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**On the Process of Choosing
the Discount Rate.**

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November 2004

Minsk, Republic of Belarus

Abstract.

Discount rate serves many countries as a chief instrument of monetary policy. The process of choosing this rate is often not open to the wide public; changes of discount rate seem to have different natures from one occasion to another. This paper researches the factors, changes in which lie behind the alterations of the discount rate by the Central Bank authorities. The process of choosing the discount rate in small open economies (to which Belarus can belong) is established to be based upon the anchor value that either represents a discount rate of a single foreign country or a value combined from the basket of countries. Factors that influence the process of choosing the discount rate and time lags of their influence are studied; an average time lag is calculated.

Introduction.

How can economic power of the state be defined in the best way? Should it be the extent to which the government influences the economic activity of the agents, or the way national authorities are doing it? Will the deepness of the economic regulation or its broadness be a better measurement of the economic power of the state? The answer to all these questions lies, to my mind, in the sphere of personal beliefs and values. It is like answering the question of whether social democracy good or bad. Every possible argument can be brought down to inner values and preferences.

The scope of state economic power, to my mind, is best approximated by the efficiency of the decision-making it is exercising, to the proficiency of the algorithm it is using when solving economic problems and choosing between various possible solutions.

Analysis (as a theoretical basis of further adjustment) of the process of using such important instrument as a discount rate can contribute to the efficiency of the economic decision-making as a whole. Determining the factors that lie behind the final choice whether to alter the discount rate one way or another or leave it on the same level as before is the first step to be made when trying to develop the whole process of choosing the discount rate. Analyzing the time scope these factors should be considered in is the second step of no less importance than the first one. Defining relative contributions of all these factors to the whole picture is the third and final step. We will only try to make the first two steps in this paper.

Theory.

Discount rate is an instrument of monetary policy implementation used widely in many countries of the world. It is a rate at which commercial banks can get short-term loans from the Central Bank to cover their debt. This is a rather wide definition that allows multiple interpretations. As every instrument in all kinds of economic policies the discount rate can be used for many various purposes depending on the economic conditions of this or another country, economic system or economic goals of all ranges. Discount rate has always been considered one of the primary instruments of monetary policy for the reasons of its quick and quite direct impact on the economic agents. Central Banks can feel rather free when adjusting the discount rate for it to reach the value the authorities feel to be the most efficient at the time. This freedom of choice enjoyed by the Central Bank certainly does contribute to its eagerness to use this particular instrument of policy implementation.

It will be valid to expect the discount rate to be used more extensively during the times of increasing activity of economic agents. At the same time lowering the discount rate will certainly boost the economic activity through an easier availability of the short-term debt coverage provided by the Central Bank.

The question is, however, how to choose an adequate response in the form of discount rate alteration to changes in this, another or multiple economic factors. Changes in which factors should contribute more, should some of the factors be neglected at all or be taken

especially seriously – these are the questions that might and do arise before the decision-makers responsible for choosing the discount rate.

Another problem is that of time allowance – how much time should normally pass for the changes in economic or social factors to be considered for being reflected by the corresponding alterations of the discount rate. In other words, how far back in time should the decision-maker go in analyzing the changes in independent factors to find the necessity of reflecting these changes in a new discount rate?

These are two basic sets of questions that this paper addresses with the help of correlation analysis.

Description of Data and Methods of Research.

The nature of the discount rate is that it can be altered at any time with no necessary time periods. The necessity of alteration of a discount rate caused by the changes in economic environment is the only stimulus for a decision-maker to adjust the discount rate. For the purposes of our analysis we consider not the discrete and irregular time series of discount rate (or its approximations) but rather a monthly weighted average of the discount rate, Volumes of the loans issued by the Central Bank to the commercial banks serve as the weights in calculation of the monthly weighted averages of the discount rate. These time series are readily found for both the US and European economies at the corresponding websites. Seasonally adjusted time series are used for the analysis.

Two basic models are considered. The first model is that of a completely independent monetary policy, the second one is that of a country with a national currency pegged to the foreign one. Considering an independent monetary policy is used for the purpose of determining the economic factors that have the crucial impact on the process of adjusting the discount rate to the value that responds to the current situation in the best way. However, it still will not fully answer the baseline question of how has the initial value of the discount rate been chosen.

For this purpose the research addresses the extensive study of the monetary policymaking in the situation of official or unofficial pegs. We consider the case of Austria that pegged Shilling to the basket of currencies since the beginning of 1970s, and then narrowed this basket to several and finally one currency (German mark) in 1973 and 1979 respectively. The correlation analysis of the influence made by German discount rate and German factors is implemented. Time lags are not considered for this model since an assumption of quick transition of changes is accepted. Study of the pegged regime is handled for the purpose of determining the existence of a base and its role in the process of choosing the discount rate.

Results.

The research conducted as described above has several major results:

Main factors influencing the alteration of the discount rate are established on a basis of correlation analysis. The factors with the correlation coefficients are presented in

Annex1. Below is the list of the factors that proved to have statistically valid and considerable correlation coefficients with the discount rate time series:

- Current inflation;
- Inflation levels for the period of time in the past;
- Business activity (approximated by the stock trade volumes);
- Money volume (approximated by M1 aggregate);
- Currency/Deposit Ratio;

Time lags for each of these factors are calculated with the help of relative shifting the time series of independent and dependent factors. A weighted average time lag is established by weighting the time lag for each factor by the correlation coefficient of this factor's time series and discount rate time series. This average time lag turned out to be around 5 1/2 months. This period seems to be a reasonable time span that is needed for data collection, processing, transmission and establishing its validity.

It is quite interesting that the time lags found when analyzing the trade volumes (as an approximation of the business activity) happen to differ significantly for the time periods of relatively stable and rather irregular changes of business activity. Time lag for the first kind of market conjuncture is established to be about 10 months, which is an extremely long time span, while the second situation gives a time lag of 4 months, which is less than the average.

A case of Austria exercising various methods of pegging its national currency provides an outlook on what can official or unofficial pegging mean for the process of adjusting and – more importantly – choosing the discount rate. What the study of Austrian monetary policy over the course of years from 1973 to 1991 shows is that the extent of the influence of foreign monetary policy on a domestic one has not been changing significantly as Austria has been dropping currencies out of the basket, then adjusting the exchange rate of the shilling to the European corridor and then pegging to German mark only.

This means, to my mind, that the foreign discount rate can be and is involved in the process of choosing the domestic one. The correlation analysis shows a significant correlation between the domestic (Austrian) and foreign (German) short and medium-term interest rates, as well as between the discount rates of those two countries. Whether the peg is official or an unofficial one, one should definitely include a foreign discount rate in the algorithm of choosing the domestic one. This can be done by inclusion of the foreign discount rate in the formula that will have a domestic rate as its final result. However, a question arises of which discount rate to consider the “foreign one” as there can be so many various ways of pegging the national currency to the foreign currency/currencies. Everything is evident for the case of a simple one-to-one peg, when a national currency is pegged to a single foreign currency. Then a discount rate of this foreign country plays the role of the basis for a choice of the domestic one. What can be added to the basis will be discussed later on.

When a country does not follow a single foreign country's monetary policies, a basket of foreign currencies can be formed. Currencies of the major trade partners should be included in this basket, but with one important consideration in view. Austrian National Bank has in 1971 adopted a basket of foreign currencies as an anchor for its exchange rate and monetary policy. This basket comprised the currencies of nine important trading partners, which were not exactly the most important trade partners. French franc, for example was not included, nor was the dollar. Such exclusion of some currencies was done for the reason of pursuing the double goal of the Austrian National Bank to "maintain the value of the Austrian currency with regard both to its domestic purchasing power and to its relationship with stable foreign currencies."

As Tatom and others note in [11, p8], "this dual stability objective is only consistent if the value of the shilling is pegged to currencies which enjoy a stable purchasing power". This dual stability objective seems to be quite valid for the countries that can become small open economies (if they are not the ones yet). This is a case for Belarus, for example. Formation of the basket can include the currencies weighted on a basis of the volumes of trade. The basket will provide not only an anchor for monetary policy (either official or unofficial) but also a list of countries whose discount rates can be also weighted by the trade volumes to form a basis for choosing a domestic discount rate.

Which factors should build upon the basis of the decision-making that has its roots in either one single discount rate of a single country or a combination of several discount rates of several countries? The answer is rooted to the list of factors whose dynamics proved to have high correlation coefficients with the dynamics of the discount rate over

time. The most important of those are: current inflation; inflation levels for the period of time in the past; business activity (approximated by the stock trade volumes); money volume (approximated by M1 aggregate); Currency/Deposit ratio.

The exact coefficients for each of these factors in equation determining the final discount rate are still to be found with the help of the regression analysis. The expectation (based on the observations) is that the influence of past and current inflation will be the most important one, however not exceeding the role of the basic discount rate brought in from abroad.

Conclusions.

The main conclusion of the research is that the domestic discount rate of the small open economy should have an anchor in form of a foreign country's discount rate or an average discount rate of several countries. The way to combine discount rates of several countries is to weight those into an average index by the volumes of trade between these foreign countries and a home one.

It is a volume of trade that is to serve as a basis for determining the inclusion of the foreign country into the anchor's basket. However, following the results of Tatom and others [11] one should bear in mind that the dual stability of domestic purchasing power and relationship with stable foreign currencies is only consistent if the value of the domestic currency is pegged to currencies which enjoy a stable purchasing power.

Therefore the anchor basket should not necessarily include all most important trade partners.

What should add to and influence the anchor (the basis) of the discount rate is a number of factors whose time series' correlation with the dynamics of the discount rate proved to be the strongest. Those include current inflation; inflation levels for the period of time in the past; business activity (approximated by the stock trade volumes); money volume (approximated by M1 aggregate); Currency/Deposit ratio.

The average time lag (i.e. the time that was needed for the factor to influence the choice of the discount rate) for all the factors above is approximately 5 ½ months, which has been calculated by weighting time lag for each of the factors by a corresponding correlation coefficient.

The extent to which each of these factors is to influence the discount rate choice by the domestic Central Bank is still to be determined with the help of regression analysis.

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Annex 1.

Parameter Factor	Country/ Region	Time Period	Correlation Coefficient with Discount Rate	Optimal Time Lag	Correlation Coefficient with Optimal Time Lag
Producers Price Index (PPI)	EU (Eurozone)	Jan 1990 – Nov 1999	0,4827	5 months	0,5984
DJ Euro Stoxx Financials	EU	Jan 1990 – Nov 1999	0,7108	6 months	0,8485
Currency/ Deposit Ratio	USA	Jan 1990 – Feb 2004	-0,5396	Constant Increase	
S&P 500 rate of changer	USA	Jan 1995 – Jan 2004	0,641	10 months	0,85467
Trade Volume Dynamics, NASDAQ (activity)	USA	Jan 1999 – Dec 2003	-0,7297	4 months	-0,7346
Basis Growth Coefficient of M1	USA		-0,64463	Constant Decrease	