

So, as we see, Ukraine has a powerful metallurgical complex, with large perspectives, which is able to meet the needs of home and foreign markets, including the market of EU. “Europe should open Ukraine and Ukraine should open Europe”. But nobody waits for us with open arms there. Not for nothing did the head of the representation of the European committee in Ukraine, an ambassador Andre Vanaverbec say: “As for the deliveries of junctureless pipes, the business can come to antidumping decision. The committee decreased the quote of pipe’s deliveries to EU and fixed the price threshold. See, the metallurgical industry is a special case in EU, also as agriculture. Here we are forced to use specific rules of market regulation”. Obviously, that mr. Vanaverbec tries to defend the European producer: nobody needs an excessive competitor. We mustn’t surrender, but continue standing for our interests, to enter the EU, although not very soon, having equal rights with all other members.

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## Interest Rate Risk Management in Lithuania

Розглядається питання ризик-менеджментної процентної ставки в Литві. Подаються порівняльні дані, вказуються джерела впливу, аналізуються різні аспекти даного питання.

Risk is inevitable component of banking industry and financial markets as a whole. Baltic banks started in extremely risky environment and earned substantial capitals during that time. However, excessive risk taking has led to massive bankruptcies later. Clearly, risk management policies in banks have profound impact on bank stability, profitability, and reliability.

Overly, banks face the following risks interesting from the point of financial theory: credit risk – risk that borrower will default on its obligations, exchange rate risk – risk that changes in exchange rate will affect profit of the bank from short and long positions in unproportional way, interest rate risk – risk that changes in interest rate will unequally affect assets and liabilities of the bank, and corresponding cash flows, liquidity risk – risk that bank will not have enough cash to operate or it will be unable to turn illiquid assets into cash quickly and at minimal cost.

Present report is delimited solely to interest rate risk management. It was chosen because as evidenced by the Baltic banks it is the main risk that originate from main activities of the banks in the Baltic i.e. saving and loan activities. Of course, the main risk in risk portfolio (up to 50%) is credit risk, but in contrast with interest rate risk credit risk does not allow to adjust it dynamically in time - credit risk management is limited to the credit risk scoring models e.g. Z – score model.

The purpose of the report is to present theoretical framework for analysis of risk management, and provide analysis of risk management practices employed in the leading Lithuanian bank Vilniaus Bankas. The function of specific bank analysis is to show how modern theoretical concepts are implemented in reality of developing countries, stress discrepancies that occur and explain them. Further comparison of economic factors between Lithuania and Sweden that influence risk management will be carried out.

The report structured as follows: firstly, theoretical framework is developed, secondly, it is applied to Vilniaus Bankas, lastly comparison with Sweden to the extent it is delimited is presented. Theoretical part is structured according to the following questions:

What are the sources of interest risk in the bank? Why to bother about interest rate risk? How it may impact the bank? How to solve problem of interest rate risk exposure? -Safety zone - How to find safety zone? How can we measure our risk exposure? How to adjust risk to safety zone or to particular bank’s preferences?

## Theoretical Framework: Interest Rate Risk Management

### Sources of Interest Rate Risk and Exposure Limits

Firstly, the sources of interest rate in a bank should be understood and consequent impact on the bank accounts should be presented. Further, the theory on prudent interest rate risk exposure will be discussed.

Interest rate risk originates from two types of bank instruments pricing approaches, namely floating and fixed interest rate on deposits and loans. Speaking about floating loans and deposits the bank is exposed to interest rate risk if floating deposits and loans have different repricing maturity, that is the interest is adjustable to the market rate at different time intervals. Fixed income instruments involve interest rate risk provided that deposits and loans have different repayment maturity. Meaning if bank lends for the long time horizons and borrows for short (to capture risk, liquidity, devaluation,



etc. premium) it will need to re-finance its liabilities in future by borrowing at uncertain market rate.

Both fixed and floating instruments are dependent on future interest rate volatility. Therefore, sources of interest rate risk in the bank are long and short positions that have different price (fixed income) or produce different cash flows (floating) depending on volatility of market interest rate in future. The sources of interest rate risk will be illustrated further in the example.

Assets	Liabilities
1000 Loan	800 Deposit
	200 Equity

Once the sources of interest rate risk are clarified, the consequences of risk on the economic interest of the bank should be laid out. Obvious interest of the bank is Net Interest Income (NII) account what usually constitutes the largest share of Net Profit of the Bank. It is volatile to changes in interest rates because changes in interest rates induce changes in cash inflows from floating rate loans and cash outflows to service floating rate deposits.

However, there is different dimension of bank's interests that is also affected by changes in market interest rates. After we have dealt with impact on cash flows in NII account, logically price or "value" factors should be

#### Effect of 1% rise in deposit yield curve

Deposit Re-pricing Maturity (months)	Annual NII	Market Value of Equity (%)	Economic Equity Ratio (%)
3.0	(1.0)	-1.4	-0.9
4.5	0.0	-0.9	-0.5
6.0	1.0	-0.5	0.0
7.5	2.0	0.0	0.5
9.0	3.0	0.5	0.9

considered. Namely, it is market value of Equity what is affected by re-valuation of market values of assets and liabilities. Market value of fixed income and floating (during the time to re-pricing) changes because future cash flows generated by these instruments are discounted at a different market interest rate. Consequently, once market value of assets (loans) and liabilities (deposits) has changed the market value of equity (assets-liabilities) is changed as well. Additionally,  $MVEQUITY / MVASSETS$  ratio (economic equity ratio) changes as well.

#### Example:

Imagine a start-up bank with newly issued roll over loan for 1000 re-priced each 6 months. Also, the bank has deposit for 800 with any desired re-pricing maturity. Interest on the loan is two percent larger than market rate for deposit. Flat yield curve assumed. No reserve

$$\frac{\Delta MVeg}{MVeg} = \left[ \frac{-Dass \cdot MVass - Dliab}{MVass - MVliab} \right] \frac{\Delta r}{1+r}$$

$$\text{Hedge : } Dass \cdot MVass = Dliab \cdot MVliab.$$

$$\Delta NII = MVass \cdot (T - Dass) \cdot \Delta r - MVliab \cdot (T - Dliab) \cdot \Delta r.$$

$$\text{Hedge : } MVas \cdot (T - Das) = \text{requirements, taxes, and insurance. Initial}$$

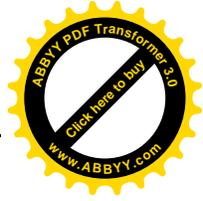
balance sheet is presented in the accompanying table. After static comparison holding all factors constant except maturity of the deposit the following results depending on chosen maturity are presented below. Further, assume upward shift of flat yield curve for one percentage point and consequent effect on the target accounts.

As it is seen from the table the bank will increase expected profit if interest increases by mismatching if maturity of deposit will be more than 4.5 months. The economics behind increase in profit of the bank for the case of 9 months maturity is in relative re-pricing times. That is, the bank enjoys paying less than market rate for deposits for 9 months, but adjusts its loan rate to the higher one already after 6 months period. Of course, the opposite its true, i.e. the bank would loose if the rate decreases.

However, the most striking feature of the table is maturity that hedge target accounts. They are derived from the equations presented in the table. It is seen that it is impossible to hedge all the target accounts of the bank.

	1 month	2 months
Assets (loans)	500	300
Liabilities (deposits)	200	400

As it is suggested by theory a bank has to choose so-called "Safety Zone" meaning hedge NII,  $MVEQUITY$ , or to be in between, then economic equity ratio will be hedged as well and increase of risk in one target account will be balanced by decreased risk in the other. However, complex reality does not allow to hedge even one target account completely, and prudent approach would be to eliminate all risk in excess of 2% value of the



corresponding target account. Therefore, logical questions arises “How the banks can measure their current exposure, and see if it is in prudent bounds or not?” which will be answered in the next part.

## Interest Rate Risk Measurement Techniques

As it is saying “if you can’t measure – you can’t manage”; therefore bank needs measurement techniques in order to track its risk exposure, and price its risk correspondingly. Basically, there are two broad categories of techniques, first one is designed specifically for interest rate risk exposure measurement, and the others are complex techniques that allow to screen and forecast all array of risks a bank faces.

There are two basic measurement techniques designed for interest rate risk that correspond to floating interest rate and fixed rate instruments. These are currency gap analysis and duration analysis. The purpose of currency gap analysis is to find out how much interest rate sensitive deposits and loans will be re-priced at any given period. The mechanics is as follows, bank chooses dates of re-pricing “time-buckets” (1 day, 1 months, 3months, etc) and groups amounts of deposits and loans that are re-priced at these dates into these “time-buckets”. Further, liabilities (deposits) are subtracted from assets (deposits) and the bank gets incremental gap (for a given period of time 1 day, 1 months, etc). Sample of currency gap table is shown in the accompanying table. As it is seen the gap is positive after one month, meaning that the bank will be better off if market interest rate increases because it will adjust more loans than deposits. Opposite situation is presented for the period of two months. Cumulative gap is the sum of incremental gaps and is 200 that shows that bank is more asset sensitive i.e. will benefit from increase in interest rate.

Duration gap evaluates risk from fixed income instruments that generate predefined cash flows. In such instruments there is risk of decrease / increase in price with changes in market rate, which we use to discount them, and risk of the rate at which cash flows will be reinvested. Duration is calculated according to the formula presented, where N is the number of periods (e.g. years) a bank receives cash-flows, CF is cash flows including both interest payments and principal,  $r_t$  is the implied forward rate at time t. Instead of  $r_t$  one may use yield to maturity. Duration is the larger the less payments are paid till the repayment date; therefore, a bank will

lose if interest rate increases and duration of liabilities is smaller than duration of assets because it loses the opportunity to re-invest proceeds from loans at higher rate.

Apart from techniques targeted at interest rate risk measurement, there are more complex packages that require complex IT systems, such as Value at Risk Method (VAR), Stress Testing, and Scenario Analysis. Due to narrow scope of the report and limited space these techniques are not discussed in the detail, but presented in short. Generally, speaking while Currency Gap, and Duration use inside bank information more complex techniques are trying to model environment and see how it affects portfolio. For example, VAR made by J.P. Morgan uses world-wide data on financial instrument volatility, correlation, and movements of macroeconomic factors frequently updated by Reuters. Stress testing allows selecting specific factor and stress it i.e. to see what happens with portfolio if, say, money base will increase. Scenario analysis is more complex method that allows modelling the whole environment consisting of many factors (in contrast with Stress testing), change them and see the result. Scenario analysis is used mostly for strategic purposes.

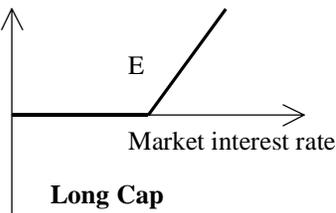
## Methods for Adjustment of Interest Rate Risk Exposure

There are two fundamental reasons for adjustment of interest rate risk. The first reason for adjustment is to keep the bank in safe bounds, and the other reason is to adjust in order to speculate meaning that the bank has forecasts that differ from the market and wants to take advantage of information. However, it should be noted that such strategies are effective only when “bank is right and the market place is wrong”. The methods will be structured in way that firstly present how to hedge with this method and how to speculate.

On-balance sheet method. The essence of the method is to match maturity of assets and liabilities by buying and selling instruments i.e. all operations are reflected on the balance sheet. Imagine a bank that has loan with 6 months to maturity, and deposit with 3 months to maturity what exposes bank to the risk of borrowing after 3 months in

order to repay the deposit. Solution is to sell deposit (or certificate of deposit) for 6 months to match existing loan; and issue loan with 3 months to maturity to cancel out current deposit. Disadvantage is high cost of buying and selling instruments and “ballooning” of balance sheet what worsens financial ratios.

One may use on-balance sheet method to speculate as well. If bank expects that interest rate *will increase more than implied forward rate* it will mismatch and issue loans with shorter maturity than deposits.



Options. Generally option may be perceived as an instrument that gives a bank the right to buy or sell instruments with predefined interest rate. However, in risk management unusual feature of options is that bank does not sell or buy anything, but simply balances possible loss with gain from option (premium or direct gain). For example, if bank fears that interest rate increase will adversely affect its positions (positive currency gap) it will sell call options with the right to buy instrument at predefined rate. If interest rate truly increases bank will loose from mismatching, but the option will not be exercised and bank will get premium. Speculative bank will simply sell more call options than required to balance loss.

Futures. Using futures bank can lock in a certain interest rate for buying or selling in future. What should be mentioned that the rate obtained with a futures contract is, in a sense identical to implied forward rate what usually is actual future spot rate (except for small deviations). Therefore, bank may either hope that actual interest rate will be equal to implied forward rate, or in order to avoid unexpected fluctuations in profit buy futures contract for delivery. The same as option, futures may be used not to provide certain source of certain financing (exercised future), but simply to sell it back and balance the loss incurred with profit from futures trading.

Once a bank chooses to speculate on future spot rates, it either chooses either not to buy futures at all, or buy more / less than prescribed for the hedge.

Caps and Floors. Caps and Floors are options with the market interest rate being underlying asset. Floor prevents payee from low interest rate on, say floating loan, Caps prevent payer from increase in market rate. As shown on the graph owner of long Cap exercises option if floating interest is more than predefined E.

Swaps. The principal idea behind hedge of interest rate risk with swaps is that there exist two parties, where

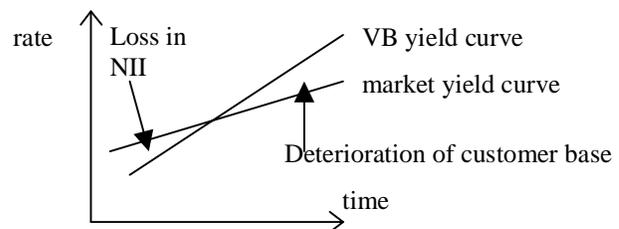
one receives certain cash flows (say bond coupons), but pays uncertain e.g. LIBOR + 2%, but another party receives certain inflow LIBOR and pays fixed interest rate. Swap means that these parties trade their cash flows and as a result both receive and pay flows of the same certainty. Bank may speculate arranging artificial swaps e.g. get fixed interest inflow in exchange for variable outflow if it believes that market rate will go down.

## Interest Rate Risk Management in Vilnius Bankas

Vilnius Bankas (VB) was established in 1990 as the bank with narrow scope of activities targeted at publishing industry. However, currently after merger with one of the largest banks Hermis VB became the leading universal bank in Lithuania. It holds 41% of all bank assets, 34% of deposits in commercial banks, and 44% of loans. VB was famous with its conservative risk policy what helped to survive banking crisis in 1995, when top five banks has gone bankrupt. In this part it will be possible to see what does “conservative policy of VB” mean.

As Asset-Liability Manager Darius Bagdonas (further ALM manager) said interest rate risk in Lithuania originates due to substantial volatility of interest rates (10 times larger that in Sweden, 6-months T-bills), and in specific demand pattern in Lithuania. Namely, population fears devaluation of national currency Litas and is reluctant to deposit money for more than one year. Opposite with loans – everybody wants to borrow in Litas for long term, and nobody wants to obtain loans in hard currencies. Therefore, there risk of financing liabilities at future uncertain rate that is likely to increase, as devaluation expectations will strengthen.

According to ALM manager bank tracks impact of the above problems only on NII account, and does not bother about market value of equity because equity markets do not react on it (i.e. share price is stable). Bank policy is to eliminate all risk in the NII account, to play safe so to speak and do not try to earn on interest rate risk. However, as it is known from the theory one can not earn sufficient returns by taking zero risk. Though in reality, in not overloaded with competition Lithuanian banking sector, where spread between loan-deposit is rather high



VB earns sufficient profits working as intermediary (fee for delegation).

Since the policy of VB is to have zero-risk on NII, then, according to theory, it should engage in operations with futures, options, swaps, etc. However, Lithuanian financial market simply does not have such instruments in trade. Only rare swaps with Hansabankas are arranged, and there is no possibility to operate on foreign financial markets because there is no demand / supply for Lithuanian currency. What it means is that VB does not have any adjustments techniques including on-balance because there is no market inside country. Consequently, the bank does need any sophisticated measurement techniques because it does not need to measure exposure because there is no possibility to change it. Indeed, it uses only simple and unreliable (due to unreliable IT system) methods such as currency gap to get information for indirect usage e.g. pricing.

Once it was said that bank does not measure and does not adjust, but still its policy is to “eliminate risk in NII account” one has to understand which model the bank employs to reach such a result. In fact, VB risk management policy boils down to correct pricing technique. Namely, all deposits and loans are pricing with floating rate and have matched re-pricing maturity, where loans are re-priced according to inter-bank borrowing rate for VB. All loans up to one year are priced accordingly, but deposit rates are fixed what induces risk and loss once market rate decreases. VB solves this problem by forecasting the lowest possible rate and attaching it to its deposits, therefore eliminating risk.

Another approach that the bank could undertake in pricing is price incentives i.e. motivate shorter loans with lower rate, and de-motivate longer loans with increased rate (change slope of the loan yield curve as illustrated in the figure). It will result in too much cheap loans and loss in NII up to the line intersection point (say 1 year). After intersection bank will loose “good” loans that will borrow from other banks at lower rate, AND it will remain with the “bad” borrowers that were refused from other banks.

To conclude the part about Vilnius Bankas the most important points are stressed once again. Namely, risk policy of the bank is conservative – it does not speculate on interest rate movements, as a result of unavailability of efficient market instruments VB uses floating pricing model in order to eliminate risk. It uses the most basic techniques for risk measurement, however as said by ALM manager the project of new IT system design and implementation is already on the paper and will be implemented soon.

## Comparison with Sweden

Comparison of risk management practices in Lithuania and Sweden is delimited to economic environment factors only and serves to layout general picture once more.

First factor that differs across the countries is interest rate volatility that is 10 times larger in Lithuania. It means that banks in Sweden do not face such adverse loss if they do not hedge their accounts because interest rate will not fluctuate so sharply.

Next factor that differs is concentration on target accounts. Whereas in Lithuania banks generally focus on NII account because markets do not react on market value changes, in Sweden markets are more efficient and shareholders may force managers to protect share price stability i.e. stress focus on equity value.

Overly, countries differ maturity of banking sector – Sweden has long tradition in banking, it has educated human resources, up-to-date IT systems, and most importantly availability of financial instruments on domestic and foreign markets to adjust its risk exposure.

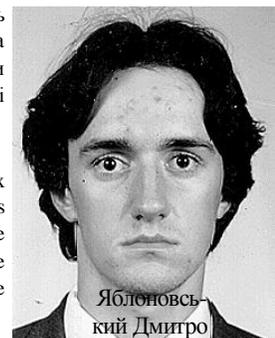
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## Флуктуації податкового тиску та їх вплив на державний бюджет України

Розглядаються питання ефекту зменшення податкового тиску, яке залишається дискусійним через неоднозначність можливого впливу на формування дохідної частини бюджету; альтернативні підходи до аналізу проблеми.

Effect of decreasing of tax pressure is under author’s attention. Its influence on the state budget is studied. Alternative approaches to the problem are proposed.



Яблоновський Дмитро