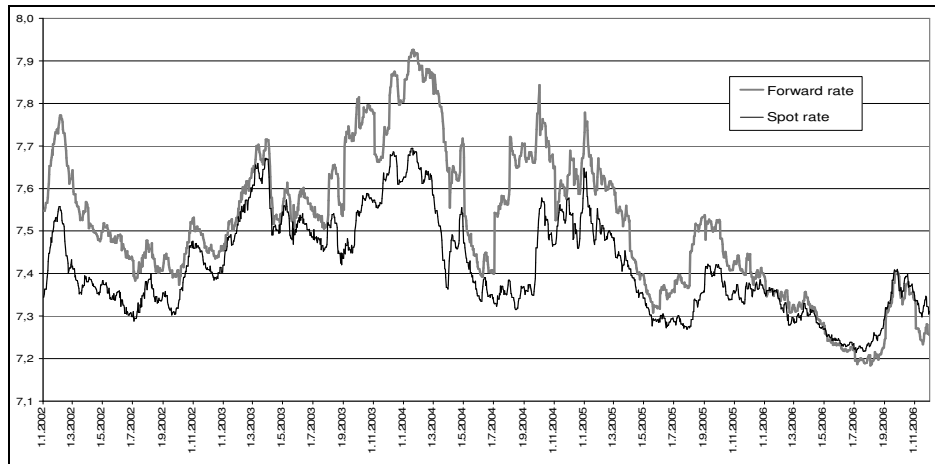
²⁸ Ware, R. and Winter, R. (1988), *Forward markets, currency options and the hedging of foreign exchange risk*, Journal of International Economics, Vol. 25, 291-302.

²⁹ Hull, J. C. (2000), *Options, Futures, & Other Derivatives*, 4th Ed., Prentice Hall, London, p. 68.

with K standing for the delivery price of a long forward contract.

The following picture shows the simulated values of a EUR/HRK spot rate and a 16 month forward contract being the usual delivery time in the Croatian shipbuilding.

Figure 2 Forward and spot rates



Data source: Croatian National Bank (HNB)

Foreign exchange options may be used to construct a complete currency hedge. Unfortunately, such a hedge may be possible only at a sizeable transaction cost that outruns its positive effects. Moreover, Giddy and Dufey show that foreign exchange options “are not ideal hedging instruments for corporations” since the gains or losses which arise from their use are not linearly related to changes in the value of the currency, thereby, increasing the variability of the firm’s real cash flow.³⁰ By using some form of hedging optimisation as for example “delta hedging”, more cost-efficient hedges are achievable.

In the foreign exchange market, options are quoted with implied volatilities instead of prices. The conversion formula is the Garman and Kohlhagen option pricing formula which is identical to the Merton-Black-Scholes formula³¹ on dividend paying stocks, except for the term q , representing the dividend yield being substituted by r_f - the foreign currency’s continuously compounded risk free interest rate.³² The formula

³⁰ Giddy, I. and Dufey, G. (1995), *Uses and abuses of currency options*, Bank of America Journal of Applied Corporate Finance, Vol. 8, 49–57.

³¹ Merton, R. C. (1973), *Theory of Rational Option Pricing*, Bell Journal of Economics and Management Science, Vol. 4 (Spring), 141-183, as also Black, F. and Scholes M. (1973), *The pricing of Options and Corporate Liabilities*, Journal of Political Economy, Vol. 81 (May-June), 637-659.

³² Garman, M.B and Kohlhagen, S.W. (1983), *Foreign Currency Option Values*, Journal of International Money and Finance, Vol. 2 (December), 231-237.

applies only to European options which are the most common type of options on the Over the Counter (OTC) market³³. The formula has been simplified by incorporating the forward rate (1)³⁴:

$$c = e^{-rT} [F_0 \cdot N(d_1) - X \cdot N(d_2)] \quad (3)$$

$$p = e^{-rT} [X \cdot N(-d_2) - F_0 \cdot N(-d_1)] \quad (4)$$

where

$$d_1 = \frac{\ln\left(\frac{F_0}{X}\right) + \sigma^2 \cdot \frac{T}{2}}{\sigma\sqrt{T}}, \text{ and } d_2 = d_1 - \sigma\sqrt{T} \quad (5)$$

and where the other symbols stand for: small cap c the European call price, small cap p the European put price, r the domestic continuously compounded risk free interest rate, $N(d)$ the standard normal distributions, X the exercise price, σ the standard deviation calculated on the basis of a moving average with the time period prior to taking the mean being of same duration as the time to maturity.

Foreign exchange futures and futures options have a limited market for currency futures and futures options with maturities greater than one year even in major currencies. These contracts are available only to quite large and creditworthy companies. The market in HRK is non-existent. The formulas for the valuation of the futures options are the same as for the currency options shown earlier because the futures price has the same volatility as the underlying asset.³⁵

Foreign currency swaps market is not large enough, so it is difficult to find a perfect match resulting in an adequate currency, maturity, amount, default risk, and interest rate if applicable.

4. THE COST BENEFIT ANALYSIS

For the purpose of identifying the costs and benefits of the proposed hedging forms, a test has been conducted. European HRK long calls i.e. EUR short put option prices³⁶ using the Garman and Kohlhagen currency option pricing formula have been simulated. What would such an option have been priced on an OTC market has been

³³ An Over the Counter (OTC) market is a financial retail market where the financial institution issues a "tailored to the measure" financial instrument directly to the client. Such financial instruments are subsequently seldom traded on stock exchanges.

³⁴ Hull, J. C. (2000), *Options, Futures, and other Derivatives*, 4th Ed., Prentice Hall, London, p. 284.

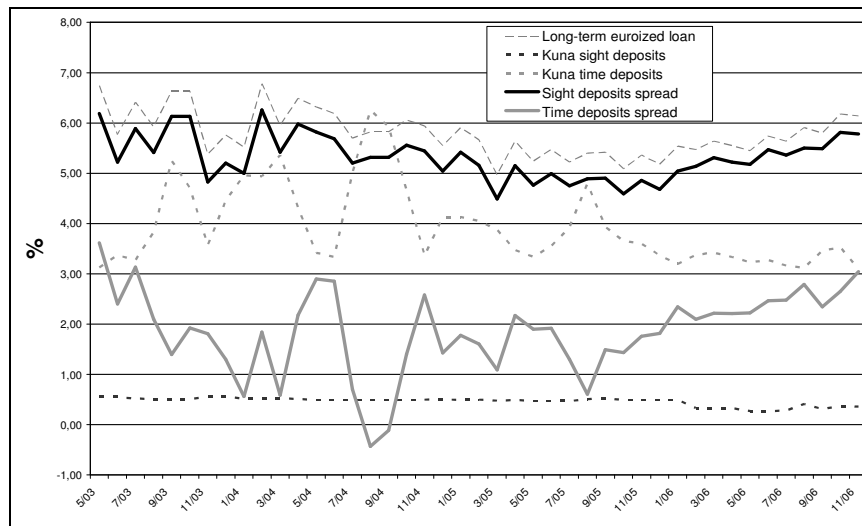
³⁵ Black, F. (1976), *The pricing of Commodity Contracts*, Journal of Financial Economics, Vol. 3 (March), 167-179.

³⁶ The two are of same value because of the put-call parity. See Hull, J. C. (2000), *Options, Futures, & Other Derivatives*, 4th Ed., Prentice Hall International, London, 174-175.

used as an external hedging proxy. The data was then compared to the kuna deposit and euro borrowing interest rate spreads which were used as internal hedging costs proxies. The time deposit spread is a good European put-call option proxy, and the sight deposit spread is a good American put-call option proxy. As expected, the sight deposit spread value is higher which depicts the higher value of its opportunity cost: an American option. The European options are used for the purposes of this test.

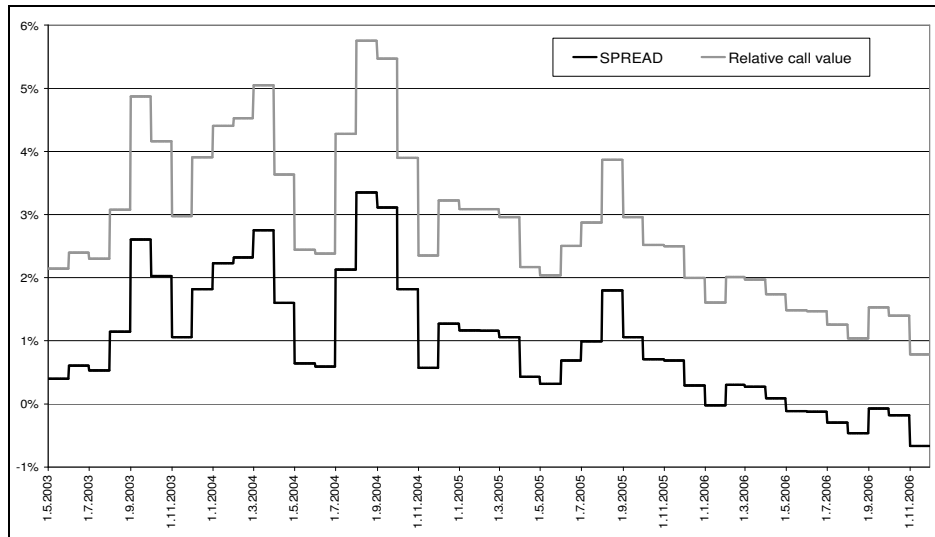
Comparing the data from Figure 3 to the data from Figure 4 it can be observed that during most of the period, the Time deposits (Figure 3) spread was lower than the simulated call value (Figure 4). This may also be the prime reason why the financial derivative markets for hedging foreign currency exposures have not developed in Croatia. The cost of hedging with non-derivative financial instruments was lower in the observed period. Nevertheless, that may change as the EUR forward rate recently comes with a discount and there are strong HRK appreciation tendencies, which also reflect lower HRK interest rates.

Figure 3 Spreads between euroised corporate loans and HRK deposits



Data source: Croatian National Bank (HNB)

Figure 4 Interest rate spread / call value



Data source: Croatian National Bank (HNB)

5. HEDGE ACCOUNTING

How the Hedges are accounted for, depends exclusively on the hedging instruments used. The company has at its disposal the financial and non financial, derivative and non derivative, external and internal hedging instruments. According to International Accounting Standard (IAS) 39.85: “Hedge accounting recognises the offsetting effects on profit or loss of changes in the fair values of the hedging instrument and the hedged item”.³⁷ A foreign sale of a ship with due delivery in 16 months is according to IAS 39.78 and IAS 39.80 a “highly probable forecast transaction” and as such qualifies as a hedged item. According to IAS 39.86 (b) “a hedge of the exposure to variability in cash flows that is attributable to a particular risk associated with ... a highly probable forecast transaction and could affect profit or loss”³⁸ is typified as a *cash flow hedge*. Moreover, it fulfils all of the five compulsory conditions prescribed by IAS 39.88 for qualifying for hedge accounting. Hedging instruments are accounted for as follows.

Derivatives meet the definition of a financial instrument and, accordingly are within the scope of the IAS 32 *Financial Instruments: Presentation*, IAS 39 *Financial Instruments: Recognition and Measurement* and the International Financial Reporting Standard 7 *Financial Instruments: Disclosures*. The application of IAS 21 *The Effects of Changes in Foreign Exchange Rates* is not required since according to IAS 39.AG83 monetary items designated as hedging instruments are exempted. IAS 39 requires the

³⁷ IASB (2006), *IFRSs*, IASCF, p. 1739.

³⁸ *Ibid.*

measurement of financial assets and liabilities at fair value and the recognition of gains and losses on measurement in profit or loss.

Due to the unwillingness of the customers to agree to, and settle the contracts in the functional currency and due to the non existence of the financial derivatives markets in Croatia, natural hedging with non-derivative financial instruments is a viable choice. By entering in a simultaneous export and borrowing activity a non-derivative financial asset with fixed or determinable payments that is not quoted in an active market may be created if the two contracts may not be separated from one another, i.e. if the non-derivative financial liability has been recognised as *hedging instrument* according to IAS 39.9. Interestingly, financial liabilities incurred for the purpose of foreign exchange hedging are the only non-derivatives permitted to be recognised as hedging instruments. IAS 39.72 to IAS 39.84 and IAS 39 Appendix A paragraphs AG94 to AG97 elaborate further definitions. Regarding the financial instruments classification, the IAS 39.9 defines “a designated non-derivative financial liability whose cash flows are expected to offset changes in the cash flows of a designated hedged item”³⁹ as *hedging instrument* and as *loans and receivables*⁴⁰. Only financial assets that are not quoted in an active market fall under this category⁴¹. So, according to IAS 32 AG 4 (d) bonds issued in a foreign currency (corporate bonds with a currency clause) are categorised as *financial liability: bonds receivable and payable*.⁴² In the case of a natural hedge, the hedging instrument is a debt which is carried at amortised cost under IAS 39. Exchange rate differences are recognised in the income statement according to IAS 39.95 in profit or loss or in equity.

The main accounting problem with financial derivatives is the measurement of their fair value. According to IAS 39.48A, the best evidence of fair value are quoted prices in an active market. In Croatia, there is none, so the second best option includes valuation techniques explained in previous chapters but also references to other instruments representing substitutes (in the sense of closest opportunity costs). The chosen valuation techniques should maximally use market information and minimally as possible their own entity-specific information. As much as this seems reasonable, it is clear that there is still significant space left for accounting shenanigans.

6. CONCLUSION

Foreign denominated debt may be used as a perfect substitute for the non available and potentially more expensive foreign currency derivatives. In a highly euroised country such as Croatia, many exporters may spontaneously (not-knowingly) be hedged against currency exposure by liability euroisation. This is called a natural hedge. The currency-interest risk transformation inherent to such an external financial non-derivative hedge may in this case be of no problem at all. It may actually be beneficial because of the

³⁹ See IAS 39.9 Definitions relating to hedge accounting. IASB (2006), *IFRSs*, IASCF, p. 1720.

⁴⁰ *Ibid.* p. 1719.

⁴¹ See IAS 39.9 *Loans and receivables* (a), (b), and (c) for exemptions. IASB (2006), *IFRSs*, IASCF, p. 1719.

⁴² See IAS 32 AG 4 (d). IASB (2006), *IFRSs*, IASCF, p. 1318.

present interest rate market structure. As such it fulfils successfully two roles: cash flow hedge and financing. As it has been shown, the market interest rate spread was much smaller in the case of credits denominated in EUR as is the case of the ones denominated in HRK. The firms pursuing the lower borrowing interest rates may not knowingly have also simultaneously chosen the cheaper hedging scenario. So, liability euroisation has a twofold positive hedging effect for the borrower and for the lender. Three separate short conclusions may be derived.

A purely microeconomic conclusion: In the case of Croatia, a natural hedge using Eurocurrency debt outperforms the external hedging techniques using financial derivatives.

A purely macroeconomic conclusion: Doing away with the currency risk altogether by unilaterally entering a currency board even before entering the EU (European Union), the EMU (Economic and Monetary Union), and the SEPA (Single Euro Payments Area) respectively would make the question of exchange rate exposure obsolete.

An accounting conclusion: The International Accounting Standard provides for *hedge accounting* of non-derivative hedging instruments. The natural hedging instruments described in this paper fall into this category and are subsequently treated like separate financial instruments but nevertheless have separate accounting rules.

REFERENCES

- Adler, M., Dumas, B., (1984), *Exposure to currency risk: Definition and Measurement*, Financial Management, Vol. 13, Issue 2 (Summer), 41–50.
- Babbel, D. F. (1983), *Determining the Optimum Strategy for Hedging Currency Exposure*, Journal of International Business Studies, Vol. 14 (Spring-Summer), 133-139.
- Black, F. and Scholes M. (1973), *The pricing of Options and Corporate Liabilities*, Journal of Political Economy, Vol. 81 (May-June), 637-659.
- Black, F. (1976), *The pricing of Commodity Contracts*, Journal of Financial Economics, Vol. 3 (March), 167-179.
- Chowdhry, B. (1995), *Corporate hedging of exchange risk when foreign currency cash flow is uncertain*, Management Science, Vol. 41, (June) 1083–1090.
- Duangploy, O., Bakay, V.H., Belk, P.A. (1997), *The management of foreign exchange risk in US multinational enterprises: an empirical investigation*, Managerial Finance, Vol. 23 (7), 85–100.
- Dumas, B. (1978), *The theory of the trading firm revisited*, Journal of Finance, Vol. 33, 1019–1029.
- Elliott, W. B., Huffman, S. P., Makar, S. D. (2003), *Foreign-denominated debt and foreign currency derivatives: complements or substitutes in hedging foreign currency risk?* The Journal of Multinational Financial Management, Vol. 13, 123-139.
- Garman, M.B and Kohlhagen, S.W. (1983), *Foreign Currency Option Values*, Journal of International Money and Finance, Vol. 2 (December), 231-237.
- Geczy, C., Minton, B. A., Schrand, C. (1997), *Why firms use currency derivatives*, Journal of Finance, Vol. 52 (4), 1323-1354.
- Giddy, I. and Dufey, G. (1995), *Uses and abuses of currency options*, Bank of America Journal of Applied Corporate Finance, Vol. 8, 49–57.
- Goswami, G. and Shrikhande, M. M. (2001), *Economic exposure and debt financing choice*, Journal of Multinational Financial Management, Vol. 11, 39-58.

- Huffman S. P. and Makar S. D. (2004), *The effectiveness of currency-hedging techniques over multiple return horizons for foreign-denominated debt issuers*, Journal of Multinational Financial Management Vol. 14, 105–115.
- Hull, John C. (2000), *Options, Futures, & Other Derivatives*, 4th Ed., Prentice Hall International, London.
- Hrvatska Narodna Banka (HNB), available at <http://www.hnb.hr>.
- International Accounting Standards Board (2006), *International Financial Reporting Standards (IFRSs) including International Accounting Standards (IASs) and Interpretations as at 1 January 2006*, International Accounting Standards Committee Foundation (IASCF), London.
- Joseph, N. L. and Hewins, R. D. (1991), *Portfolio models for foreign exchange exposure*, International Journal of Management Science, Vol. 19, 247-258.
- Joseph, N. L. (2000), *The choice of hedging techniques and the characteristics of UK industrial firms*, Journal of Multinational Financial Management, Vol. 10, 161-184.
- Khoury, S.J. and Chan, K.H. (1988), *Hedging foreign exchange risk: selecting an optimal tool*, Midland Corporate Finance Journal Vol. 5, 40-52.
- Marshall, A. P. (2000), *Foreign exchange risk management in the UK, USA, and Asia Pacific multinational companies*, Journal of Multinational Financial Management, Vol. 10, 185-211.
- Merton, R. C. (1973), *Theory of Rational Option Pricing*, Bell Journal of Economics and Management Science, Vol. 4 (Spring), 141-183.
- Muller, A. and Verschoor, W.F.C. (2006), *Foreign exchange rate exposure: Survey and suggestions*, Journal of Multinational Financial Management, Vol. 16, 385-410.
- Shapiro, A.C. (1975), *Exchange rate changes, inflation and the value of multinational corporations*, Journal of Finance, Vol. 30, 485–502.
- Shapiro, A.C. (2003), *Multinational Financial Management*, 7th International Ed., John Wiley & Sons, NJ.
- Smith, S.W. and Stulz, R.M., (1985), *The Determinants of Firms' Hedging Policies*, Journal of Financial and Quantitative Analysis, Vol. 20, 391–405.
- Ware, R. and Winter, R. (1988), *Forward Markets, Currency Options and the Hedging of Foreign Exchange Risk*, Journal of International Economics, Vol. 25, 291–302.