

AN INSTITUTIONAL SETUP OF THE CZECH MARKET FOR TREASURY SECURITIES

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Abstract:

This theoretical paper maps the transition experience of the financial sector using evidence from the Czech money market. Especially, the respect is paid to the structure of interest rates during the period from 1993 to 2001. The main components of the money market that mostly determine the term structure are the interbank deposit market and the market for short-term securities. The study abstains from interbank market survey and provides a detailed description of the default-free short-term securities market and its impact on past interest rate movements.

Keywords: treasury bills, treasury bonds, Czech National Bank, fixed income securities, taxation

JEL Classification: E43, E44, E58, G28

1. Introduction

This paper can be treated as an introduction to the Czech financial market which can be considered as central both to economic theories and financial practitioners. Because this study is mainly concentrated on the term structure of interest rates, closely related to the development of the whole financial market, detailed knowledge of market conditions is fundamental. More specifically, a substantial part of this paper is a comprehensive study of the market with fixed income securities that form a very important part of the Czech financial market. A description of other interest rate sensitive components is discussed only marginally and forms a complement to the default-free market survey.

There are basically two components of the financial market: the money market and the capital market. A substantial part of this chapter describes the functioning and development of the money market, because this market provides a great deal of information about the Czech short-term interest rate structure. The most important segments of the money market are the market for time deposits and the market for short-term bills. The continuous-time econometric models are based on zero-coupon bill yields, although interbank deposit rates may be a good approximation of the spot rate, too. In any case, both of these monetary instruments exhibit similar

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yield development and are highly correlated. The capital market can be further divided into bond, equity, and derivatives markets. In the context of this study, the most important part of the capital market is the bond market where trade with fixed income securities of maturities higher than one year is carried out. Although the data on coupon treasuries can be used in the cross-sectional setup to estimate interest rate models, this approach is not applied so often. Establishment of the equity market is related to an initial step in Czech economic reform, the voucher privatization of state enterprises. However, because of its complexity, the equity market is not addressed here. The market with derivatives is still developing and over the time period discussed in this study was not so important for financial modelling.

2. The Czech Market for Fixed Income Securities

The existence of an efficient and liquid market for fixed income securities is important for the determination of monetary policy by means of treasury operations. To better allocate the time preferences of investors and to transfer a part of the short-term capital out to later appreciation, the market for fixed income securities plays an irreplaceable role. Also, the debt market is indispensable when the government can no longer finance the budget deficit. Because stabilization of the budget deficit is one of the main objectives of fiscal policy, the importance of the short-term securities market is evident. The reasons referred to above explain why fixed income securities played a very important role in the medium-term financial strategy of the government and the Czech National Bank during 1993 – 2001.

The presented paper includes an institutional study of short-term securities on the money market and long-term securities on the capital market. The short-term fixed income market includes T-bills, CNB-bills, and to a less extent also NPF-bills. Long-term securities are T-bonds and selected banking bonds. Government T-bills and T-bonds are issued by the Ministry of Finance. CNB-bills and the NPF-bills are issued by the Czech National Bank and the National Property Fund, respectively. In addition to the description of the fixed income market, development of the other interest rate sensitive segment – time deposit market is illustrated at the end of this section.

2.1 *Short-term Securities*

Treasury bills, similarly to CNB-bills, appeared as a tool of the republic and federal governmental financing in 1992. T-bills are discount bills electronically registered. The primary issues of T-bills are organised by the CNB and coordinated with the Ministry of Finance.

T-bills are auctioned every second Thursday with up to CZK 10 billion in volume; maturities of bills are one week, and one, three, six, nine, and twelve months. For cash management, T-bills with maturity of four weeks are usually issued, and T-bills with maturity of 13 – 52 weeks are issued to cover long-term debt. The nominal value of a bill is CZK one million. An American (multiple price) auction technique was used to sell T-bills, bids are offered in terms of yields. Under this algorithm, minimum yield is set before each auction, and bids are arranged according to the yield and accepted from the lowest yield to the highest until the amount reaches the intended issue volume. Each bidder pays the price that is computed from the yield bid. Since January 1997, in connection with the change in the tax regime on T-bills (an accrued interest rate was taxed starting January 1, 1997), a single price (Dutch style) auction has been used. In contrast to the American auction, each bidder pays the lowest accepted price. Auctions are open for domestic as well as

foreign subjects. The average amount of T-bill emissions achieved 108 billion in 1999.

CNB-bills are discounted bills with maturities of four or twelve weeks, and from September 1994 also with maturities of 13 and 26 weeks. The primary emissions of CNB-bills affect banking sector liquidity and help regulate the monetary base, mainly to sterilize foreign capital inflows. The CNB permits thirteen possible algorithms of primary market auctions. First, there are five modifications of American and five modifications of Dutch auctions, sale according to order, sale by decreasing emission and sale for a fixed price. American auctions were held until July 1993, then Dutch auctions were introduced. Depending on the auctionary algorithm, participants submit competitive or non-competitive orders. To intervene on the market, the CNB can participate with additional or preferential order. Intervention with additional order means that the CNB buys unsold securities for the minimum price quoted in the auction. Preferential order then allows the CNB to participate on the market before the competitive orders are proceeded.

Figure 1

The Structure of Fixed Income Securities Market (October 2000)

Source: WoodCommerz Fixed Income Research, 2001.

The average amount of CNB-bill emissions increased rapidly from CZK 3.8 billion in January 1993 to almost CZK 140 billion in 1995. According to the statistics, CNB-bills for CZK 272.8 billion were in market by the end of October 2000. Starting October 1993, interest was subject to a 25 % withholding tax. The importance of operations by means of CNB-bills, however, consists mainly in long-term interest rate targeting. Over some periods of time, repurchase operations (repos) played an unsubstitutable role as they were used to immediately react to unexpected monetary development. This concerns the period in the second half of 1995 when amount of repo operations increased rapidly due to intention of the CNB to support inter-bank market activity through daily banking control. In the period of monetary crisis in the middle 1997, operations on the repo market were used by the CNB to stabilise the whole money market. Repo operations are therefore frequently applied by the CNB as close substitutes to the short-rate bills.

The total value of **NPF-bill** emission amounts to CZK 50 billion. The bills were issued in order to strengthen the asset side of commercial bank balance sheets and

could be converted into shares of privatised companies. NPF-bills are discount bills with a maximum maturity of one year and a nominal value of CZK one million. The emissions took place between December 31, 1993 and December 31, 1997 repeatedly under the restriction that the value of the bills is at most CZK 35 billion at any moment.

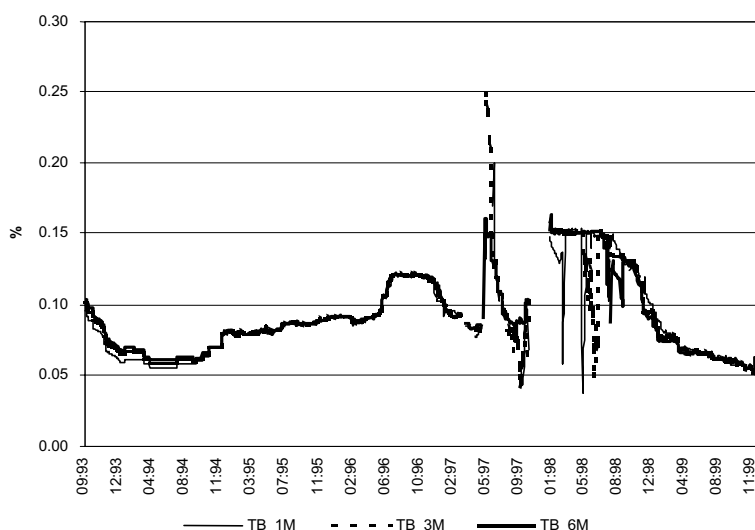
Participants of the auctions have to be members of the short-term securities market and have to sign an agreement with the CNB on participation in this system. The system is a book-entry system managed by the CNB that combines the roles of a central register and a real time settlement system. In accordance with the Securities Act, book-entry instruments with maturities of up to one year are registered there. Up to 1994, only banks and securities dealers/brokers were allowed to be short-term securities market members. Since implementation of the new system in August 1995, the participants have been divided into direct members (agents) and indirect members (clients). The requirements that each direct participant must meet are creditworthiness, market position (secondary market turnover at least 1 %) and the unconditional duty to participate in every auction. The group of direct members includes banks operating in the Czech Republic and securities dealers. Although only direct participants are counterparties for the issuer, other investors may use them as intermediaries. As far as each direct participant has a specific limit for its total amount and number of bids, this limit includes both a direct participant's order and the orders of its customers.

The CNB issues and regularly updates the short-term securities market system's rules book and rules governing the primary market. These rules specify the rights and duties of the direct participants and primary dealers, auction procedures, conditions of issue, the list of participants, and so on.

Short-term securities bought on the primary market are resold on the secondary market. The secondary securities market is an over-the-counter market for large institutional investors. This is due to the high nominal value of T-bills as well as other traded instruments (Czech National Bank bills, National Property Fund bills) at CZK 1 million, and the fact that the fees paid for keeping a securities account makes a lower level of investment disadvantageous. Trading is organised daily according to CNB regulations, either directly among participants or using intermediaries. Securities are traded on the secondary market solely on the basis of written orders delivered to the Registration Centre. The participants communicate with the Registration Centre on-line, and orders for purchasing and selling are paired automatically. The CNB operated on the secondary market as a "market maker" up to September 1994. In line with this strategy, the CNB quoted buying and selling prices for T-bills, CNB-bills and NPF-bills for up to CZK one billion per day. If the upper limit of traded volume (CZK 2.5 billion per day) was exceeded, the regulations allowed the price to be shifted within a 1.5 % range. As a result, banking reserves were precisely balanced at the end of each controlled period through direct trades with the CNB. However, banks were not forced to pay attention to their reserve development, and the interbank trade activity was negatively affected. The CNB dropped its role as a market maker on the money market in mid-1994, and since then, market liquidity has been secured by the group of big banks (Komerční banka, Investiční banka, Česká spořitelna and Československá obchodní banka), replacing the central bank in this function. As a market maker, each bank operates on the interbank and repo markets, announces its offer and bid quotations for a minimum transaction value of CZK 100 million, and on the CNB's request provides direct trades and repo operations with the CNB. Some advantages that the CNB provides to market makers include multiple bids in auctions, an increased limit to participate in auctions and individual repo operations and transactions with the CNB in favour of market makers.

The secondary market with short-term securities was developing quickly from 1993, and the average monthly turnover exceeds CZK 100 billion from 1998 to 2000. Although the secondary market is a well-developed part of the money market, it was particularly affected by a number of factors. Trading with CNB-bills was first negatively affected by changes in tax policy in 1996, introduced to prevent arbitrage trading through pension funds. Second, due to the same reasons, the T-bill market was influenced by the temporary termination of CNB primary issues; the last auction took place on July 10, 1997. Following this strategy, the CNB introduced three-month repo tenders to deal with the long-term surplus of liquidity in the banking system. Third, the change in tax legislation that became effective on January 1, 1998 discouraged non-financial enterprises from selling T-bills before maturity and reduced liquidity with shorter maturities. The development of short-term bill yields for all maturities is provided in Figure 2.

Figure 2
T-bill Yields for Maturities from One to Six Months



2. 2 Long-term Securities

T-bonds are issued as fixed interest-bearing securities in book-entry form with a face value of CZK 10,000 and a standard amount of issue of CZK 5 billion. The coupon is paid annually, and the coupon rate is based on the results of the auction. Auctions of five-year government bonds are held every February and August, and two-year bonds are auctioned every May and November. Longer maturities were issued recently, 10-years benchmark in 2000 and a 15-year issue in 2001. The American yield auction technique was used for placing T-bonds in 1997. The Central Registry is run by the Securities Centre. A group of direct participants was established as an open group to take part in T-bond auctions and provide subsequent sales of T-bonds. The direct participants also provide transactions for other companies and individuals that want to buy bonds on the primary market. The Czech Na-

tional Bank and the Ministry of Finance formulated criteria for the group of direct participants. Any applicant who meets the following criteria can become a member while any direct participant who does not obey them can be excluded. Each direct participant:

- holds his own account with the CNB Clearing System or is linked to the CNB Clearing System through another bank,
- is obliged to observe the conditions set announced by the administrator of an issue,
- is ready and able to act as an agent for indirect participants in the primary market and to ensure prudent conditions for this function,
- is obliged to comply with Auction Regulations,
- is obliged to participate in each T-bond auction announced by the CNB and to fill out at least the minimum amount of T-bonds within the scope of his own auction order (in case of not meeting this obligation, the participant is subject to exclusion from the group of direct participants of T-bond auctions on the basis of a decision by the issuer and the CNB),
- is responsible for timely settlements within the scope of auction orders on the day of an issue,
- is ready and able to provide information to the CNB,
- is able to provide suitable advertisements to promote the sales of T-bonds and to publish the procedures for involvement by indirect participants in the primary market,
- agrees to be included on the list of direct participants to be published by the CNB,
- as a part of the group of direct participants, is approved by the CNB Banking Supervision Department (banks) and by the Capital Market Supervision Department of the Ministry of Finance (securities dealers).

As mentioned earlier, bids are submitted in term of yields. In 1997, individualised limits and the number of bids, similar to T-bill auctions, were introduced. The main criteria for the size of limits are participation in T-bond auctions during previous years (total amount of bids, number of bids) and the share of each participant in secondary trading with T-bonds. The auctions are organised by the CNB, and each auction is announced in economic newspapers and through Reuters. The basic information available states the date and volume of issue, date and period of maturity, and the maximum accepted yield in auction. Economic newspapers issue a list of participants and the conditions for auctions of medium-term government bonds. The record of government bond owners is kept by the Securities Centre. The bonds can be purchased indirectly in the auction by one of the direct participants if the client has an open asset account. This is the best opportunity, because the possibility of purchasing the bonds in large volumes is limited due to the restricted liquidity of these bonds on the secondary market – on the Prague Stock Exchange or in the RM-System. T-bonds on the secondary market are listed automatically (without request and prospectus). The turnover of T-bonds consists of outright sales and an automated trade system. The total turnover of T-bonds listed on the Prague Stock Exchange reached almost CZK 250 billion in 1999. There were 18 treasury bond issues in the market by the end of 2000 with a total capitalization of CZK 105 billion. There were three special programs for treasury bonds to be issued in 2001; drought bonds of CZK 4.2 billion, the CZK 6.0 billion in bonds as deposit compensation of bankrupted credit unions and CZK 4.7 billion of government issues to cover outstanding debt to the former German Democratic Republic. Special programs thus increased the regular volume of issued bonds and the total amount of bonds achieved 75 billion in 2001. Bonds were attractive particularly for foreign investors, be-

cause the implied yield achieved almost double the foreign interest rate level in 1997 – 1998. In addition, agreements on prevention of double taxation and agreements on support of investments ensure that the foreign investor has no barriers against such investments. By the end of 2000, foreign investors held about 10 per cent of the total volume of Czech bond market. The main domestic holders of Czech government papers are banks and corporates that own two-thirds of the market.

The only exception where yield with a variable coupon was used were the so-called Flood Bonds issued by the government in August 1997 and sold to the public through a network of banks. The coupon was determined as fixed for the first year, namely at 12.5 per cent; in future years, it was determined by the development of the price level in the previous 12 months (year-on-year index of consumer prices in June plus 2.5 per cent).

The establishment of an eurokoruna market is related to the introduction of CZK convertibility and its acceptance as a settlement currency on an international scale. As a consequence of convertibility, the International Financial Corporation was the first multinational company that issued koruna eurobonds with a total amount of CZK 1 billion in November 1995. Issues of eurokoruna bonds contributed to increased international confidence in Czech monetary policy, and fast development of the total amount of bonds was connected to the macroeconomic rating of the Czech Republic. Eurokoruna bond issues were mostly popular with foreign international corporations and banks because foreign subjects are eligible to receive full coupon payment. The issuers are internationally known highly rated institutions, banks and corporations (IBRD, GE, Toyota, Commerzbank, etc.). The procedure under which eurobonds are issued is similar to the typical procedure on the eurobond market. Issues are not subject to Czech regulatory authority except the issues where international institutions have the Czech Republic as a member. These issues are subject to approval by the CNB. Borrowers typically have an AA rating or better. The bonds are settled through Euroclear or Clearstream. The market grew as investors arbitrated interest rate differentials via swaps. However, with changes in taxation for new domestic subjects in January 1998, these disparities were eliminated. The total amount of issued eurobonds exceeded CZK 95 billion during the period from 1995 until the end of 1997. There were about 70 issues with a capitalization of CZK 62 billion as of October 2000.

2. 3 Taxation of Fixed Income Securities

The taxation of fixed income securities is a factor that helps to explain the behaviour of different components of the money market. To understand the taxation principles, we have to distinguish between different securities as well as different time periods.

Trades on the interbank money market were not taxed directly, but a 41 % income tax was paid at the end of each year. Short-term government securities were taxed in such a way that the tax was paid immediately from yield-to-maturity when the trade was successfully matched. However, the taxation policy concerning short-term securities was often imperfect.

Czech T-bills were tax-exempt, however, transactions with T-bills began to be affected by the application of a 25 % withholding tax from January 1997. As a result, taxed and non-taxed T-bills were traded at the same time during the first half of the year. The profit from the return on T-bills was not subject to income tax if T-bills (after transaction) were held until maturity.

The CNB-bill interest rate had been subject to a 25 % withholding tax until 1997, however, insurance companies and pension funds were tax-exempt. The policy of

tax differentiation uncovered arbitrage possibilities through pension funds and, in fact, collapsed in February 1996. The consequence of tax differentiation between CNB-bills and T-bills resulted in separation of the yield curves on both securities in this period, because arbitrages through pension funds caused the yields on CNB-bills to be lower than the yields on T-bills of the same maturities. CNB-bills are not allowed to be bought by foreign subjects, and profit from the sale of this debt instrument is treated as a part of the tax base. FNP-bills were subject to a 25 % tax, but foreign investors did not have to pay tax at all (the exemption holds for up to CZK 10 billion).

Coupon income was tax-exempt for government bonds issued before January 1997. However, coupon income was subject to a 25 % withholding tax for other bonds issued before January 1998. Important changes were related to the coupon bonds issued after January 1, 1998. In contrast with the bonds issued before this date, accrued interest was now taxed as a part of capital gain. Therefore, it should not be profitable to "wash the coupon", i.e. to be taxed abroad by temporarily transferring the bond before coupon payment. This strategy was frequently applied by bond holders to avoid tax duty.

Starting 1998, the corporate tax rate had been set at 35 % (excluding investment funds and pension funds that were subject to a 25 % tax). It is evident that 1998 issues were "discriminated" in relation to other issues, and the lower demand for these issues was not offset even by the higher yield for which they were traded. However, corporate bonds are not specifically discussed in this study as they are burdened by a non-zero portion of default risk. The corporate tax is 31 % and the withholding tax on coupons is 15 % since 2000. Investment, mutual and pension funds, and individual investors are subject to withholding tax based on coupon income at this rate.

Non-residents, subject to a double-taxation treaty, usually receive a full discount for coupon payments. This part of investments considerably influenced the behaviour of the market in the second half of 1997 when the newly introduced changes in taxation were announced. T-bills issued in 1997, and due in 1998, were the most important investment targets of non-resident investors who held them until maturity.



An important introduction to the analysis of any particular interest rate structure is the institutional issue related to the financial market. This study provides a survey on the Czech financial market for which interest rate development is analysed based on market conditions from 1993 to 2001. The most important segments of the Czech financial market that affect the overall structure of interest rates are the markets for fixed income securities. Both the short-term and long-term fixed income markets as well as the different methods of each instrument taxation are covered in detail in this chapter. However, special attention is paid to the short-rate zero-coupon treasury bills as a direct measure of the default-free interest rate process.

This paper can be an introduction to the empirical efficiency study of different money market segments and also provides important information for econometric analysis of various interest rate models. The study is completed by description of short-rate structure on default-free securities and provided by graphs. However, the interbank rate and treasury bill rate developments are not particularly compared here as the detailed analysis of the interbank deposit market goes above the scope of this paper.

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