

DEBT MANAGEMENT: A SURVEY OF THEORETICAL DEVELOPMENTS AND INNOVATIONS IN EUROPEAN PRACTICES

Guido Wolswijk and Jakob de Haan***

Introduction

Debt management practices in Europe are evolving quickly. The working environment of government debt managers in Europe has transformed considerably during the last few years. The introduction of the euro was the most significant one, creating conditions for a pan-European capital market. Exchange rate risks within the euro area no longer exist, market conventions have been harmonised and efficient linkages between European settlement systems have been established. Thus, debt managers became small to medium-sized players in a European capital market, instead of the dominant player in the national market. Consequently, competition among debt managers increased, stimulating a more efficient primary market and a deeper, more liquid secondary market.

Lower government deficits and debts have also changed the work environment of debt managers. Standing at 5.1 per cent of GDP in 1995, the average deficit in the euro area declined continuously until 2000, when a small surplus was reported of 0.2 per cent of GDP.¹ After having peaked at 75.4 per cent of GDP in 1996/1997, the average debt ratio in the euro area declined continuously until 2002, when it stood at 69.0 per cent of GDP. Reduced gross borrowing needs have started discussions on which instruments to use to finance debt, how to preserve liquidity in the market, and what role for interest rate swaps.

These developments have also affected theoretical thinking on debt management. In particular, the fiscal constraints introduced in the Maastricht Treaty have influenced theoretical work on deficit stabilisation. The independence of the ECB and the changed policy constellation, with one monetary policy actor and twelve national fiscal authorities, have been reflected in the academic literature as well.

This paper reviews recent developments in debt management in Europe, focussing on a few key aspects. Relevant theoretical developments as well as practical innovations in debt management since EMU are presented.² Key aspects we focus on are the objectives of debt management (section 1), the organisation of

* Fiscal Policies Division, European Central Bank. E-mail: guido.wolswijk@ecb.int
The views expressed in this paper are those of the authors and do not necessarily reflect the views of the European Central Bank.

** Faculty of Economics, University of Groningen and CESifo, Munich.

¹ This includes 1.1 per cent of GDP receipts on the sales of UMTS licenses. After 2001, deficits have been re-introduced, standing at an average of around 2.6 per cent of GDP in 2003 in the euro area.

² We refer to Favero *et al.* (1999) and Missale (1999) for comprehensive studies on government debt management before EMU.

debt management (section 2), the maturity of debt (section 3), inflation-indexed debt (section 4), debt denomination (section 5) and the ownership of debt (section 6). The final section offers our conclusions and considers some upcoming challenges for debt management in Europe.

1. Debt-management objectives

Theories on optimal debt management have emphasised a variety of goals over time, including macroeconomic stabilisation, supporting monetary policy, minimising costs and minimising risks.

Tobin (1963) looked at debt management primarily as a tool for macroeconomic stabilisation, with minimisation of interest costs coming secondary, and risk minimising not playing any role at all. Thus, in an economic upturn, issuance of new debt should be concentrated on longer maturities, driving up long-term interest rates, thus cooling off the economy.

Tax smoothing is the central government objective in Barro's work (1999). Debt levels in his approach vary over time to allow smooth tax rates, which is welfare improving. In his approach, issuing debt contingent on uncertain developments would be optimal. GDP-indexed debt, for instance, could be issued, with returns dependent on GDP: in a high growth environment, a higher return can be offered without changing tax ratios. Not being available, attention focuses on combinations of conventional instruments (nominal bonds, indexed bonds and foreign-currency bonds) that may produce similar results (see e.g. Missale, 1999). Which combination of instruments is optimal then depends on the type of shocks that the economy experiences. Inflation-indexed debt, for instance, is optimal in case of demand shocks: assuming a positive shock, rising GDP lowers the budget deficit, which is countered by rising nominal interest spending due to higher inflation. The choice of debt maturity can also play a role in smoothing tax rates (Angeletos, 2002).

More recently, Missale (2000) has suggested deficit stabilisation as the main objective of debt management. The costs of using debt instruments for reducing the likelihood of budget balances breaching the 3 per cent of GDP deficit limit need to be weighted against the costs of the deficit exceeding 3 per cent of GDP. He argues that fluctuations in the deficit-to-GDP ratio can be minimised via an appropriate selection of debt instruments on the basis of inflation and real GDP-sensitivity of interest payments. The optimal structure depends on sign and strength of the correlations between inflation, real GDP growth and interest rates. Missale models the changes in optimal debt management under EMU following the introduction of a single monetary policy in the euro area, which affects the aforementioned correlations. Assuming the ECB to give high priority to price stability, his model shows that a combination of long-term conventional debt and inflation-indexed debt would be optimal for the purpose of deficit stabilisation.

Turning to practice, the primary objective of debt-management agencies is to ensure financing of the annual borrowing at minimal (medium-term) costs, at acceptable risks. The precise wording and emphasis differ somewhat between countries, as the two examples below show:

Italy: "Efficient public debt management aims at meeting public borrowing requirements, and the renewal of redemptions by choosing a strategy that optimally combines the cost and risks of funding." (Dipartimento del Tesoro (2003), *Guidelines for public debt management for 2004-05*, p. 2),

and

France: "... to manage the French Government's debt and treasury in the best interests of the taxpayer while maintaining the best possible conditions of security and risk control." (Agency France Tresor (2003), *2002/2003 Annual Report*, p. 4).

The more concrete operational targets or guidelines for debt-management units also differ among the European countries. Often, these are based on asset-liability studies or cost-at-risk models, weighting interest costs against budgetary risks. Targets can take the form of a target (range) for the average maturity or the (modified) duration,³ subject to certain restrictions such as quantitative limits on the use of derivatives. For example, the French debt agency has a 2004 target of an average maturity (after swaps) of 5.3 years, implying a decline by nearly half a year compared to 2003. The Belgian debt agency has to operate within limits for the shares of different maturities in total debt, such as a 25 per cent cap for total euro-denominated debt for which the interest rate needs to be reset within a year. In the Netherlands, after focussing on duration, now the total annual refinancing amount (including swaps) is targeted, at a level of 9 per cent of GDP.

These goals of European debt managers bear little resemblance to the objectives identified in the academic literature. Active support to macroeconomic policies has lost ground because of reduced confidence in active demand management and more integrated capital markets. Tax smoothing likewise has been ignored as debt-management goal. Instead of focussing on the budget with the aim of avoiding large changes in taxes, debt managers focus more narrowly on reducing public interest payments and avoiding (risks of) large fluctuations. While *ceteris paribus* low interest rate costs contribute to lower taxes, interactions with other budget elements are not taken into account, possibly resulting in sub-optimal debt management from the tax-smoothing point of view.

The lack of practical follow-up also applies to the deficit stabilisation goal. Where the optimal composition of debt depends on types of shocks and on

³ The modified duration measures the change in the current value of the debt portfolio if the yield curve changes by 1 basis point.

covariances between macroeconomic variables, these are difficult to predict and may be subject to change. Stabilising deficit ratios could also conflict with the goal of output stabilisation. Finally, current experiences indicate that the costs of excessive deficits, politically, economically and financially, may be lower than anticipated. Taken all together, the benefits of adapting debt-management practices for deficit stabilisation seem limited.

Although the objectives identified in the academic literature do not coincide with the goals of the debt managers, Missale (2001) finds actual debt structures to closely resemble the optimal debt composition. In most countries, fixed-rate long-term debt dominates the funding of debt. The shares of inflation-indexed debt are below optimal levels. Thus, he concludes that current debt structures provide a sufficiently good insurance against macroeconomic shocks, and contribute to reducing risks of deficits above 3 per cent of GDP.

Nevertheless, the gap between the theory and the practice of debt management is striking. As mentioned by Leong (1999), possible causes include the nature of the models used (with taxpayers and bondholders basically coinciding). Differences in accounting conventions may also explain the different focuses. Whereas changes in the market value of the debt portfolio are central in most theoretical contributions, debt managers and policy makers in general focus on annual budgets.

2. Organisation of debt management

The evolution in the organisation of debt management is closely linked to changes in thoughts about debt-management goals. Emphasising macroeconomic stability naturally leads to the debt-management task being arranged to the Ministry of Finance, while fear of interference with monetary policy may lead to operational responsibilities being assigned to the national central bank.

The shift in thinking on the role of debt-management units that took place around the start of the Nineties was also reflected in giving more independence to the units involved. A stronger focus on “narrow” debt-management goals allows for more delegation to separate units. Also, higher product complexity and competition among debt managers requires a high degree of operational independence and professionalism, which is easier to accomplish for a non-government unit. Cost considerations sometimes also played a role.⁴

While the process started earlier, the advent of the euro and increasing competition between debt managers gave additional impulses to granting more independence to debt managers. Increasing independence of debt managers in France and Germany is a relatively recent development (2001).

⁴ In Germany, debt management was centralised in 2001, and is expected to deliver interest payments savings of up to ¼ bln euros per year.

Table 1

Government Debt Managers in the Euro Area

	Manager	Institutional position	Debt manager classification*	Website
Austria	Österreichische Bundesfinanzierungsagentur	Part of Ministry of Finance	SMO	www.oebfa.co.at
Belgium	Federale Dienst van de Staatsschuld	Part of Federal Public Service Finance	DMO	www.treasury.fgov.be/interdette
Finland	Valtiokonttori	State Treasury is supervised by Ministry of Finance	DMO	www.valtiokonttori.fi/rahpa/bulletin/bulletin.htm
France	Agence France Trésor	Part of Ministry of Economic Affairs, Finance and Industry	DMO	www.aft.gouv.fr
Germany	Finanzagentur	Company with German state as sole shareholder, represented by Federal Ministry of Finance	SMO	www.deutsche-finanzagentur.de/eng/
Greece	General Accounting Office	Part of Ministry of Economy and Finance	DMO	www.mof-gl.gr/en/home.htm
Ireland	National Treasury Management Agency	Chief Executive, appointed by the Minister for Finance, is directly responsible to him	SMO	www.ntma.ie
Italy	Dipartimenti del Tesoro	Part of Ministry of Economy and Finance	DMO	www.tesoro.it/publicdebt
Luxembourg	Trésorerie de l'Etat	Part of Ministry of Finance		www.etat.lu/TS/
Netherlands	Agentschap van Financiën	Part of Ministry with much autonomy	DMO	www.dutchstate.nl
Portugal	Instituto de Gestão do Crédito Público	Part of Ministry of Finance	SMO	www.igcp.pt
Spain	Tesoro Público	Part of Ministry of Economy	DMO	www.mineco.es/tesoro/htm/deuda/index_en.htm

* SMO stands for Special debt Management Office, being a separate unit outside the Ministry of Finance to which operational responsibilities are delegated. DMO represents a unit for debt management without such delegation. Classification: Currie *et al.* (2003) and own classification.

The precise organisation of debt management differs between countries (Currie *et al.*, 2003). Some countries emphasise the role of portfolio management in debt management, and delegate operational responsibilities to separate units outside the Ministry of Finance (SMO), although the Ministry ultimately remains responsible. Examples include Austria, Ireland and Portugal. Other countries, such as Belgium, France and the Netherlands, have not gone that far, and maintain the debt-management unit as part of their Ministry, but with more independence. These countries emphasise the role debt management can play in public policy, e.g. regarding maintaining well-developed financial markets. Table 1 presents an overview of the organisation of debt management in the euro-area countries.

3. Government debt maturity

Government debt maturity is seen as a key parameter in debt management, both in the academic literature and in practice. In theory, issuing short-term debt is cheaper than issuing long-term debt if the normal term structure prevails. Taking just a short-run cost perspective, the optimal policy probably would be to borrow (much) short-term and to invest in the equity market (Campbell and Shiller, 1996). Against this, the refinancing risk is higher for short-term debt. Regular refinancing implies a higher risk of having to refinance debt at higher interest rates. Such policy will also add to volatility of budget balances and of household disposable incomes.

Debt maturity has often been related to the size of government debt, following a time-consistency point of view. Missale and Blanchard (1994) expect a negative relation between debt and maturity above 100 per cent of GDP, arguing that high debt increases government incentives to inflate the debt burden away, requiring the government to issue short-term debt. De Haan *et al.* (1995) argue that a positive connection between size of debt and maturity sometimes can be expected if a higher debt ratio forces the debt manager to lengthen maturity to avoid a crisis of confidence. In the model of Drudi and Giordano (2000), negative relations between the size and the maturity of debt prevail at low and extremely high debt levels. In the first case, it reflects fears of inflating away debt if debt becomes larger, and at extremely high debt levels the default risk premia become too large for governments to use long-term debt. In the intermediate range, the relation becomes positive, as governments try to avoid refinancing risks by lengthening maturity.

In addition, Miller (1997b) considers effects of political instability on debt maturity. Political instability causes inflation uncertainty, reflected in higher long-term interest rates. This creates incentives to issue a larger portion of debt with short-term maturity.

The link between central bank independence and debt maturity is also explored in the literature. A very high level of central bank independence is a wall against inflationary pressure from a government. Falcetti and Missale (2001) argue that central bank independence is more efficient in overcoming time-inconsistency

problems and in reducing inflationary expectations than issuing inflation-indexed or foreign-currency bonds. Thus, longer maturities in the late Eighties are attributed to increased central bank independence, reflecting increased investors' confidence in longer-run price stability. With a larger volume of nominal bonds outstanding, the sensitivity of output to inflation, and thus the effectiveness of monetary policy is increased. Rising current inflation with constant inflation expectations keeps expenditures constant, thus avoiding changes in distortionary tax rates.

Based on the above, the EMU regime would suggest a lengthening of maturities. Time-consistency concerns have abated, as central banks have a high degree of independence, direct monetary financing has been ruled out, and price stability was set as the primary objective of the ECB. Furthermore, debt levels have come down following the rules of budgetary discipline enshrined in the Maastricht Treaty.

The maturity choice of European debt managers since EMU has been partly motivated by liquidity concerns, with low liquidity premia contributing to low costs. The development of EMU, with decreased cross-border obstacles to trade, has caused an increased interest in issuing standardised "plain vanilla" government bonds, especially 10 year bonds. Usually, the size of these bond issues is rather large compared to the pre-EMU years, with the aim of achieving a high degree of liquidity in the markets. While issues of about 2 bln euros were standard in smaller countries pre-EMU, the minimum nowadays is 5 bln euros, with large countries in the euro area issuing bonds of over 20 bln. euros.⁵

Substantially lower long-term interest rates compared to pre-EMU years also created incentives for a focal shift to the long-term segment of the capital market. This applies in particular to countries with previously less disciplined fiscal policies, such as Greece and Italy. The exchange rate risk premium in interest rates vanished with the adoption of the common currency.⁶ In addition, credit risk premia may also have decreased because of improved public finances and limits on government deficit and debt.⁷ From a debt-management perspective, therefore, joining EMU has been a major contribution to the objective of cost-minimisation.

With government deficits generally lower than some years ago, the possibilities of issuing one or more large 10-year benchmark bonds decreased, especially for the countries with smaller government debts. Governments have used various strategies to increase borrowing possibilities at benchmark maturities. Buy-back operations and bond switching operations have been introduced or extended, while non-tradable debt instruments, such as retail debt, have decreased in

⁵ The lower limit for government securities to be eligible for trading on the EuroMTS electronic platform is 5 bln euros.

⁶ The exchange rate risk premium was particularly high in Italy (1.5 percentage points), but also significant in Spain (1.0 percentage point) and in Finland and Ireland (0.4 percentage points), according to Blanco (2001) in a study in which Greece was not included.

⁷ The relative contribution of liquidity and of credit risk as main differentiating feature among government bonds is subject to debate (See, e.g., Codogno *et al.*, 2003 and Santillán *et al.*, 2000).

Table 2

Residual Maturity of Government Debt in the Euro Area
(years)

	Ultimo 1995	Ultimo 1998	Ultimo 2002	Ultimo 2003
Austria	5.8	5.5	6.0	6.3
Belgium	-	-	6.1	5.9
Finland	-	4.8 ^{a)}	4.5	3.9
France	6.3	6.3	5.9	5.9
Germany	4.9	6.0	6.0	6.3
Greece	-	3.9	6.1	6.2 ^{c)}
Ireland	-	-	4.5	5.8
Italy	4.5	5.2	5.6	6.1
Luxembourg	-	7.0	2.3	1.9
Netherlands	6.9	6.5	6.1	6.0
Portugal	-	3.8	4.5	4.3
Spain	3.7 ^{b)}	5.4	6.0	6.1
Euro Area	-	-	5.8	6.0

a) Ultimo 1999.

b) Ultimo 1996.

c) At the end of the 3rd quarter of 2003.

Source: *Annual Reports of Euro-area Debt Managers*, OECD (2003).

size.⁸ Some additional room for issuing benchmark bonds in the market came from a decrease in short-term financing. The share of short-term debt fell particularly in Belgium, Greece and Italy, which all three are countries with very high debt ratios.

At the start of EMU, issuances heavily concentrated on 10-year bonds, with all euro-area debt managers active in that market. The 3, 5 and 30 year segments also remained attractive, with about half of the debt managers issuing at least one security in those segments (EFC, 2000a). More recently, a somewhat wider spectrum of maturities has been selected, including some reversion to issuing short-term securities. Factors underlying this include the aim of establishing benchmarks in the short end of the entire yield curve. Furthermore, disappointing

⁸ Easier access of individuals to the primary and secondary market for government bonds via financial intermediaries and the Internet also plays a role in decreasing the volume of retail debt.

deficit developments resulted in unplanned borrowing requirements, which are easier to finance in the short term and allow some smoothing over time. Short-term debt can also help debt managers to even out redemptions over time. This is often a secondary objective of debt managers, to ensure frequent contacts with capital markets and being able to issue large liquid bonds each year. Finally, historically low short-term interest rates favoured issuances in the short-term segment.⁹ At the other end of the maturity spectrum, Italy is considering issuing 30-year bonds.

The outcome of these developments has been a strong convergence of the residual maturity of government debt, to an average of around 6 years in 2003 (see Table 2). This process already started before the launch of the euro (Favero *et al.*, 1999). Broadly speaking, the average residual maturity in the large majority of countries is now within a 5.5 to 6.5 years band, with exceptions in a few smaller countries. Dispersion was larger before, though limited data availability and caveats in definitions and data collection call for caution in interpretation, especially when making cross-country comparisons.

The convergence in maturities can be seen as contributing to a more homogeneous transmission mechanism of monetary policy in the euro area. However, it has to be taken into account that government debt only plays a minor role in the entire transmission process. Debt levels of course also continue to differ substantially, contributing to differences in the strength of the transmission. Furthermore, the residual maturity of government debt is a limited indicator for transmission goals. Many debt managers nowadays use interest rate swaps, making the concept of residual maturities a less useful indicator of the short-term interest rate sensitivity of government interest payments.

4. Inflation-indexed government debt

The benefits and drawbacks of inflation-indexed bonds are much debated in the theoretical debt-management literature. Discussing pros and cons of inflation-indexed bonds can be grouped around the objectives of the parties involved. (Shen, 1995).

Treasuries may benefit from issuing inflation-indexed bonds as investors do not need to be compensated for inflation uncertainty, and thus require a lower interest rate. Benefits may be particularly large if government's inflation expectation deviates from markets' expectations.¹⁰ In addition, under some circumstances inflation-indexed bonds may contribute to stabilising expenditures, and thus result in some tax smoothing. Indexed debt may be particularly useful for this purpose if macroeconomic shocks are predominantly demand shocks, and inflation and growth

⁹ Low short-term interest rates made Ireland finance its entire gross borrowing requirement (4 bln euros) short-term in 2001.

¹⁰ A case in point is the first European issue of an indexed bond, in the UK in 1981, where the government had a lower inflation expectation on account of a strong belief in its anti-inflation policy.

Box 1. Interest Rate Swaps Increasingly Popular

Interest rate swaps conducted by euro-area debt managers normally imply that the debt manager receives the long-term interest rate from a counterparty and pays the short-term interest rate. This effectively reduces the duration of the outstanding debt as the maturity until the next interest rate fixing is reduced (Ladekarl and Svennesen, 1999).¹¹

The increasing popularity of interest-rate swaps is related to reduced government financing needs. Combined with the policy of issuing high volumes of benchmark bonds to obtain liquidity in these markets and guidelines for the maturity of debt, this leaves little choice for steering the risk profile of government debt.¹² Swaps introduce more flexibility in debt management by separating the question of liquidity from the risk profile.¹³ While issuing long term benchmark bonds, cost advantages of short-term interest rates can be reaped.¹⁴

Using interest rate swaps also introduces risks (Piga, 2001), such as the counterparty risk: the possibility that the counterparty can no longer fulfil its obligations. Authorisation for debt managers to conduct swaps is therefore accompanied by several restrictions, regarding the minimum rating of counterparties, maximum risks per counterparty and overall maximum risks. Only a limited number of government debt managers provide (non-standardised) information on swap operations undertaken and the risks involved. The risks involved were recognised by the French minister of finance, who temporarily suspended swap operations in September 2002 in view of the high volatility in financial markets.

are negatively correlated (Missale, 1999). Potential disadvantages are reduced predictability of nominal interest payments, resulting in larger sensitivity of budgets to inflation and more volatility, unless revenues are also inflation-sensitive. Issuing this type of debt also risks segmenting the market, with a liquidity premium in the

¹¹ Swaps can be (and apparently have been) used also to provide government high revenues today, to artificially improve the budget, at the expense of lower revenues later (Piga 2001).

¹² Higher deficits in recent years have increased the number of issuances of 10-year bonds. To avoid overshooting the targets for maturity/duration, some debt managers have used reverse, payer swaps.

¹³ Governments being big players, their behaviour may affect the operation of the swap market itself. Remolona and Wooldridge (2003) observe a ceiling on euro swap spreads, as governments enter the market to receive short-term interest rates when differences between government long-term interest rates and swap rates become large.

¹⁴ France uses swaps since 2002 and has estimated the gain at 200 mln euros. The Dutch public debt manager has calculated that it has saved 111 mln euros due to using interest rate swaps in the period 1999-2001.

market for indexed bonds, as their size and trade usually is limited,¹⁵ but possibly also in the other debt markets if liquidity is reduced because of smaller borrowing requirements in that market. It has also been argued that the default risk premium of the government increases, as the road to reducing the real value of debt via inflation is cut off. Price (1997) has documented main rationales for governments to issue inflation-indexed debt in a variety of countries.

Investing in indexed bonds offers investors protection against inflation.¹⁶ Such may be particularly attractive for institutional investors like pension funds, giving the opportunity to match their long-term, inflation-sensitive liabilities. Via “demonstration effects”, a larger market for inflation-indexed products may arise, providing more opportunities for inflation-risk adverse investors to hedge against inflation. Campbell and Shiller (1996) argue on these grounds that setting up such a market classifies as a public good. The start of a market for derivatives of inflation-indexed products may contribute to further develop the market, also fostering liquidity (European Commission, 2003b).

For monetary policy authorities, indexed bonds allow for deducing market participants’ inflation expectations, by comparing yields on an index-linked bond and on a nominal bond with the same maturity.¹⁷ Inferences on this basis may be more reliable than those based on other sources like interviews as it reflects economic decisions rather than opinions. Furthermore, issuing indexed bonds may reduce government’s incentives to put pressure on central banks for higher tolerance of inflation with a view to reducing the real value of government debt,¹⁸ although a high degree of central bank independence is a better safeguard against this. Another consequence of issuing indexed bonds could be the reduction of inflation aversion of investors, as they are protected from its direct adverse effects (Uhlig, 1997). Moreover, inflation indexation could spread to other parts of the economy, notably wage setting, increasing real wage rigidities.¹⁹ Support for monetary policy aimed at price stability then may decrease (Pecchi and Piga, 1997), as well as monetary policy effectiveness.

Turning to practice, it can be argued that the introduction of the euro has reduced interest in this type of bonds following the lines of reasoning above. A large number of safeguards against high inflation have been introduced (the ECB primary objective of price stability, the high degree of independence of the ECB, the prohibition of monetary financing, the no-bail-out clause). The fact that the twelve national governments no longer have national authorities as monetary counterparts

¹⁵ Liquidity is less of an issue insofar as investors, institutional ones in particular, want to hold this debt until maturity.

¹⁶ Governments dominate the market for indexed bonds, but some private companies have recently also entered the market. See Commission (2003b).

¹⁷ Changes in the inflation-risk, the liquidity premium or the tax treatment of indexed bonds may decrease the reliability of such inferences. See ECB (2003).

¹⁸ In this context, Ms. Thatcher referred to inflation-indexed bonds as “sleeping policemen”.

¹⁹ Guidotti (1992) describes circumstances under which the likelihood of spreading of indexation increases.

but the European Central Bank, which focuses on euro-area wide developments, also reduces governments' possibilities to influence monetary developments.

Nevertheless, the market for indexed bonds is growing rapidly, as EMU has shifted issuers' and investors' incentives. So far, cost savings and establishing credibility had been major motivations for issuing this type of bond, while the primary reason for investing in it was protection against inflation risks. Nowadays, with low inflation (expectations), portfolio diversification emerges as the main motivation to invest in index bonds (European Commission, 2003b). Indexed bonds are of particular interest for pension funds, whose future obligations are linked to nominal developments because of the price or wage indexation of pension benefits. Investing in inflation-indexed bonds offers them the opportunity to match liabilities by nominal claims, reducing mismatches in the growth of assets and liabilities due to inflation. For governments, issuing indexed bonds may have the advantage of establishing one's name in a market that potentially can grow in light of the mounting importance of funded pension systems, and of developing the market for this product with possible private follow-ups.

Within the euro area, the number of countries issuing inflation-indexed bonds is small but growing: France, Italy and Greece. France has been issuing this type of bonds since 1998, linked to a domestic price index. Since 2001, bonds linked to the euro-area harmonised consumer-price index (HICP, excluding tobacco) are also offered, with a view to broadening the investor base. Issuance statistics confirm that ownership of inflation-indexed bonds is widely spread; some 75 per cent of the first French bond linked to the European price index were sold to non-residents, of which more than half were investors outside the euro area. To ensure that sufficient liquidity prevails in this market segment, the issuance programme will be speeded up; eventually some 10 per cent of net bonds issued will be inflation-indexed. Italy and Greece have taken up issues of inflation-indexed bonds of 5-year, respectively 20-year maturity in 2003, while Germany and the Netherlands are considering this option. Although growing rapidly, the share of inflation-indexed bonds in total debt is still relatively minor. In France, it currently represents around 4 per cent of total tradable central government debt.²⁰

A somewhat related type of debt, GDP-indexed debt, has not seen the daylight yet. The main advantage of this kind of debt would be to limit the variation of the debt-to-GDP ratio, and thus chances of a debt crisis: in a recession, interest payments would be low.²¹ Obstfeld and Peri (1998) discuss GDP-indexed bonds in the context of limited adjustment mechanisms in Europe to deal with asymmetric shocks. They suggest issuing perpetual debt linked to nominal GDP, and invest the proceeds internationally in a diversified portfolio. In that way, the country would be less vulnerable to economic shocks. Potential disadvantages of GDP-indexed bonds include fears of deliberate misreporting of GDP, and moral hazard as benefits of

²⁰ The global market for indexed bonds has grown from 190 billion US\$ to 440 billion US\$ in October 2003, with the US and the UK together now accounting for 75 per cent.

²¹ See Borensztein and Mauro (2002) for a discussion of pros and cons of this debt instrument.

growing faster are reduced. Furthermore, large government intervention may be needed to create a market for GDP-indexed bonds because of development costs and setting standards.

5. Denomination of debt

The choice of denomination of debt instruments is less debated in the literature than the choice of nominal versus indexed bonds (Gilson and Gerard, 2002) although there are similarities in choice. Both types of securities can be seen as commitment devices, protecting bondholders against domestic inflation and thus weakening government's incentives to pressure for high inflation. Like indexed debt, foreign-exchange debt can be instrumental in avoiding large variations in tax rates. Issuing foreign-currency debt is seen as more advantageous if the domestic and the foreign economies are strongly positively correlated. In such a case, the domestic economy can enjoy a free lunch: higher inflation in the foreign economy, e.g. to alleviate the debt burden, then also reduces the real burden of the domestic country without bearing the negative reputational consequences (Miller 1997a).

The choice for issuing debt in foreign currency seems to be motivated by practical considerations. These can include avoiding overburdening the domestic capital market, supplementing official foreign exchange reserves, increasing international ownership of bonds, and taking advantage of better financing conditions abroad. Claessens *et al.* (2003) find that smaller economies, with narrower domestic investor bases, take more recourse to foreign-currency debt. Financing conditions were found to have empirical validity in work of De Fontenay *et al.* (1995). Pecchi and Di Meana (1998), testing various theories on the denomination of debt, conclude that (expected) cost considerations matter a lot in deciding on issuing foreign-currency debt.

Issuing non-domestic debt sometimes is avoided because of prestige considerations, with recourse to foreign-currency debt regarded as a token of financial weakness. Furthermore, advantages as to costs are not always obvious in view of interest and exchange rate fluctuations and liquidity premia to be paid when a small issuer enters a relatively large market. Swaps, however, can be used to reduce excessive volatility in budgets resulting from exchange rate or interest rate changes.

The relevance of many of these motives has diminished in recent years in the euro area. Integrated European capital markets and improved public finances have relaxed fears of crowding out private capital demand. As for foreign exchange reserves, national central banks participating in the euro area have not expanded their holdings of foreign exchange reserves, sometimes linked to exchange rate targets, thus not providing additional demand for foreign-currency denominated debt. Likewise, with the advent of the euro, countries no longer need to issue securities in another major, non-domestic currency to attract international investors. The credible price stability objective of the independent central bank also reduced

the need for foreign-currency debt as a commitment device, as modelled by Gilson and Gerard (2002).

Countries' attitudes towards borrowing in non-euro currencies still differ. In some countries, reducing the foreign-currency-denominated debt is explicitly stated as part of the debt-management strategy (Belgium, Greece, Ireland and Italy). A few other debt managers, in search of favourable financing conditions, continue to use this possibility (Austria),²² or do not exclude this option if conditions turn favourable (Germany, Spain). Italy continues issuing US dollar denominated securities, with a view to maintaining the benchmark status among non-US sovereign issuers. A few countries, such as the Netherlands, explicitly exclude the possibility of financing part of government debt in foreign currencies. France lifted the prohibition on borrowing in foreign currencies in 2003, and Germany now no longer excludes this possibility.²³ Countries using non-euro-denominated debt use forex swaps to reduce the exchange rate risk.

The share of debt in non-euro-denominated currencies, standing at 2 per cent in the euro area at the end of 2002, shows a slightly declining tendency, as it did before (Gilson *et al.*, 2002). With the introduction of the euro, debt denominated in foreign currencies of more than 3 per cent of GDP was automatically redenominated into domestic debt on 1 January 1999. The main currencies in which this type of debt is denominated are US Dollars, UK Pounds, Japanese Yen and Swiss Francs (Table 3). The share of foreign exchange denominated debt exceeds 10 per cent of total central government debt only in Austria (12 per cent) and Finland (13 per cent). Its level had been much higher previously: in 1995, for instance, the share of non-domestic currencies in total debt exceeded 25 per cent in Belgium, Finland and Ireland.

6. Debt ownership

Debt ownership is another topic in debt management that has received little attention in the literature. Issues highlighted are the possibilities to enlarge financing via international investors, and alleviated national macroeconomic and political consequences in case of government default, as default costs are borne by the issuer in trouble, and foreign owners do not vote cross-border. Practical considerations seem to dominate the decisions of debt managers whether or not to actively seek to attract attention of non-domestic investors.

Attracting foreign investors nowadays relies much less on the currency in which debt is denominated, but more on the features of the bond and the distribution

²² The Austrian debt management office indicates that long-term cumulative saving from using foreign-currency markets ranges between 1½ and 2 per cent of GDP (Hauth and Kocher, 2001).

²³ The introduction of the euro also had a major effect on debt managers outside the euro area. Denmark and Sweden, but also the ten countries joining the European Union in spring 2004, nowadays denominate a substantial part of their debt in euros, or issue debt in the domestic currency and then swap it to euros.

Table 3

Foreign-exchange-denominated Debt in Euro-area Countries, 2002

	as percent of total central government debt	US\$	JP¥	GB£	CHF
Austria	12.7		45		55
Belgium	2.1	5	21		74
Finland	13.2	36	29	29	7
France	0.0				
Germany	0.0				
Greece ⁽¹⁾	2.8	61	15	6	18
Ireland	2.0			100	
Italy	3.5	80		14	6
Luxembourg	5.0				100
Netherlands	0.0				
Portugal	1.7	100			
Spain	3.3	49	47	4	
Euro area	2.0	52	19	10	19

(1) After using foreign-exchange swaps.

channels. While attracting foreign investors has been no major problem for the larger euro-area countries, for the smaller ones it has been a relatively new situation.

With the euro now being the domestic currency for twelve countries and exchange rate risks and costs having disappeared, the degree of national bias in investors' preferences has decreased.²⁴ Exchange rate risks used to play a major role, but non-standardised market conventions and a lack of efficient pan-European settlement systems also hampered international trade in government bonds. Nowadays, government debt managers are less "assured" about national demand for their debt securities, forcing them to enter into competition with other debt managers. Portfolio managers also diversify into a wider range of corporate bonds

²⁴ In some cases, legal restrictions on pension funds were effectively relaxed as the obligation to invest only in national currency automatically broadened the investment scope to the all euro-area countries.

given tight spreads for government bonds. Thus, government debt managers face increased competition, requiring them to cater to the desires of investors. Smaller countries in particular have taken action to increase attention for their products, for instance by road shows, and by issuing only a few, large bonds on a limited number of days.

To attract foreign investors, distribution channels have changed. All euro-area countries but Germany use primary dealers to distribute government bonds. These primary dealers mediate between the debt agency and the market and operate on both the primary and secondary market.²⁵ The latter function implies continuous offering of buy and sell prices, thus increasing the liquidity of the market. In all countries concerned, foreign financial institutions dominate in number, reflecting the wish to spread ownership of government securities widely. Bank syndicates have also gained in importance as distribution channel for government bonds. This approach has the advantage that banks can actively select foreign investors. Furthermore, it allows for placing a large debt volume at once, thus increasing the liquidity of the bond and making it immediately eligible for electronic trading.

Results indicate that ownership of government debt is indeed much more spread than before (see Figure 1). On average in the euro area, domestic ownership of total government debt decreased from 76 in 1997 to 63 per cent in 2002. Increased spreading of bonds' ownership occurred in most countries, but in the smaller ones in particular. Thus, in the Netherlands, foreign ownership of long-term government debt doubled in the period 1997-2001 to 51 per cent, in Spain it increased from 18 (1997) to 41 per cent (2002) in 2002, while in France non-residents' share of marketable debt increased from 15 (1997) to 36 per cent (2002).

7. Conclusions and outlook

Debt-management strategies have changed remarkably in recent years, following the introduction of the euro and declining government debt ratios. The objectives of debt management have remained more or less the same, but financing debt at low costs in this new environment required adapting strategies.

Academic literature on government debt management seems to have little bearing on debt managers' practices. Very practical considerations regarding costs and risks dominate the objectives adopted and debt instruments used.

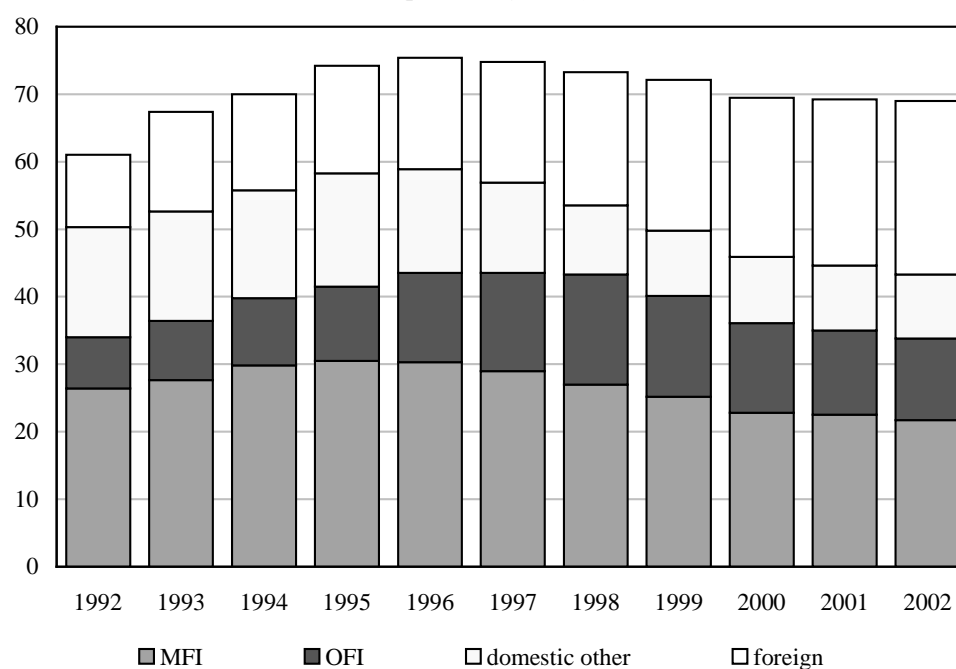
Although the history and the institutional position of debt managers in the euro-area countries differ, a strong tendency for convergence can be observed since the start of EMU. In particular:

- the autonomy of debt-management agencies continues to develop, although to different degrees,

²⁵ See EFC (2000b) for more information on tasks and privileges of primary dealers in Europe.

Figure 1

Ownership of Government Debt in the Euro Area
(percent of GDP)



Note: MFI = Monetary Financial Institution, OFI = Other Financial Institution.
Source: ECB.

- in line with this, debt-management agencies have been given more precise goals and guidelines, emphasising key aspects of debt management such as maturity and refinancing risk,
- the average maturity of outstanding debt converges. The average residual maturity of debt in euro-area countries is now close to 6 years on average,
- increasingly, the duration of debt is managed by interest rate swaps. Public information on its use and the risk exposure of debt managers is often still lacking,
- index-linked debt instruments increase in importance, with more countries issuing this type of debt than before and others considering it. Portfolio diversification rather than cost saving appears to be the prime reason for issuing this type of debt, with particular emphasis on pension funds,
- less emphasis is given to issuing non-euro-denominated debt given the large pool of resources available in euro now,

- foreign ownership of euro-area government debt has increased notably since EMU, especially in smaller euro-area countries. Primary dealers and syndication are main distribution channels.

While convergence is central in debt management in Europe, some divergences remain, reflecting differences in objectives and in sizes of deficits and debts. Furthermore, the emphasis on converging debt-management practices has decreased somewhat lately reflecting a return to higher government deficits and an increasing willingness to innovate, to attract investors' attention.

Looking forward, debt managers in Europe will face some additional challenges. With low deficits and competitive auction data setting in the beginning of EMU, the issue of coordination of debt-management practices in the euro area has risen (Giovannini, 2000). Current high deficits have put the issue to the background, but it may revive once public finances have been put on a sounder footing again. Debt managers may then start to look for ways to improve coordination.

Ageing of populations will have a noticeable effect on government debt management. Higher pension and health care spending would raise deficits if no compensatory action were taken. Indeed, countries have agreed to make additional efforts to reduce debt burdens to free up resources that otherwise would be spent on interest payments. At the same time the demand for government debt, and possibly for (very) long-term index-linked debt in particular, is bound to rise because of the building up of pension funds, which will want to invest part of the entrusted money in safe government assets.

REFERENCES

- Angeletos, G. (2002), "Fiscal Policy with Non-contingent Debt and the Optimal Maturity Structure", *The Quarterly Journal of Economics*, August, pp. 1105-31.
- Barro, R. (1999), "Notes on Optimal Debt Management", *Journal of Applied Economics*, Vol. II, pp. 281-89.
- Blanco, R. (2001), "The Euro-Area Government Securities Markets. Recent Developments and Implications for Market Functioning", Banco de España, Working Paper, No. 120.
- Borensztein, E. and P. Mauro (2002), "Reviving the Case for GDP-Indexed Bonds", IMF Policy, Discussion Paper, No. 10.
- Calvo, G.C. and P.E. Guidotti (1990), "Indexation and Maturity of Government Bonds: An Explanatory Model", in R. Dornbusch and M. Draghi (eds.), *Public Management: Theory and History*, Cambridge University Press, pp. 52-82.
- Campbell, J. and R. Shiller (1996), "A Scorecard for Indexed Government Debt", Cowles Foundation, Discussion Paper, No. 1125.
- Claessens, S., D. Klingebiel and S. Schmukler (2003), "Government Bonds in Domestic and Foreign Currency: The Role of Macroeconomic and Institutional Factors", CEPR, Discussion Paper, No. 3789.
- Codogno, L., C. Favero and A. Missale (2003), "Yield Spreads on EMU Government Bonds", *Economic Policy*, 18, pp. 503-32.
- Currie, E., J.J. Dethier and E. Togo (2003), "Institutional Arrangements for Public Debt Management", World Bank Policy Research, Working Paper, No. 3021.
- De Fontenay, P., G. Milesi-Ferretti and H. Pill (1995), "The Role of Foreign-Currency Debt in Public Debt Management", IMF, Working Paper, No. 95/21.
- Drudi, F. and R. Giordano (2000), "Default Risk and Optimal Debt Management", *Journal of Banking and Finance*, No. 24, pp. 861-91.
- Economic and Financial Committee (2000a), *Progress Report on EU Government Bond Instruments*, Brussels.
- (2000b), *Progress Report on Primary Dealership in EU Public Debt Management*, Brussels.
- European Central Bank, *Monthly Bulletin*, several issues.
- (2003), "Recent Developments in the Market for Index-Linked Bonds in the Euro Area", *Monthly Bulletin*, December.
- European Commission (2003b), "Special Feature: Index-Linked Bonds", *Quarterly Note on the Euro-denominated Bond Markets*, January-March, Brussels.

- Falcetti, E. and A. Missale (2002), "Public Debt Indexation and Denomination with an Independent Central Bank", *European Economic Review*, Vol. 46, No. 10, pp. 1825-50.
- Favero, C., A. Missale and G. Piga (1999), "EMU and Public Debt Management: One Money, One Debt?", CEPR, Policy Paper, No. 3.
- Gilson, N. and M. Gerard (2002), "Currency Composition and Public Debt in EMU", IFO Studien, Vol. 48, No. 2, pp. 301-21.
- Giovannini Group (2000), "Coordinated Public Debt Issuance in the Euro Area", available on the Internet at:
http://europa.eu.int/comm/economy_finance/giovannini_en.htm
- Guidotti, P. (1992), "Wage and Public Debt Indexation", IMF, Working Paper, No. 92/7.
- Haan, J. de, B. Sikken and A. Hilder (1995), "On the Relationship Between the Debt Ratio and Debt Maturity", *Applied Economics Letters*, No. 2, pp. 484-86.
- Hauth, E. and P.A. Kocher (2001), "Austria's Sovereign Debt Management Against the Background of Euro-area Financial Markets", ONB, *Focus on Austria*, No. 2, pp. 59-176.
- Ladekar, J. and A. Svennesen (1999), "Interest Rate Swaps and Domestic Government Debt Management in Denmark", *OECD Financial Market Trends*, June, pp. 155-74.
- Leong, D. (1999), "Debt Management – Theory and Practice", Treasury Occasional Paper, No. 18.
- Lumpkin, S. (2000), "Recent Innovations in Government Debt Management Techniques and Practices and Government Securities Markets", *OECD Financial Market Trends*, No. 75, pp. 63-76.
- Miller, V. (1997a), "Why a Government Might Want to Consider Foreign-Currency-Denominated Debt?", *Economic Letters*, pp. 247-50.
- (1997b), "Political Instability and Debt Maturity", *Economic Inquiry*, January, pp. 121-27.
- Missale, A. (1999), *Public Debt Management*, Oxford, Oxford University Press.
- (2000), "Optimal Debt Management with a Stability and Growth Pact", *Public Finance and Management*, Vol. 1, No. 1, pp. 58-91.
- (2001), "Public Debt Management and the Stability and Growth Pact", in A. Brunila, M. Buti and D. Franco (eds.), *The Stability and Growth Pact – The Architecture of Fiscal Policy in EMU*, New York, Palgrave, pp. 44-68.
- Missale, A. and O. Blanchard (1994), "The Debt Burden and Debt Maturity", *American Economic Review*, Vol. 84, No. 1, pp. 309-19.

- Obstfeld, M. and G. Peri (1998), "Regional Non-Adjustment and Fiscal Policy", in *EMU: Prospects and Challenges for the Euro*, Special issue of *Economic Policy*, pp. 206-47.
- OECD (2003), *Central Government Debt, Statistical Yearbook, 1992-2001*.
- Pecchi, L. and G. Piga (1997), "Who's Afraid of Index-Linked Bonds", in M.D. Cecco, L. Pecchi and G. Piga (red.), *Managing Public Debt: Index-Linked Bonds in Theory and Practice*, Cheltenham, Edward Elgar Publishing, Ltd.
- Pecchi, L. and A. di Meana (1998), "Public Foreign-Currency Debt: a Cross-country Evaluation of Competing Theories", *Giornale degli Economisti e Annali di Economia*, No. 2, September.
- Piga, G. (1999), "Public Debt Management in the European Monetary Union", LUISS, OCSM, Working Paper, prepared for the European Commission.
- (2001), *Derivatives and Public Debt Management*, Zurich, ISMA, 150.
- Price, R. (1997), "The Rationale and Design of Inflation-Indexed Bonds", IMF, Working Paper, No. 97/12.
- Remolona, E.M. and P.D. Wooldridge (2003), "The Euro Interest Rate Swap Market", *BIS Quarterly Review*, March, pp. 47-57.
- Santillán, J., M. Bayle and C. Thygesen (2000), "The Impact of the Euro on Money and Bond Markets", ECB, Occasional Paper, No. 1.
- Shen, P. (1995), "Benefits and Limitations of Inflation Indexed Treasury Bonds", *Federal Reserve Bank of Kansas City Economic Review*, 3rd Quarter, pp. 41-56.
- Tobin, J. (1963), "An Essay on Principles of Debt Management", in *Fiscal and Debt Management Policies*, Englewood Cliffs, pp. 143-218.
- Uhlig, H. (1997), "Long-Term Debt and the Political Support for a Monetary Union", CEPR, Discussion Paper, No. 1603.

