The Structure of Government Securities Markets in G10 Countries: Summary of Questionnaire Results

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Abstract

The Study Group on Market Liquidity, under the auspices of the Euro-currency Standing Committee (now the Committee on the Global Financial System), conducted a survey, using a common questionnaire, on the structural features of eleven government securities markets; Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom, and the United States, based on the understanding that degree of market liquidity is at least partly affected by market structure.

This paper is a summary of the survey results, focusing on the interesting features of each government securities market from the viewpoint of market liquidity. The features are summarised and compared across countries in terms of (1) degree of market liquidity, (2) market microstructure, (3) transparency, i.e. availability of price and volume information, (4) market fragmentation, (5) information extraction from yield curves, and (6) market surveillance.

Key words: market liquidity, government securities market, market structure, transparency, market fragmentation

JEL classification: G10, G18

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1. Introduction

Central banks have much interest in the liquidity of government securities market. This is partly because government securities markets are where central banks conduct open market operations and extract information on market participants' expectations regarding the future course of the economy, especially future inflation rates. In addition, a deep and liquid government securities market is also important for central banks from the viewpoint of macro-prudential policy. This is because, when the market is sufficiently deep and liquid, private financial institutions may be able to raise necessary funds through the market, and thus the lender of last resort functions of central banks are called upon only when truly needed.

While it is not easy to pinpoint what determines market liquidity, it is safe to say that degree of market liquidity is at least partly affected by market structure. In this sense, it may be worth examining the structural features of government securities markets from a viewpoint of market liquidity. Against this background, the Study Group on Market Liquidity, under the auspices of the Euro-Currency Standing Committee (now the Committee on the Global Financial System) of the Bank for International Settlements, conducted a survey based on a common questionnaire on the structure of government securities markets.[1] In addition to the five member countries of the Study Group, i.e. Canada, Italy, Japan, the United Kingdom, and the United States, six non-member countries joined the survey, i.e. Belgium, France, Germany, the Netherlands, Sweden, and Switzerland.[2]

The objective of this paper is to highlight interesting features of government securities markets based on contributions from the eleven countries, as well as to provide issues for future study regarding market liquidity. In this sense, this paper does not intend to indicate that the market of any specific country is "better" than that of other countries.

This paper's structure is as follows: in Section 2, the degrees of market liquidity are broadly summarised; in Section 3, the microstructure of each national market is described; in Section 4, the degree of transparency is compared across national markets; in Section 5, factors affecting the degree of market fragmentation are analysed; in Section 6, the role of government securities is discussed in the context of extracting information from yield curves, and in Section 7, several measures for market surveillance are described.

2. Degree of market liquidity

It may be useful to start with a brief overview of the degree of market liquidity in each of the surveyed countries. There are various ways to measure market liquidity, each of which captures a certain aspect of market liquidity. In this paper, due to availability of data through the questionnaire, two measures are highlighted. First, one of the simple and primitive measures is turnover ratios, which are the ratios of yearly trading volume against outstanding volume. Second, in order to estimate the degree of market liquidity, it may be interesting to compare bid-ask spreads because the spreads are a more direct measure of market liquidity.

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[1] The compendium of questionnaire results is attached to Part 1 (overview) of the report of the Study Group. The data in this paper and the compendium are as of the end of 1997 or in 1997. However, some important institutional changes since then have been incorporated and are indicated accordingly.

[2] Under such circumstances, each table in this paper is composed of two panels, each of which covers the five member countries and the six non-member countries, respectively. The countries within each group is lined up in alphabetical order.

2.1 Turnover ratios[3]

While the degree of market liquidity differs according to maturity or whether securities are benchmark or non-benchmark, it may be worthwhile to obtain a rough overview of the liquidity conditions in each market by comparing the turnover ratios for the overall market. Turnover ratios are defined as yearly-trading volume divided by outstanding volume.[4]

Among the countries surveyed, the turnover ratios range from 3 to 34. The ratios are high in Canada, the US France, and Sweden. The ratios are low in Belgium, the Netherlands, and Switzerland.[5]

While this section aims to compare the degree of market liquidity for cash government securities markets, it may be interesting, for reference purposes, to compare the trading volume of futures markets. Futures market trading volume is largest in the US followed by Japan. Other countries have relatively small futures markets. The cash-futures ratio, measured by cash trading volume divided by futures trading volume, is greater than one in all countries except Japan and the UK This may imply something about the relative degree of market liquidity between the cash and futures markets.

Table 1

Turnover ratio

	CAN	ITA	JPN	UK	US
Volume outstanding (a)[1]	285	1,100	1,919	458	3,457
Yearly trading volume (b)[2]	6,243	8,419	13,282	3,222	75,901
Turnover ratio (b) / (a)	21.9	7.7	6.9	7.0	22.0
(reference) Yearly trading volume in futures market (c)	185	2,036	18,453	3,294	27,928
Cash / futures ratio (b) / (c)	33.7	4.1	0.7	1.0	2.7

	BEL	FRA	GER	NEL	SWE	SWI
Volume outstanding (a)[1]	232	551	563	176	111	35
Yearly trading volume (b)[2]	947	18,634[3]	n.a.	450[3]	3,626	125[3]
Turnover ratio (b) / (a)	4.1	33.8	n.a.	2.6	32.7	3.6
<reference> Yearly trading volume in futures market (c)	28	n.a.	n.a.	not exist	1,137	90
Cash / futures ratio (b) / (c)	33.8	n.a.	n.a.	-	3.2	1.4

[1] The figures are for the end of 1997, in billions of US dollars, converted at 1997 year-end exchange rates (US$1 = US$1.43 = ITL1,770 = ¥130 = BEF37.1 = FFr6.02 = DM1.80 = Dfl2.03 = SKr7.93 = SFr1.46, £1 = US$1.65). [2] The figures are for the 1997 calendar year, in billions of US dollars, converted at the same exchange rates as above. Trading volume is calculated on a two-way basis, i.e. when dealer A sells a US$100 security to dealer B, a US$200 transaction is recorded, as opposed to US$100. [3] The figures may include trading other than outright transactions, such as repos or buy/sell backs.

[3] In the tables in this paper, the name of each country is abbreviated as follows. CAN for Canada, ITA for Italy, JPN for Japan, BEL for Belgium, FRA for France, GER for Germany, NEL for the Netherlands, SWE for Sweden, and SWI for Switzerland.

[4] In this analysis, total outstanding volume of all marketable securities is used as the denominator. However, when the government or the central bank effectively take a large portion of marketable securities out of circulation, the effective turnover ratios could be higher than those shown in Table 1. For example, the ratio for Japan would be 12.9, if government and central bank holdings are subtracted from the denominator. See page 17 for a discussion on government and central bank holdings.

[5] The aggregate turnover ratio for the so-called Euroland, i.e. Belgium, France, Italy, and the Netherlands, is 13.8. (Germany is not included in this calculation because its trading volume is not available).

2.2 Bid-ask spreads

Smaller bid-ask spreads indicate higher market liquidity. In this sense, it is meaningful to compare bid-ask spreads across countries. However, this is not as easy as it sounds, because actual market data on spreads are unavailable in many countries. Therefore, the quotes for which spreads are calculated, applicable for a trade size of US$10 million, need to be estimated by each central bank. In this sense, the spreads may not be completely comparable across countries.

Having said that, bid-ask spreads for on-the-run issues,[6] quoted in price terms, tend to be larger for securities with longer original maturities, as a reflection of larger price risk. Also, while the level of bid-ask spreads seems to significantly differ across countries, the spreads are the smallest in the US market for all original maturities. Specifically, the smaller spreads in the US market are pronounced for securities of longer original maturities.

Japan is the only exception to the pattern of wider spreads for longer maturities. In Japan, the spreads for 10 year bonds are smaller than those for 6-year bonds. This may be a reflection of the concentration of liquidity in 10-year bonds in the Japanese market.

Table 2

Bid-ask spread for on-the-run-issues[1]

		CAN	ITA	JPN	UK	US
Fixed coupon	2 years	2	3	5	3	1.6
	5 years	5	5	9[2]	4	1.6
	10 years	5	6	7	4	3.1
	30 years	10	4	16[3]	8	3.1
Index-linked	10 years	25	not exist	not exist	15	6.3

		BEL	FRA	GER	NEL	SWE	SWI
Fixed coupon	2 years	n.a.	4	4	not exist	4	not exist
	5 years	n.a.	5	4	n.a.	9	not exist
	10 years	5	10	4	n.a.	15	10
	30 years	n.a.	24	10	n.a.	27[4]	25
Index-linked	10 years	not exist	not exist	not exist	not exist	39	not exist

[1] The table shows bid-ask spreads for on-the-run issues. The spreads, given in one-hundredths of a currency unit for the face amount of 100 currency units, apply to interdealer transactions. [2] For 6-year bonds. [3] For 20-year bonds. [4] For 22-year bonds.

3. Market microstructure – in pursuit of better price discovery

3.1 Dealer market vs. auction-agency market[7]

Broadly speaking, two types of trading system exist in the secondary market for government securities: dealer markets and auction-agency markets. In dealer markets, dealers supply immediacy of trade by continuously providing bid and/or ask quotations. In this sense, they are called “quote-driven

[6] Most recently issued securities for each original maturity.

[7] For detailed characteristics of each market, see Dattels [1995].

markets". In auction-agency markets, buy-orders and sell-orders are matched by a centralised auction agency. Therefore, they are called "order-driven markets".[8]

In general, dealer markets are common for cash trading, and auction-agency markets are common for futures trading. However, there are several exceptions. For example, in Italy, most cash customer transactions are conducted in the auction-agency market (MOT), but long bond futures contracts are traded in the dealer market (MIF).[9] In Switzerland, nearly half of cash customer trading is conducted at the auction-agency market (SWX). Another interesting exception is Japan where a majority of interdealer trading is intermediated by brokers who play the role of an auction agency.

Table 3

Market structure

		CAN	ITA	JPN	UK	US
Cash market	customer	D	A	D[1]	D	D
	interdealer[2]	D	D[3]	A and D	D	D
Futures market[4]		[5]	A and D[6]	A	[5]	[5]

		BEL	FRA	GER	NEL	SWE	SWI
Cash market	customer	D[1]	D[1]	D[1]	D and A	D	D and A
	interdealer[2]	D	D	–	A	n.a.	–
Futures market[4]		A	A	A	Not exist	A	A

Note: D – dealer market, A – auction-agency market.

[1] Auction-agency markets exist, but their share in trading volume is marginal (not more than 10%). [2] Applies to trading intermediated by interdealer brokers (IDBs). [3] Applies to trading on the MTS, a specialised trading system for interdealer transactions. [4] The structure shown applies to the main session, and not to evening or overnight session. Foreign markets are only shown when trading volume is larger in the foreign market than in the domestic market. [5] The structure is somewhere between dealer market and auction agency market. It is a continuous auction-agency market, but no order-book exists. The incoming orders are routed to floor traders, and then matched bilaterally between floor traders who continuously "scream out" their buy or sell prices. [6] Auction-agency market in the foreign market (LIFFE) and dealer market in the domestic market (MIF).

3.2 Order matching system in auction-agency market

How orders should be matched in an auction-agency market is an area which has drawn the attention of authorities trying to make their markets more attractive. Traditionally, in most markets, orders were manually matched on the floor of the trading pit (open-outcry trading). However, thanks to the development of information technology, electronic processing has become possible. The benefits of electronic trading seem to be (1) increased speed of price discovery by quick execution which reduces the risk of price fluctuations, (2) operational efficiency by eliminating manual paperwork, and (3) extending the geographical reach of the market through the possibility of remote trading.

Because of these benefits, more and more futures markets are turning to electronic trading to remain competitive not only across exchanges, but also with OTC markets and new styles of electronic trading systems.[10] The LIFFE in the UK and the CBOT and the CME in the US are examples of such efforts. In these exchanges, open outcry trading has been the norm, but they are now shifting to electronic trading.

[8] In most cases, exchanges play the role of auction agencies.

[9] Italian bond futures contracts are also traded in the auction-agency market (LIFFE) in the UK

[10] Examples include Instinet, Posit, and the Arizona Stock Exchange in the US equities market. Similar innovations may occur in the government securities market in the future.

Table 4

Order matching systems in auction-agency markets[11]

		CAN	ITA	JPN	UK	US
Cash market	customer	–	E	–	–	–
	interdealer	–	–	E	–	–
Futures market		O	E[1]	E	O[2]	O[3]

		BEL	FRA	GER	NEL	SWE	SWI
Cash market	customer	–	–	–	E	–	E
	interdealer	–	–	–	E	–	–
Futures market		E	E	E	–	E	E

Note: O - open-outcry, E - electronic.

[1] In August 1998, the order matching system changed from an open outcry system to electronic trading. [2] Electronic trading is currently available for after-hours trading sessions, and the whole order-matching system is planned to be changed in 1999. [3] Electronic trading is available for after-hours trading sessions.

3.3 Primary dealer systems

In government securities markets, governments raise funds and central banks conduct open market operations. To facilitate such activities, primary dealer (PD) systems have been adopted in several countries, where a group of dealers are designated as PDs by the Treasury or the central bank. Such PDs have special rights such as greater access to primary market auctions, and in some cases, they are treated as counterparties in open market operations. However, in return, they must comply with special obligations such as active participation in primary auctions and market making in the secondary market with a certain degree of tight bid-ask spreads. Because of the obligations in the secondary market, the PD system can help enhance market liquidity.

Among the surveyed countries, all except Japan, Germany, and Switzerland have PD systems, but whether the system is one-tier or two-tier differs from market to market. While a one-tier structure, where there is no distinction among PDs, seems more popular, a two-tier structure is used in Canada and Italy where certain PDs have elevated rights and obligations.

The obligations to bid in primary auctions and to report to central banks and/or Treasuries are imposed in almost all countries which use PD systems. However, only Italy, the UK, Belgium, and France impose obligation to quote.

3.4 Tick size[12]

Tick size, the minimum increment in quoted prices/yields, may affect the level of market liquidity. Too large a tick size is harmful to market liquidity because matching supply and demand for a security would be more difficult with a large tick size. In addition, quoted bid-ask spreads, one measure of market liquidity, cannot be smaller than the tick size. On the other hand, too small a tick size might not enhance market liquidity either, because operational costs could increase with too small a tick size.

[11] Table 4 applies only to auction-agency markets, since orders are not matched in dealer markets.

[12] Tick size in OTC dealer market should be understood to be a pricing convention, because there is no entity, such as an exchange, which regulates the size of the minimum price increment.

Table 5

Primary dealer systems

	CAN[1]	ITA	JPN	UK	US
Structure	Two-tier	Two-tier	–	One-tier[2]	One-tier
Number of PDs (with elevated status)	28 (8)	32 (15)	–	16 (–)	37 (–)
Obligation to quote[3] Always	No	Yes	–	Yes	No
Obligation to quote[3] Both sides	No	Yes	–	Yes	No
Obligation to quote[3] Tightness	No	Yes	–	Yes	No
Obligation to bid in auctions[3]	Yes	Yes	–	Yes	Yes
Obligation to report[3]	Yes	Yes	-–	Yes	Yes

	BEL	FRA	GER	NEL[4]	SWE	SWI
Structure	One-tier	One-tier	–	One-tier	One-tier	–
Number of PDs (with elevated status)	12 (–)	12 (–)	–	13 (–)	10 (–)	–
Obligation to quote[3] Always	Yes	Yes	–	No	No	–
Obligation to quote[3] Both sides	Yes	Yes	–	No	No	–
Obligation to quote[3] Tightness	Yes	Yes	–	No	No	–
Obligation to bid in auctions[3]	Yes	Yes	–	Yes	Yes	–
Obligation to report[3]	Yes	Yes	–	No	Yes	–

[1] The PD system in Canada was changed in 1998. Former PDs and jobbers are now called Government Securities Distributors (GSDs) and (new) PDs, respectively. Their responsibilities were changed somewhat, but these changes do not affect the table. [2] From September 1998, a subset of 8 PDs have market-making obligations in index-linked securities, too. [3] In the table, obligation for Canada and Italy is for PDs with elevated status (jobbers <now PDs> – Canada, specialists – Italy). [4] A PD system was created in January 1999.

In cash markets, tick size differs significantly from country to country, ranging from 0.1/10,000 of face value in Canada and Italy to 11/10,000 in Sweden. While securities are quoted in price terms in most countries, all securities in Japan and Sweden, and securities with shorter maturities (5-year or less) in France are quoted in yield terms. The size is the same irrespective of maturity in all markets except Italy where zero coupon securities with an original maturity of 2 years or less are quoted with a smaller tick size.

On the other hand, in futures markets, the standard for tick size seems to have converged to 1/10,000 of the notional face value, with the exception of the U.S and France.

Consequently, in Japan, the UK, and Sweden, tick size is significantly larger in the cash market than in the futures market, while the opposite holds in Canada, Italy, the US, and France This difference may imply something about the relative degree of market liquidity between the cash and futures markets.

Table 6

Tick size

		CAN	ITA	JPN	UK	US
Cash market[1]	customer	0.1	0.1 – 1[2]	3 – 4[3]	3.1[4]	0.8 – 3.1
	interdealer	0.1	0.1 – 1[2]	3 – 4[3]	3.1[4]	0.8 – 3.1
Futures market[5]		1	1	1	1	3.1[6]

		BEL	FRA	GER	NEL	SWE	SWI
Cash market[1]	customer	1	1 – 2[7]	1	1	2 – 11[8]	1
	interdealer	1	1 – 2[7]	1	1	2 – 11[8]	1
Futures market[5]		1	2[9]	1	Not exist	1	1

[1] Tick size is shown in ten-thousandths of the face value of 100 currency units of each country. [2] A tick size of 0.1/10,000 of face value applies to zero coupon securities with original maturities of 2 years or less, and that of 1/10,000 applies to other securities. [3] In Japan, securities are quoted in yield terms with a tick size of 0.5 bp, which can be converted to from about 3/10,000 to 4/10,000 of face value in price terms for the 10-year benchmark. [4] In the UK, the tick size was 3.1/10,000 before gilts became quoted in decimals in 1998. [5] Tick size is shown in ten-thousandths of the notional face value of 100 currency units of each country. [6] This tick size applies to futures contracts for T-bonds and 10-year T-notes, which make up the dominant share of all futures transactions. [7] In France, securities with an original maturity of 5 years or less (BTANs and BTFs) are quoted in yield terms with a tick size of 0.5 bp, which can be converted to about 2/10,000 of face value for 5-year BTANs. Securities with an original maturity of 10 years or more (OATs) are quoted in price terms with a tick size of 1/10,000 of face value. [8] In Sweden, securities are quoted in yield terms with a tick size of 1 bp, which can be converted to anywhere between about 2/10,000 of face value (2-year benchmark) and 11/10,000 (16-year benchmark). [9] This tick size applies to 10-year contracts, which make up the dominant share of all futures transactions.

4. Transparency

4.1 Transparency in the secondary market

The relationship between market liquidity and transparency is complex. On the one hand, if the market is too opaque and one cannot see the current market value of securities, investors may exit the market because it would be very difficult to accurately value their portfolio. In this case, the depth of market participants would be reduced, and thus market liquidity would be decreased. On the other hand, if the market is too transparent and the information on order flows is perfectly disseminated, some large investors may exit the market because they do not wish to reveal their identity when conducting transactions for fear of possibly revealing private information about the traded securities.[13] In this case, the depth of market participants would also be reduced, and thus market liquidity would also be decreased. Making the issue more difficult to tackle, the appropriate level of transparency, i.e. what type of information is available, and to what degree, may differ from market to market depending on the nature of products being traded, as well as the environment surrounding the market.

4.1.1 Cash customer market

The overall degree of transparency in this market seems to be somewhat lower than in cash interdealer and futures markets. The availability of information is highest in Italy, where the auction-agency can handle the collection and dissemination of information. However, the degree of transparency is generally lower in the other countries which use dealer markets where the collection and dissemination

[13] In market microstructure theory, such large investors may be characterised as “informed traders”, who know more about the true value of the security than other traders.

of information is relatively difficult by nature. Also, a large number of traded products (issues) and the variety of customers may have made it difficult to maintain transparency.

Table 7

Degree of transparency in cash customer market[14]

		CAN				ITA				JPN				UK				US			
Type of info.		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**	
Dealer/Public		D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P
Pre-trade	more qts	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0
	best b-a	0	0	0	0	1	1	1	1	0	0	0	0	1	0	1	0	1	1	0	0
	freq.	0	0	0	0	1	1	1	1	0	0	0	0	1	0	1	0	1	1	0	0
Post-trade	history	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1
	freq.	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1

		BEL				FRA				GER				NEL				SWE				SWI			
Type of info.		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**	
Dealer/Public		D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P
Pre-trade	more qts	1	1	0	0	0	0	0	0	1	1	0	0					1	1	0	0	0	0	0	0
	best b-a	1	1	0	0	0	0	0	0	1	1	0	0					1	1	0	0	0	0	0	0
	freq.	1	1	0	0	0	0	0	0	1	1	0	0	n.a.				1	1	0	0	0	0	0	0
Post-trade	history	0	0	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0
	freq.	0	0	0	0	0	0	0	0	0	0	0	0					0	0	0	0	0	0	0	0

Standards for grading	
Type of info.	Price information consists of quotes of bid-ask prices (pre-trade) and intraday price history (post-trade). Volume information consists of order sizes (pre-trade) and accumulated trading volume (post-trade).
Dealer / Public	Shows for whom the information is available. The cells below "D" and "P" show information available to dealers and the public, respectively. For example, if information on the best bid-ask price is available to dealers, but not released to the public, a 1 is put in the cell below "D" and a 0 in the cell below "P".
more qts (quotes)	If price and volume information is available for more than the best bid-ask quotes = 1 If not = 0
best b-a	If price and volume information is available for the best bid-ask quotes = 1 If not = 0
freq.	If information is disseminated tick-by-tick on a real-time basis = 1 If not = 0
history	If intraday price history and accumulated trading volume are available = 1 If not = 0

[14] The data applies to OTC dealer markets, except for Italy, where an exchange-based customer market is dominant.

4.1.2 Cash interdealer market[15]

In the cash interdealer market intermediated by interdealer brokers (IDBs), the overall degree of transparency is generally higher than the cash customer market, which could be a partial reflection of the smaller number of intermediaries (IDBs) in this market than in the cash customer market.

A distinct feature of the market is that the pre-trade information in not publicly available except in Italy and the US This is probably because dealers tend to keep pre-trade information within the dealers' community in order to make customer trading more profitable.

Table 8

Degree of transparency in cash interdealer market intermediated by IDBs

		CAN				**ITA[1]**				**JPN**				**UK**				**US**			
Type of info.		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**	
Dealer/Public		D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P
Pre-trade	more qts	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0
	best b-a	1	0	1	0	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1
	freq.	1	0	1	0	1	1	1	1	1	0	1	0	1	0	0	0	1	1	1	1
Post-trade	history	0	0	0	0	1	1	1	1	1	1	1	0	1	0	1	0	1	1	1	1
	freq.	0	0	0	0	1	1	1	1	1	0	1	0	1	0	1	0	1	1	1	1

		BEL				**FRA**				**GER[2]**				**NEL**				**SWE**				**SWI**			
Type of info.		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**	
Dealer/Public		D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P
Pre-trade	more qts	0	0	0	0					–	–	–	–	0	0	0	0		0		0	–	–	–	–
	best b-a	0	0	0	0					–	–	–	–	1	0	1	0	n	0	n	0	–	–	–	–
	freq.	0	0	0	0		n.a.			–	–	–	–	1	0	1	0	. a	0	. a	0	–	–	–	–
Post-trade	history	0	0	0	0					–	–	–	–	0	0	1	1	.	0	.	0	–	–	–	–
	freq.	0	0	0	0					–	–	–	–	0	0	1	1		0		0	–	–	–	–

[1] The transparency applies to the MTS. [2] IDBs do not exist.

4.1.3 Futures market

The overall degree of transparency is generally higher in the futures market than in the cash market. Differences in the degree of transparency across countries are the smallest. This may be because traded products are highly standardised and traded in exchanges where collection and dissemination of information is relatively easy.

[15] Cash interdealer transactions are composed of direct transactions between dealers and transactions intermediated by IDBs. For all countries except Italy, grading is based on the information availability in the IDB market. In Italy, where interdealer brokers do not exist, grading is based on the information availability of the MTS.

Table 9

Degree of transparency in futures market

		CAN				ITA[1]				JPN				UK[2]				US[2]			
Type of info.		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**	
Dealer/Public		D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P
Pre-trade	more qts	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0
	best b-a	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	freq.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Post-trade	history	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	freq.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

		BEL				FRA				GER				NEL[3]				SWE				SWI			
Type of info.		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**		**Price**		**Vol.**	
Dealer/Public		D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P
Pre-trade	more qts	1	1	1	1	1	0	1	0	1	0	1	0	-	-	-	-	1	0	1	0	1	0	1	0
	best b-a	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	1	1	1	1	1	1	1	1
	freq.	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	1	1	1	1	1	1	1	1
Post-trade	history	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	1	1	1	1	1	1	1	1
	freq.	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	1	1	1	1	1	1	1	1

[1] Applies to information on the MIF. [3] Futures market does not exist. [2] Applies to information on the regular open-outcry floor trading.

4.2 Transparency in the primary market

In regard to the relationship between primary market transparency and secondary market liquidity, one may conclude that higher transparency, i.e. the pre-announcement of primary auction information, may increase market liquidity in the secondary market, and decrease governments' debt funding costs.

First, if an auction schedule is announced in advance, it is possible to trade securities in the form of when-if-issued trading even before the primary auction, if the authority permits.[16] In fact, when-if-issued trading is conducted in seven of the surveyed countries. When such trading is available, market liquidity for securities just after an auction (ordinary when-issued trading) or issuance may be enhanced, as it may be easier for market makers to provide tight bid-ask quotations if the true values of securities have been well tested in the market before the auction.

In addition, if an auction schedule is pre-announced, it is easier for auction participants to formulate bidding strategies to construct optimal portfolios. This would attract more investors to the market, which could help decrease governments' debt funding costs. All the surveyed countries pre-announce auction information such as dates, original maturities, and auctioned amounts.

A related issue is the announcement of coupon rates. In Canada and the US, coupon rates for new issues are not announced before auctions. They are set just below the average subscribed yield so that the subscription price of a security will be slightly less than par. This treatment could keep some investors away because they cannot predict coupon cashflows, however this also could attract other investors who hope to avoid redemption losses.

[16] When-if-issued trading is conducted between the auction announcement day, usually several days before the auction, and the auction day. Ordinary when-issued trading is conducted between the auction day and the issuance day.

Table 10

Transparency in the primary market

		CAN	ITA	JPN[2]	UK	US
Announcement of auction information[1]	Dates	Q	Y	Q	Y	Q
	Maturity	Q	Q	Q	Q	Q
	Amount	D	D	D	D	D
	Coupon rate	–	D	-	D	–
Availability of when-if-issued trading		Yes	Yes	No	Yes	Yes

		BEL	FRA	GER	NEL[3]	SWE	SWI
Announcement of auction information[1]	Dates	Y	Y	D	Q	SA	Y
	Maturity	D	Y	Q	D	D	D
	Amount	D	D	Q	D	D	D
	Coupon rate	D	D	D	D	D	D
Availability of when-if-issued trading		No	Yes	Yes	No	Yes	No

[1] Y – announced every year, SA – announced semi-annually, Q – announced quarterly, and D – announced several days (less than one month) before auctions. [2] Started to pre-announce auction information from March 1999. [3] Applies to announcements of tap-issuance schedules, because all issues are created on tap.

5. Market fragmentation

Government securities are fungible products compared to other debt instruments because there is only one issuer per country. However, each issue is different in its coupon rate and maturity, so the government securities market is also fragmented by nature. The degree of fragmentation is affected by several factors, such as the distinction between on-the-run and off-the-run issues, the profile of products, the profile of holders, and the institutional framework.

5.1 Fragmentation between on-the-run and off-the-run issues

The government securities market is fragmented between on-the-run securities and off-the-run securities. On-the-run securities are the most recently issued securities, which become off-the-run when a new issue is created for the same maturity.

There are strong preferences for on-the-run-issues. This is partly because their coupon rates tend to near the current market rates, thus they are traded near par, which may attract some investors who do not wish to incur redemption losses or gains. In addition, on-the-run issues provide the most suitable hedging instruments for active market participants who conduct short-term trading. This is because these securities are highly available, because a relatively short time has passed since issuance, meaning fewer securities are in the hands of investors who employ buy-and-hold strategies.

Reflecting these preferences, the bid-ask spreads for on-the-run issues tend to be smaller than those for off-the-run issues in most countries.

Table 11

Comparison between on-the-run and off-the-run issues[1]

		CAN		ITA		JPN		UK		US	
On-the-run or off-the-run		On	Off	On	Off	On	Off	On	Off	On	Off
Bid-ask spread – remaining maturity of	5 years	5	13[2]	5	8	9[3]	11[3]	4	4	1.6	6.3
	10 years	5	16[2]	6	8	7	7	4	4	3.1	6.3
	30 years	10	19[2]	14	14	16[4]	19[4]	8	12	3.1	12.5

		BEL		FRA		GER		NEL		SWE		SWI	
On-the-run or off-the-run		On	Off	On	Off	On	Off	On	Off	On	Off	On	Off
Bid-ask spread – remaining maturity of	5 years	n.a.	n.a.	5	6	4	4	n.a.	n.a.	9	n.a.	n.a.	n.a.
	10 years	5	7	10	6	4	5	n.a.	n.a.	15	n.a.	10	10
	30 years	n.a.	n.a.	24	10	10	10	n.a.	n.a.	27[5]	n.a.	25	n.a.

[1] The table compares bid-ask spreads for on-the-run and just off-the-run issues having similar remaining maturities. The spreads, given in one-hundredth of a currency unit for the face amount of 100 currency units, apply to interdealer transactions of fixed coupon bonds. While the spreads are generally for a common trade size of US$10 million, the trade size could differ significantly across markets. In addition, the data source differs according to market, i.e. actual market data are accessible in some countries, but the spreads must be estimated by the central bank in other countries. In this sense, the spreads are not completely comparable across countries. 2 The figure is the mid-point of a range. 3 For 6-year bonds. 4 For 20-year bonds. 5 For 22-year bonds.

5.2 Fragmentation by the profile of products

5.2.1 Maturity distribution

The number of original maturities has much to do with the degree of fragmentation. On the one hand, a large number of original maturities would further fragment the market, because several securities of different coupon rates with the same remaining maturity would coexist. On the other hand, investors may not be able to find on-the-run securities to fit their needs, if too few original maturities are available. In order to keep a good balance, each country has 5 (the UK) to 12 (Switzerland) original maturities. In lists of original maturities, there seem to be "key maturities" for which most of the countries issue securities; 3 and 6 months, 1, 2, 5, 10, and 30 years.

Even when an equal number of original maturities exists, the implication for market liquidity would be different between cases where total outstanding volume is evenly distributed among each original maturity, and cases where one original maturity takes a dominant share of the total outstanding volume. Among the surveyed countries, the maturity distribution of Japan and the Netherlands is distinctively skewed towards 10-year bonds, which may cause market fragmentation between 10-year bonds and other securities.

The number of benchmarks, ranging from 1 in Japan to 12 in Sweden, seems to be related to the maturity distribution.[17] The number seems to be larger when the volume outstanding is evenly distributed among each original maturity.[18]

[17] Benchmarks are the most liquid issues for each sufficiently liquid original maturity. Whether an issue is a benchmark or not is determined by market practice.

[18] In cash markets, trading volume seems to be relatively evenly distributed among different original maturities. However, in futures markets, trading volume is heavily concentrated in one of the maturities, mostly 10-year contracts, even when several maturities are listed. The following are composition ratios for the most active maturity among all trading volume: Canada – 96.2% (10-year), Italy – 99.9% (10-year), Japan – 98.4% (10-year), the UK – 100% (10-year), the US – 70.4% (30-year), Belgium – 96.4% (10-year), and Switzerland – 96.9% (10-year).

Table 12

Features of maturity distribution[19]

		CAN	ITA	JPN	UK	US
Number of original maturities		7	10	8	5	7[1]
Original maturities (M – month, Y – year)		3, 6M, 1, 2, 5, 10, 30Y	3, 6M, 1, 1.5, 2, 3, 5, 7, 10, 30Y	3, 6M, 2, 4, 5, 6, 10, 20Y	3M, 5, 10, 20, 30Y	3, 6M, 1, 2, 5, 10, 30Y
Distribution by original maturity[2]	1 yr and under	32%	17%	5%	7%[3]	21%
	1 – 5 years	29%	32%	8%	29%[3]	62%
	5 – 10 years	27%	48%	78%	34%[3]	
	Over 10 years	12%	3%	9%	30%[3]	17%
Number of benchmarks		7	5	1	3	7

		BEL	FRA	GER	NEL	SWE	SWI
Number of original maturities		7	8	6	6	n.a.	12
Original maturities (M – month, Y – year)		3, 6M, 1, 5, 10, 15, 30Y	3, 6M, 1, 2, 5, 10, 15, 30Y	6M, 2, 4, 5, 10, 30Y	3, 6M, 1, 5, 10, 30Y	n.a.	3, 6M, 5, 7, 9, 10, 11, 12, 13, 14, 15, 20Y
Distribution by original maturity[2)]	1 yr and under	19%	10%	2%	4%	n.a.	27%
	1 – 5 years	6%	27%	32%	10%		23%
	5 – 10 years	43%	53%	61%	74%		13%
	Over 10 years	32%	10%	5%	12%		37%
Number of benchmarks		2	7	4	2	12	7

[1] The number of original maturities in the US dropped to 7, after it stopped issuing 3-year securities in 1998. [2] Distribution is based on the volume outstanding. In calculating the component ratio, older issues out of the regular issue cycle are excluded. [3] Figures are for the remaining maturity, not for the original maturity.

5.2.2 Issue size and frequency of issues

The relationship between market liquidity and issue frequency is not simple. For a given amount of overall issuance, the average issue size and frequency of new issues will be negatively correlated. On the one hand, when issue frequency is low, i.e. particular issues remain on-the-run for a long time, the average issue size is larger and the degree of fragmentation is low. However, prices of on-the-run issues tend to deviate from par value, which some investors may not like. On the other hand, when issue frequency is high, prices of on-the-run issues are close to the par value. However, the average issue size is smaller thus the degree of market fragmentation is higher.

Among the countries surveyed, there seems to be a trend that issue frequency is lower when the outstanding volume of government securities, a proxy for the financing needs of the government, is small. This may be interpreted as the debt management authority of each country seeking to reduce issue frequency so that average issue size is maintained or increased, probably because the authority may be aware of the link between average issue size and liquidity in the government securities market. As a reflection of such efforts, the number of issues and the volume outstanding are positively correlated (see reference chart).

[19] Index-linked bonds are not included in the table.

Table 13

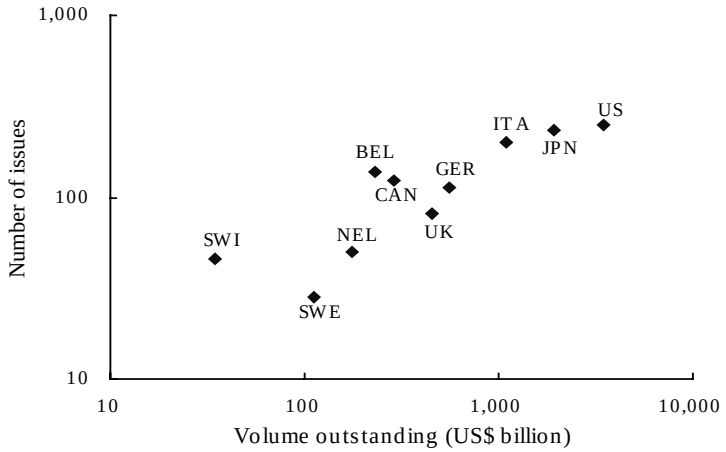
Features of issue size

	CAN	ITA	JPN	UK	US
Volume outstanding (US$ billion)[1]	285	1,100	1,919	458	3,457
Number of issues	125	199	234	82	248
Average issue size (US$ billion)[1]	2.3	5.5	8.2	5.6	13.9
Issue frequency (times a year)[2]	0.5 - 2	1 – 4	12	0.5 - 1	3 – 12

	BEL	FRA	GER	NEL	SWE	SWI
Volume outstanding (US$ billion)[1]	232	551	563	176	111	35
Number of issues	138	n.a.	115	50	28	46
Average issue size (US$ billion)[1]	1.7	n.a.	4.9	3.5	4.0	0.8
Issue frequency (times a year)[2]	Not fixed	n.a.	2 - 4	2	Not fixed	Not fixed

[1] The figures are for the end of 1997, in billions of US dollars, converted at 1997 year-end exchange rates of end-1997 (US$1 = US$1.43 = ITL1,770 = ¥130 = BEF37.1 = FFr6.02 = DM1.80 = Dfl2.03 = SKr7.93 = SFr1.46, £1 = US$1.65).
[2] Figures are given for original maturities where benchmarks exist, except for maturities of 1 year or less.

<reference chart>



5.2.3 Reopening system

Reopenings are conducted in ten of the eleven surveyed countries, i.e. only Japan does not have a reopening system.[20] However, while the general purpose of reopening is to increase the fungibility of benchmark issues, the rationale behind reopenings seems to differ for the US from the nine other countries (Canada, Italy, the UK, Belgium, France, Germany, Sweden, and Switzerland).

First, in the nine other countries, reopenings are conducted to increase issue size given dealers' limited subscription capacity. By creating an issue with several consecutive auctions instead of creating an issue with one auction, the authorities can expect larger benchmark issues and a lesser degree of market fragmentation, without taking a risk of paying risk premia to dealers who have to subscribe to large amounts of securities at one time.

[20] Some countries reopen issues for market surveillance purposes. Such reopenings are discussed later in section 6. Reopenings are also conducted to smooth out government receipts throughout the year, but such reopenings are not discussed in this paper because they have little to do with market liquidity.

Second, in the US, reopenings are conducted to increase the issue size of benchmark T-bills even though there is no problem in their subscription capacity. In the US, all benchmark 3-month bills are reopened 6-month bills, and one in four benchmark 6-month bills are reopened 1-year bills, because 6-month bills are created weekly while 1-year bills are created every four weeks.

Table 14

Reopening for creating an issue

	CAN	ITA	JPN	UK	US
Reopening for creating an issue	Yes	Yes	No	Yes	Yes

	BEL	FRA	GER	NEL	SWE	SWI
Reopening for creating an issue	Yes	Yes	Yes	Yes	Yes	Yes

5.2.4 Strippability

Stripping is the process of separating a coupon bond into its individual coupon and principal repayments, which can then be separately held and traded as zero coupon bonds. By doing so, investors can construct their portfolios to fit their needs. In this sense, strippability can enlarge the investor base, which enhances market liquidity. Among the surveyed countries, government securities can be stripped in all countries except Japan, Sweden, and Switzerland.

However, it must be noted that, holding the total financing needs of the government constant, the introduction of stripped bonds may reduce the net supply of coupon bonds, which could eventually increase the level of market fragmentation. In order to cope with this problem, several countries (the UK, Belgium, and Germany) have synchronized the timing of coupon payments to be unrelated to original maturities so that coupons of different maturities can be fungible.

Table 15

Features of strippability

	CAN	ITA	JPN	UK	US
Strippability	Yes	Yes[1]	No	Yes	Yes
Perfect synchronization of coupon payment dates	No	No	No	Yes	No

	BEL	FRA	GER	NEL	SWE	SWI
Strippability	Yes	Yes	Yes	Yes	No	No
Perfect synchronization of coupon payment dates	Yes	No	Yes[2)]	No	No	No

[1] From July 1998. [2] For strippable bonds (10 and 30-years).

5.3 Fragmentation by holder profile

Holder profile also affects the level of market fragmentation. For example, if some securities are held by market participants who do not sell securities once acquired, total outstanding volume would effectively be divided between volume held by such holders and volume held by active traders. Another example is, if securities are held by a certain type of market participant who reacts differently to new incoming information, total outstanding volume would effectively be divided according to the type of holder. Such division in total outstanding volume may lead to fragmentation in the market.

The first example may apply to holdings by the government and/or the central bank, whereas the second example may apply to holdings by non-residents.

5.3.1 Holdings by the government and/or the central bank

When the government and/or the central bank holds a large portion of the outstanding volume, the government securities market becomes fragmented, assuming that the government and/or the central bank do not sell securities once acquired. This fragmentation may lead to a decrease in the volume of securities actually tradable in the private sector (effective supply).

This is not the only effect of holding by the government and/or the central bank. Because they usually do not reveal their holding volume of securities issue by issue, market participants are unable to know the exact volume available in the private sector for a certain issue. This makes it difficult for market participants to precisely value securities, because the price of a security is partly determined by the security's supply and demand conditions. This may involve the further possibility that, in certain situations when the risk of short-squeeze is high, dealers may be inclined to stop quoting to protect themselves from being squeezed, because they do not know the volume of available securities.

Among the surveyed countries, the holding share of the government or central bank is highest in Japan, followed by Sweden. In other countries, the holding share is generally less than 10%.

Table 16

Holdings of marketable securities by the government or central bank

	CAN	ITA	JPN	UK	US
Holdings by the government	4.5%	0.1%	35.8%	3.6%	0.0%
Holdings by the central bank	5.3%	7.6%	10.5%		13.1%

	BEL	FRA	GER	NEL	SWE	SWI
Holdings by the government	4.3%	0.0%	n.a.	0.0%	21.4%	n.a.
Holdings by the central bank	0.7%	n.a.		0.0%	5.5%	

5.3.2 Holdings of non-residents

The holding share of non-residents could affect the level of market fragmentation. This is because non-residents, who usually hold government securities of a certain country in the context of global portfolio allocation, tend to have different risk exposure than residents, or domestic investors, and thus react differently to new incoming information than residents. In addition, the different reactions may also stem from the differences in how they interpret and digest the incoming information. If securities held by non-residents behave differently than securities held by residents, the market may be fragmented between holdings of residents and non-residents.

While the relationship between market liquidity and holding share of non-residents is unclear, it may be said that heterogeneous reactions to incoming information lead to better functioning of the market, particularly enhancing the robustness of the market, because when market participants react heterogeneously, it is easier to find counterparties to execute trades.

Among the surveyed countries, the holding share of non-residents is highest in the US, indicating the highly international investor base. The share is lowest in Japan, which may be a product of unfavorable tax treatment (described later).

Table 17

Holdings of non-residents

	CAN	ITA	JPN[1]	UK	US
Holdings of non-residents	25.0%	22.5%	10%	14.4%	36.9%

	BEL	FRA	GER	NEL	SWE	SWI
Holdings of non-residents	23.0%	12.9%	n.a.	24.0%	19.5%	n.a.

[1] Estimated.

5.4. Fragmentation by institutional framework

5.4.1. Tax

Generally speaking, taxes reduce the expected return of trading and holding securities. In particular, transaction taxes reduce the incentive to trade by creating a wedge between supply-prices and demand-prices. In this sense, taxes clearly reduce market liquidity. In addition, different taxation treatment according to the type of holder and security also reduces market liquidity by further fragmenting the market.

Withholding taxes exist in more than half of the surveyed countries: Italy, Japan, Belgium, France, Germany, Sweden, and Switzerland. In Italy, Belgium, France and Sweden, only personal investors, such as households, are generally subject to the tax, therefore it seems that most active traders in the market do not have to factor in the tax burden. However, in Japan only designated financial institutions are tax-exempt, and in Switzerland, no one is tax-exempt.[21] In these countries, market fragmentation may occur due to the different tax treatment of various market participants. In Japan, it is said that market fragmentation exists between non-taxable bonds and taxable bonds.

Transaction taxes exist in Belgium and Switzerland.[22] In Belgium, the transaction tax is only levied on households. In Switzerland, the tax does not apply to the dealing book of traders. Such tax treatment in these countries may indicate that the authorities are trying to mitigate the effect of the tax on market liquidity.

5.4.2 Accounting[23]

Although there is no definite conclusion for the relationship between particular accounting practices and market liquidity, it is safe to say that a market will be more fragmented if different accounting treatments are imposed according to the type of holder, holding purposes, and the status (listed or unlisted) of bonds on exchanges. In general, securities priced far from their par value may be avoided by market players who adopt historical cost accounting where they have to recognize redemption gains and losses.

The market is fragmented between listed and unlisted securities in Japan where listed securities (10 and 20-year bonds) are valued by either historical-cost, lower-of-the-cost-or-market, or mark-to-market method according to the type of holders, while unlisted securities (securities other than 10 and 20-year bonds) must be valued by the historical cost method.

[21] The Japanese government announced that non-residents will be exempt from the withholding tax after September 1999, if they meet certain conditions.

[22] In Japan, the transaction tax was abolished by end-March, 1999.

[23] Important issues on financial accounting are discussed here. However, from the viewpoint of market liquidity, issues on managerial accounting such as a performance evaluation system of traders may also be important.

Table 18

Taxation rules

(Y – exists, N – not exists)

		CAN	ITA	JPN	UK	US
Withholding tax		N	Y	Y	N[1]	N
Transaction tax	Cash	N	N	N[2]	N	N
	Futures	N	N	N[2]	N	N

		BEL	FRA	GER	NEL	SWE	SWI
Withholding tax		Y	Y	Y	N	Y	Y
Transaction tax	Cash	Y	N[3]	N	N	N	Y
	Futures	N	N	N	-	N	N

[1] After April 1998. [2] The tax was abolished by the end of March, 1999. [3] Although transaction taxes exists in the exchange, their share on the exchange is only 2%.

Table 19

Accounting practice

H – historical cost, L – lower of the cost or market, M – mark to market

		CAN	ITA	JPN	UK	US
Holder	Dealers	M	H, L	M	M	M
	investors	M	H, L	H, L, M	M	H, M
Purpose	Hold to maturity	-	H	-	-	H
	Available for sale	-	-	-	-	M
	Short-term trading	-	L	-	-	M
Security	Listed	-	H, L	H, L, M	M	H, M
	Unlisted	M	-	H	-	-

		BEL	FRA	GER	NEL	SWE	SWI
Holder	Dealers	H, M	H, L, M	L	H, M	H, M	H, L, M
	investors	H, M	H, L	L	H	H, L	L
Purpose	Hold to maturity	H	H		H, M	H	H
	Available for sale		L				L
	Short-term trading	H, M	M		H, M	M, L	L, M
Security	Listed	H, M	H, L, M	L	H, M	H, L, M	H, L, M
	Unlisted			L			H, L, M

6. Extraction of information

One expected attribute of government securities markets is that central banks derive information on market expectations for future interest rates from yield curves. In order to derive accurate information, a smooth and fitted yield curve is needed.

In addition, central banks need tools to precisely extract information from yield curves. Historically, central banks relied on the price information of conventional coupon bonds. However, it was not very easy to extract expectations for the real interest rate. In addition, central banks must mathematically eliminate the coupon effect in order to estimate the zero coupon rate. Under such circumstances, index-linked bonds and stripped coupons function as new tools to extract information more accurately.

Table 20

Features of index-linked bonds

	CAN	ITA	JPN	UK	US
Original maturity	30-year	-	-	Various	10, 30-year[1]
Volume outstanding (US$ billion)	5.9	-	-	51.9	33.0
Ratio in total volume	2.1%	-	-	11.3%	1.0%
Number of issues	2	-	-	13	2
Method of issue	Uniform-price auction	-	-	Uniform-price auction[2]	Uniform-price auction
Choice of index	CPI	-	-	CPI	CPI
Indexing of cashflows	Capital-indexed[3]	-	-	Capital-indexed[3]	Capital-indexed[3]
Length of lag	3 months	-	-	8 months	3 months

	BEL	FRA[4]	GER	NEL	SWE	SWI
Original maturity	-	11-year	-	-	Various	-
Volume outstanding (US$ billion)	-	3.3	-	-	11.4	-
Ratio in total volume	-	na	-	-	10.3%	-
Number of issues	-	1	-	-	5	-
Method of issue	-	Syndication	-	-	Tap	-
Choice of index	-	CPI	-	-	CPI	-
Indexing of cashflows	-	Capital-indexed[3)]	-	-	Zero coupon[5], Capital-indexed	-
Length of lag	-	3 months	-	-	2-3months	-

[1] In 1998, the US started to issue 30-year bonds, but stopped to issue 5-year bonds. [2] In November 1998, the method of issue changed from tap to uniform-price auction. [3] Principal repayment is the product of the bond's nominal value and cumulative changes in the index. Coupon payments equal the fixed coupon rate times the inflation-adjusted principal amount. [4] In September 1998, France started to issue index-linked bonds. [5] Principal repayment is adjusted for inflation.

6.1 Index-linked bonds

Central banks can theoretically estimate expected inflation rates by observing the yield differential between index-linked bonds and ordinary coupon bonds. Although the initial purpose of introducing index-linked bonds may be to reduce the government's debt funding costs, they are issued in almost half of the surveyed countries (Canada, the UK the US, France, and Sweden) and are utilized, to some extent, as a tool to extract information.

6.2 Stripped bonds

Another way to extract information from yield curves is to use the rates on the strips. When stripped, one on-the-run 10-year coupon bond becomes 21 zero coupon bonds composed of one principal and 20 coupon strips when coupons are paid semi-annually. Central banks can derive zero coupon rates directly from each of the 21, without having to consider the coupon effects of conventional coupon bonds.

7. Market surveillance

A manipulation-free market surely leads to active market participation by dealers and investors. As the base of market participants expands, market liquidity is all the more enhanced. In this sense, adequate market surveillance is necessary for a deep and liquid market.

In the secondary market, several measures are taken to reduce expected profits by attempting market manipulations such as short squeezes. One approach, taken by all countries except Japan and Germany, is to formulate rules and practices for delivery fails. This facilitates short-sales of securities by dealers, increasing market depth. The other approach is to increase the availability of securities by lending and reopening securities. Italy, the UK, the US, Belgium, Germany, and Sweden have a securities lending scheme allowing central banks to lend securities which are in short-supply. Also, nearly half of the surveyed countries (Canada, Italy, the UK, the US, and Belgium) are prepared to reopen any security when market integrity is challenged. In practice, there have been few occasions when the authorities actually reopened securities for this purpose.

In the primary market, nearly half of the surveyed countries (Canada, Japan, the UK, the US, France) have bidding or allocation limits in auctions, in order to prevent concentration of securities with a certain dealer. This measure can improve market liquidity by contributing not only to preventing attempts to corner the market, but also by diversifying the profile of security holders.

Table 21

Features of market surveillance

		CAN	ITA	JPN	UK	US
Rules / practices for fails		Yes[1]	Yes[1]	No	Yes	Yes[1]
Securities lending / repo to prevent squeeze		No	Yes	No	Yes	Yes
Reopening to prevent squeeze		Yes	Yes	No	Yes	Yes
Auction procedure	Bidding limit	Yes	No	No	No	No
	Allocation limit	No	No	Yes	Yes	Yes

		BEL	FRA	GER	NEL	SWE	SWI
Rules / practices for fails		Yes	Yes	No	Yes	Yes	Yes
Securities lending / repo to prevent squeeze		Yes	No	Yes	No	Yes	No
Reopening to prevent squeeze		Yes	No	No	No	No	No
Auction procedure	Bidding limit	No	No	No	-[2]	No	No
	Allocation limit	No	Yes	No	-[2]	No	No

[1] While official rules for delivery fails do not exist, clear practices have been established among market players. [2] Issues are created by tap-issuance, not by auctions.

<reference> Dattels, Peter, "The Microstructure of Government Securities Markets", IMF Working Paper, November 1995