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Measuring the fiscal revenue loss of VAT exemption in commercial banking

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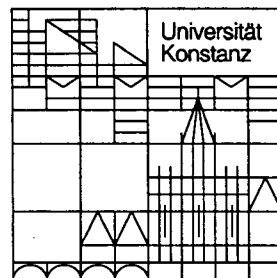
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**Sonderforschungsbereich 178
„Internationalisierung der Wirtschaft“**

Diskussionsbeiträge

Juristische
Fakultät

Fakultät für Wirtschafts-
wissenschaften und Statistik

Bernd Genser
Peter Winker

**Measuring the Fiscal Revenue Loss of
VAT Exemption in Commercial Banking**

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Measuring the Fiscal Revenue Loss of VAT Exemption in Commercial Banking

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Measuring the Fiscal Revenue Loss of VAT Exemption in Commercial Banking*

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Abstract

The closing of tax loopholes is one important instrument for fiscal consolidation. We concentrate on the value added tax exemption of banking services in Germany. The potential tax revenue under full value added taxation cannot be estimated from national accounting data, as it is necessary to apportion the value added between final consumption and intermediate production. We develop a method which allows to base our estimates on disaggregated banks' balance sheet data and obtain an estimate for the lower bound of the net revenue loss of tax exemption to the order of 7 bill. DM in 1994.

1 Introduction

Fiscal consolidation is one primary target of all EU member countries in order to meet the fiscal discipline criteria of the Maastricht treaty. This not only implies cutting fiscal spending, but also levying taxes most efficiently and closing tax loopholes. The important loopholes under general discussion

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are the erosions of the income tax base, giving rise to consolidating tax policy measures following a “tax cut cum base broadening” strategy. There is much less discussion on loopholes in general commodity taxation through VAT exemption.

Two kinds of exemption have to be distinguished within the European consumption type VAT system: full exemption (or zero rating) and restricted exemption (exemption without VAT crediting). Full VAT exemption is granted to exports of goods, which is a consequence of the application of the destination principle in order to avoid double taxation and commodity price distortions in international commodity trade. The elimination of commodity exports from the national VAT base is compensated by charging VAT on commodity imports. This makes national consumption the aggregate VAT base. In addition, zero rating has been intensively used in UK and in Ireland. Unlike most other EU members, which levy a reduced VAT rate on food, books, newspapers, medical care etc., UK and Ireland have chosen a zero rate on these necessities.

In addition to zero rating, VAT codes in Germany and in most other EU countries allow for restricted exemption of well defined sets of entrepreneurial activities. VAT relief through exemption is restricted since the advantage of charging no VAT on sales of these commodities and services is partly offset by allowing no credits to recover VAT payments on intermediate inputs. Basically, VAT exemption without crediting only eliminates the taxation of value added of the exempted processing stage, whereas VAT levied on intermediate inputs remains a hidden cost element. But restricted exemption has a further consequence. If exempted commodities or services are used as an intermediate input, the hidden VAT burden cannot be recovered by a VAT credit and remains a cost element through all further processing stages.¹ The break in the credit chain through restricted exemption gives rise to VAT cascading.²

In Germany VAT exemption is offered on a broad variety of activities,

¹ According to the 1991 Input–Output Table for West Germany, published by the German Statistical Office in 1995, more than 18 percent of total VAT revenues remain on intermediate products and another 19 percent on investment. The VAT embedded in intermediate products of the banking sector still amounts to more than one percent of total VAT revenues, i.e. more than 2 bill. DM.

² Cf. Gottfried and Wiegard (1991) for an estimate of resulting effective tax rates for Germany.

in particular on financial services. The political arguments for VAT exemption are manifold:³ (1) continuity, since many of the exempted goods and services had already been exempt under the old turnover tax, (2) reduction of compliance costs, (3) avoidance of conceptual problems created through “difficult-to-tax” transactions, and (4) price reductions to cope with distributional targets.

(1) and (3) are certainly relevant for the exemption of banking services. Banks had been exempt from the turnover tax and there is a wideheld view that it is impossible to define a correct VAT base, which would allow an application of the general credit/invoice method of VAT taxation for the broad scope of bank services.⁴

While the exemption of financial services from VAT gives rise to social costs for different reasons, including loss in tax revenue, price distortions and regressive redistribution for final consumers, and distortion of production input through cascading, in this paper we want to concentrate on the tax revenue effect. Our aim is to compare the present VAT exemption of financial services with a hypothetical benchmark case of full or “normal” VAT and to derive first numerical estimates for the direct fiscal revenue loss. In order to determine the hypothetical benchmark case, we divide the interest spread of deposit and loan services as the most important source of banks value added, in service components rendered to lenders and borrowers. A further disaggregation is made with regard to the demanders of these margin services in firms, which are entitled to VAT credits, and public and private households. Disregarding the other minor sources of exempt margin services (e.g. foreign exchange services), we estimate a net VAT revenue loss of 7 bill. DM or 3.5% of VAT revenue) in 1994 through the exemption of bank services and we show that our figures are pretty robust with respect to changes of our crucial parameters.

The paper is organised as follows. In section 2 we sketch the current VAT regulation for financial services in Germany. Section 3 surveys the problems with the identification of macroeconomic aggregates which measure the banks’ contribution to national value added. Section 4 is devoted to the economic theory of the banking firm, and shows a way to identify prices for

³Cf. Tait (1988).

⁴Hoffman, Poddar and Whalley (1987) and van Brederode (1995) sketch concepts to include financial services consistently into a credit/invoice type VAT.

crucial banking services. In section 5 the consolidated bank balance data published by the Bundesbank are used to break down the national value added to final and intermediate bank services. Numerical results for German banks between 1990 and 1994 are presented in section 6. We do not draw political conclusions in section 7, but rather call for further investigations based on more disaggregated bank data in order to improve the estimates for the fiscal effects and to study the issue of implementing a regular VAT on bank services in more detail.

2 The Status Quo of Value Added Taxation in the German Banking Sector

Most of the services provided by financial institutions are exempt from VAT in Germany. This exemption is in line with the treatment of bank services under the former gross turnover tax, the predecessor of the VAT, or the harmonization requirement of the 6th EU VAT directive of 1977. The German VAT code does not exempt banks. Banks are economic entities which are subject to VAT in Germany under §1(1) UStG⁵, since they are entrepreneurs selling market services to their customers. Nevertheless, banks do not have to charge VAT since the majority of these financial services is explicitly exempt under §4(8) UStG. This exemption comprises

- a) loan services (granting, negotiation and management of credits),
- b) currency services (transactions and negotiation concerning currency, bank notes and coins used as legal tender, apart from those of numismatic interest),
- c) outstanding debt services (transactions and negotiation of debts, except debt collection and factoring),
- d) deposit and current account services,
- e) security services (transactions and negotiation of securities, except for management and safekeeping),

⁵UStG (Umsatzsteuergesetz) is the German VAT code.

- f) equity services (transactions and negotiation of shares of companies and associations),
- g) guarantee services (negotiation and management of credit guarantees and other securities for money),
- h) management of special investment funds, and
- k) bullion services (transaction and negotiation in bullion, gold coins used as legal tender and crude gold).⁶

These exemptions from the VAT code are related to taxable activities and not to taxable persons and thus they are not only applicable to banks but to any firm which provides services of these kind.

Financial institutions therefore do not charge VAT on the bulk of their services provided to their clients. An immediate consequence of VAT exemption is that banks are not entitled to VAT credits related to VAT exempt services according to §15(2) UStG. As a matter of fact non-creditable VAT paid on intermediate goods and services or on inputs has to be regarded as a source of production costs which banks try to shift via higher prices of bank services.

Restricted VAT exemption creates two effects on banks' output prices. There is a price reducing effect since no VAT is charged on exempt bank services, and there is a price increasing effect through non-deductible VAT on bank inputs. If the VAT rate on banks' inputs and outputs is the same, e.g. the regular VAT rate of 15% in Germany, then the price decreasing effect will always outweigh the price increasing effect and the gross output prices of exempt bank services will be lower than their hypothetical prices if banks were subject to VAT. Nevertheless, bank clients are affected fundamentally different by VAT exemption. Household clients for whom VAT is a final burden will benefit from exempt bank services. Commercial clients who are entitled to VAT credits have no possibility to recover the hidden VAT in their payment for bank services, which therefore become more expensive. They therefore have to shift this cost element forward to their output prices.

Bank services which are not exempt according to §4(8) UStG are subject to the regular VAT rate. The main taxable activities of banks comprise agency services in financial and estate investment, security custody services,

⁶Items i) and j) have been omitted since they do not refer to bank services.

estate administration services, safe deposit services, factoring services and trade in numismatic coins.⁷ Taxable bank services give rise to VAT credits. As a matter of fact banks are obliged to apportion VAT paid on inputs according to their internal utilization for taxable and for exempt bank services and only VAT credits associated with taxable services can be deducted.⁸ A peculiarity of the German VAT code is the optional waiver of VAT exemption, which is open to banks according to §9(1) UStG.⁹ This option offers German banks the opportunity to charge VAT on selective financial services rendered to registered firms and consequently to deduct VAT credits associated with these taxable services.¹⁰ VAT crediting is feasible not only for purchases of intermediate inputs and investment in the year when the option is exercised but can be extended to VAT payments on investment goods purchased up to 10 years before.¹¹ Although this option seems to provide a rather generous selective cost reduction to VAT registered bank clients, it has not been widely applied by German banks. One reason is certainly the administration cost burden, which is likely to exceed the VAT credit relief. Another explanation is the opportunity to circumvent the VAT credit restriction by strategic tying of VAT credits to taxable bank services or a special class of exempt services,¹² which allow a full deduction.

⁷Cf. Hartmann, Weber und Schnittker (1995), pp. 19 ff.

⁸The VAT regulations for banks in Germany comply fully with the 6th VAT directive. The exemption of bank services in §4(8) UStG follows Art. 13, B(d) of the VAT directive, and the obligation of apportionment between deductible and non-deductible VAT credits in §15(4) follows Art. 17(5).

⁹This option is in line with Art. 13, C of the 6th VAT Directive.

¹⁰Besides Germany only Belgium and France have included the VAT option of financial institutions in their national VAT legislation. Cf. van Brederode (1995), p. 20f.

¹¹Cf. Hofmann (1991).

¹²§43 of the USt-DV (Umsatzsteuer-Durchführungsverordnung), which contains mandatory implementing regulations for the German VAT code, defines certain classes of exempt services, which do not require an apportionment of VAT credits but allow full credit deduction.

3 Measuring the National Value Added by Banks

A first approximate evaluation of the amount of VAT revenue forgone through the exemption of financial services may start out from value added figures in national accounting. Several attempts have been made in the past few years to improve the measurement of the financial sector due to its growing importance for output, capital formation and employment.

The current method of measuring financial service output followed by the statistical offices of industrial countries can be exemplified by the approach taken by the Federal Statistical Office (Statistisches Bundesamt). It is perceived as impossible to assign the value added by banking services on a transaction by transaction basis, as a large part of it is not charged directly in the form of commissions or fees, but is included in the interest margin. Hence, the calculation of the value added for national accounting is based on an aggregate view of bank business. The aggregated difference between interests received and paid by banks is used as a proxy for the so-called "imputed bank services". In fact, for Germany a somewhat larger definition is used, namely the net surplus of returns to wealth.¹³

As we will expose further in this paper, this method allows for a good approximation of overall value added for a single bank or the banking sector as a whole. However, this aggregate approach does not allow the assigning of value added to different customers such as firms, public or private households. Consequently, it is not possible to separate the share of services rendered to final demand components from services rendered to other production sectors as intermediate services.

The current approach attributes all services to a special account in the national accounts and assumes that they are all rendered to the production sector. This treatment results in an underestimation of gross national product,¹⁴ as the resulting net contribution of margin services to gross value added is zero in this case. Furthermore, the intermediate services to the different sectors cannot be identified and subtracted leading to biased figures of value added on a sectoral base.

A first view of the figures of national value added by banks in table 1

¹³Cf. Dorow (1972).

¹⁴Cf. Kopsch (1987a,b)

reveals a share of the banking sector between 4% and 4.5%. The VAT statistic gives evidence for the corresponding VAT revenue share of the banking sector which is between 1% and 1.5% of total VAT revenue.

Table 1: VAT in (West) German Banking Industry (bill. DM)

year	Value added			VAT				
	total ^{c)}	banks imp. services		total	banks			
		tot.	share		taxable activit.	non-de-ductable	sum	share
88	1946.4	85.2	4.38%	130.1	0.042	1.545	1.60	1.23%
89	2063.5	88.4	4.28%	137.5	n.a.	n.a.	n.a.	–
90	2246.1	96.3	4.29%	161.6	0.512	1.824	2.34	1.45%
91	2429.1	114.1	4.40%	176.6	n.a.	2.168 ^{a)}	n.a.	–
92	2595.2	124.1	4.78%	181.9	0.615	n.a.	n.a.	–
93	2615.6	132.3	5.06%	179.8	n.a.	n.a.	n.a.	–
94	2725.8	n.a.	n.a.	189.6	0.63 ^{b)}	2.433 ^{a),b)}	2.98 ^{b)}	–

a) including East Germany.

b) estimates.

c) corrected for banks imputed services.

Source: Statistisches Bundesamt, Fachserie 14, Reihe 8 (Umsatzsteuer); Fachserie 18, Reihe 1.3 (Konten und Standardtabellen), and Reihe 2 (Input-Output-Tabellen).

The 3% gap between the value added and the VAT share is the result of exempting banks.¹⁵ But unfortunately neither the national account figures nor the VAT statistic provide data which would allow a more detailed and sophisticated determination of the fiscal exemption effect. This is most clearly demonstrated by an application of the national accounts approach,

¹⁵Non exempted services only play a minor role in the banking sector and are not subject to our further considerations, as the problem of breaks in the value added chain does not arise for these services.

which attributes all bank services to producers. If this were true, then a general VAT on bank services would be fully neutralized through VAT credits of producers and the net revenue loss of exemption would even be negative. In order to estimate the VAT revenue effect correctly, a breakdown of bank services to final consumers and to VAT registered firms is needed.

Disaggregated national account figures of this kind are not available, although a number of propositions have been brought forward on how to improve the treatment of banking services in national accounts.¹⁶ Two different approaches may be distinguished. The first approach consists of taking the imputed aggregate value added of the banking sector as given and trying to find reasonable procedures for assigning it to the production sectors and to final demand components according to some balance sheet indicators. Thus, this approach resembles the method used in the German national accounting prior to 1974 when the value added was divided equally between depositors and debtors. The contribution to specific sectors was calculated on the sum of interests paid and received.¹⁷ The advantage of this approach is that it allows to base an estimate of value added solely on aggregate volume data. However, the split of value added between depositors and debtors is ad hoc and not based on theory. Furthermore, this approach does not give hints on how to implement a VAT on bank services. The second approach aims at developing methods for measuring the value added through bank intermediation services on a transaction by transaction basis, which would allow for the treatment of banks like any other firm. Such a method can, however, only be justified economically by a transparent theory of a banking firm. In the following section 4 we provide a short overview of those theories and suggest one viable approach.

4 Measuring the Output of a Banking Firm

The traditional argument for the exemption of financial services is the lack of explicit prices charged for them. Contrary to other firms, which sell definite quantities of commodities or services at well-defined market prices, the price charges for loan or deposit services are hidden in the interest rates taken for loans or paid for deposits. This difficulty is most evident for deposit services,

¹⁶Cf. Kopsch (1987a) for an overview.

¹⁷Cf. Dorow (1972), p. 380.

whose implicit price is given by the wedge between the true rate of interest and the interest rate received by the depositor corrected by liquidity and risk premia. Similarly, the value of foreign exchange services is hidden in the margins of bid and ask prices of foreign currency. Although the value of a bank's total output can be calculated by summing up the margins for all transactions, there is no simple way of identifying the service component rendered to a specific lender or borrower.

Taxing banks under a VAT would require a theory of the banking firm, which allows the calculation of implicit market prices for financial services. Such a comprehensive theory does not exist. Swank (1996) distinguishes four major groups of models which explain the rational behaviour of a banking firm: portfolio models, risk management models, imperfect market models and real resource models. The theories behind those models concentrate on specific aspects of banking activities and neglect others.

With respect to our primary target of identifying banks' output and value added as the correct base of VAT, real resource models are most promising, since the other models focus on financial resources and tend to regard banks as investors rather than producers of financial services.¹⁸ The real resources approach regards a bank as a profit maximising firm engaged in the production of financial services demanded by borrowers and lenders. In providing these services banks accumulate financial assets and liabilities, loans and deposits of different riskiness and maturity in a profit maximising way. In general, customers purchase bank services either directly by paying fees and commissions or in the form of increments on interest rates on loans or decrements on earned interest rates on deposits.

Hancock (1991) has developed a model of the banking firm where outputs are determined endogenously, given the prices for real and financial inputs and a joint-production technology. The model also allows us to study the user costs of the different capital services offered by a bank. The user costs are defined as the net effective costs of holding one unit of a loan or a deposit for one period of time. User costs for loans and deposits are calculated with respect to a bank's discount rate, a benchmark rate, which reflects the opportunity costs of service provision. The net user costs of a unit loan is the sum of the factor costs for intermediation, the costs for reserve requirements, deposit insurance, the risk premium, and the discount rate, minus the interest

¹⁸Cf. Markowitz (1952) and Tobin (1961).

earned on the loan. The net user costs for a unit deposit service consist of the interest rate paid, factor costs of intermediation, the costs for deposit insurance, liquidity holding, reserve requirements, minus the discount rate. If the user costs on a financial service are negative, then the corresponding asset or liability is an output, otherwise it is an input. Empirical estimates of the model for U.S. bank data showed that loans, as well as the other assets, were outputs (negative user costs), whereas on the liability side demand deposits were classified as outputs and time deposits as inputs.

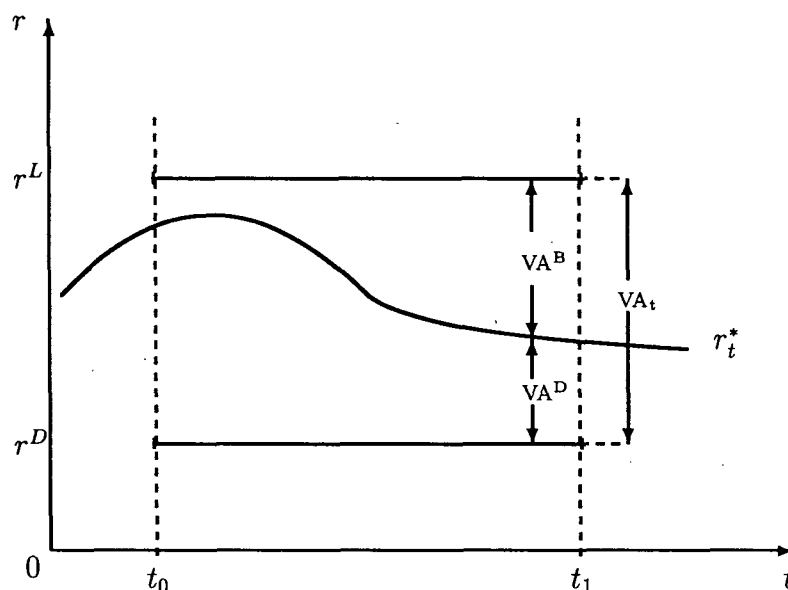
It is evident that the classification depends crucially on the choice of the discount rate, whereas the discount rate cancels out when the user costs for loan service and corresponding deposit service are consolidated. An immediate economic interpretation of Hancock's discount rate is of course the opportunity costs of borrowing or lending one marginal unit of funds. Economic theory predicts that a bank would engage in production of a specific service only as long as a positive rent can be earned and stop production of this service otherwise. Thus, Hancock introduced a feasibility condition for the discount rate requiring positive quasi-rents for all bank services which are in operation during a year, and selected the highest rate satisfying the feasibility condition.

Hancock's approach is supported by the observation that contemporary financial markets are characterised by substantial borrowing and lending among banks in the interbank market. So there is a real opportunity for banks to invest excess deposits and to cover a shortage of funds in this interbank market. Thus, the interbank market comes very close to the requirements of a perfect capital market, without information problems, default risk and unexpected liquidity requirements. The interbank market largely produces riskless and serviceless "pure" interest rates, which qualify for the benchmark rate in Hancock's production approach to the economic theory of the banking firm. The value of the output of a bank service is the absolute value of its user costs and allows the re-identification of the service component of any bank service, viz. the VAT base. The open question remains of whether one benchmark rate can be identified, given the term structure of the interbank market. A second problem is that of those banks, which do not have access to the interbank market. Finally, the perfectness of the interbank market might be questioned.

The imputation method which we are going to use, following the proposal of Hancock (1991) can be exemplified by a simple model bank restricted to

pure intermediation services in a riskless market, where deposits and loans are made at the beginning of the period (t_0) and repaid at the end of the period (t_1) as pointed out in figure 1. It is assumed that lending and borrowing are undertaken for the same period length and in the same amount K . Thus, the bank's total value added in period t VA_t is simply given by the difference of receipts and payments, which corresponds to the interest margin $r_L - r_D$ times the intermediation volume, i.e. $VA_t = K(r_L - r_D)$, and remains constant over the time interval $[t_0, t_1]$.

Figure 1: Value added for a simple bank per unit of capital



If capital gains or losses, for example due to loan defaults, were included, they would increase or decrease the value added when realized within the period. This corresponds to the treatment of capital gains or losses in the manufacturing sector due to a change in the value of inventories.¹⁹

¹⁹We neglect this aspect in the numerical analysis presented in section 6 as it has a limited quantitative impact. However, it would have to be incorporated in a real life VAT system.

This aggregate view of bank's value added corresponds closely to the standard approach of measuring financial service output followed by the statistical offices of industrial countries.²⁰ The basic drawback of this approach is that it does not allow for assigning shares of the value added to borrowers and lenders, which is crucial in order to distinguish between the value added delivered to final consumption and to intermediate stages of production. However, this distinction can be added to figure 1 by choosing a benchmark rate which reflects the true interest rate as the marginal source of finance. To split the total value added in two components, we choose the 3-month interbank rate (FIBOR)²¹ as a proxy for this "true interest rate". The introduction of this benchmark rate r_t^* allows a unanimous split of total value added by these margin services in a service component to the borrower (VA^B) and to the depositor (VA^D) in any period t .

5 Estimating the Implicit Prices for Deposit and Loan Services

Using the above definition of value added in the banking firm it is possible to calculate the value added embedded in any single loan or deposit contract. It is simply given by the difference between the contractual rate and the current marginal costs of refinancing, times the volume of loans or deposits outstanding.

Thus, knowing volume, conditions and sector of outstanding debt and deposits it would be possible to exactly calculate the contribution of banks' value added to different sectors. Unfortunately, the information available on the aggregate level for Germany does not cover all three aspects. While the statistics on banks published by the Deutsche Bundesbank²² includes quite

²⁰Cf. Dorow (1972).

²¹The Frankfurt InterBank Offer Rate is calculated and published by Telerate GmbH, Frankfurt. It is based on the daily reports of 19 major German banks on their interbank offer rates for one to twelve months.

The mean rates for every maturity is calculated by omitting the two highest and the two lowest rates. The robustness of the estimator makes it less likely that a single bank or a small number of banks can influence the FIBOR strategically. Finally, it should be mentioned that the current version of the FIBOR is calculated on a 365 days base in contrast to preceding versions.

²²Statistische Beihefte zum Monatsbericht der Deutschen Bundesbank.

detailed information on the volumes of outstanding debt and deposits, the information on the sectoral distribution and in particular on the conditions is far less comprehensive.

In order to obtain estimates of banks' value added rendered to different sectors it is therefore necessary to use approximations for some unknown parameters or to look for more disaggregate data. As the latter are not yet available we try to extract as much information from the aggregate data as possible. Assumptions have to be made with regard to maturities of new and outstanding contracts and interest rates for different loan and deposit categories. To check the robustness of our numerical estimates of the total revenue effect some sensitivity analysis is performed in particular with regard to the influence of the reference rate. Bank level data on individual debt and deposit contracts will help to improve the reliability of the results and are needed as an input for future research.

As this paper aims at approximating the aggregate VAT impact of VAT exemption of the banking sector, we restrict the sectoral disaggregation to firms, private households and public households. The firm sector (F) comprises all enterprises, self-employed and non-profit organizations. Private households (P) include all other private persons, and public households (G) cover government and social security. Unfortunately, this sectoral split is not optimal since sector F does not coincide with entities entitled to VAT credits. In particular, insurance companies and a substantial part of the self-employed, e.g. self-employed physicians, are VAT exempt in Germany. Nevertheless, the split of table 2 seems to be the best compromise obtainable using the Bundesbank data and the estimated revenue loss from exemption will be a lower bound due to non-recoverable VAT credits by these exempted firms. It might be of interest for future work to consider a further disaggregation of sector F with regard to different industrial sectors. This seems to be possible according to the current breakdown of data, but was not necessary for the purposes of this study, since it was not possible to identify exempt firms within the different sectors.

For all three sectors the available data include outstanding values for different categories of debt and deposits. Tables 2 and 3 give an overview of the aggregates used for the further analysis. As there is no information about housing loans of the public sector, this category remains empty.

The disaggregated data on loans and deposits described in the tables are not sufficiently comprehensive for the purpose of estimating VAT revenue

Table 2: Loan Categories

Sector	Contracted Maturity					
	short-term (< 1 year)		medium-term (1 – 4 years)		long-term (≥ 4 years)	
	housing	other	housing	other	housing	other
Firms	L_F^{sh}	L_F^{so}	L_F^{mh}	L_F^{mo}	L_F^{lh}	L_F^{lo}
Private Households	L_P^{sh}	L_P^{so}	L_P^{mh}	L_P^{mo}	L_P^{lh}	L_P^{lo}
Public Households	–	L_G^s	–	L_G^m	–	L_G^l

Table 3: Deposit Categories

Sector	Current Account incl. trust funds	Time Deposits with Contracted Maturity of				Saving Deposits with Maturity			Saving Certi- ficates
		1m – 3m	3m – < 1yr	1yr – < 4yr	$\geq 4yr$	3m	3m – < 4yr	$\geq 4yr$	
Firms	D_F^c	D_F^{t1}	D_F^{t2}	D_F^{t3}	D_F^{t4}	D_F^{s1}	D_F^{s2}	D_F^{s3}	D_F^{sc}
Private Households	D_P^c	D_P^{t1}	D_P^{t2}	D_P^{t3}	D_P^{t4}	D_P^{s1}	D_P^{s2}	D_P^{s3}	D_P^{sc}
Public Households	D_G^c	D_G^{t1}	D_G^{t2}	D_G^{t3}	D_G^{t4}	D_G^s			D_G^{sc}

effects. For example, the value of L_F^m gives the outstanding volume of loans to firms with an original term to maturity of one to four years. Now, two problems arise. Neither do we know the distribution of maturities and the contracting periods in this aggregate, nor the other conditions, in particular which interest rates are charged and to what extent floating or fixed term contracts may have been signed.

Hence, we have to use several approximations. First, we generate an artificial distribution of maturities within each category of loans or deposits using a perpetual inventory method. For a given loan volume V let V_t^m describe the volume of outstanding loans in period t with maturity m , where $m \in [1, \dots, M]$ and $V_t = \sum V_t^m$.²³ For some remote initial period $t_0 = 1970.1$ (January 1970) we set $V_{t_0}^1 = \dots = V_{t_0}^M = V_{t_0}/M$. For all subsequent periods t , the volume of new loans V_t^n can be calculated from the levels V_t and V_{t-1}^1 by

$$V_t^n = V_t - V_{t-1} + V_{t-1}^1$$

as by definition V_{t-1}^1 reaches its maturity in t . Now, we have to make some assumptions about the distribution of the new loans V_t^n on the subcategories $m \in [1, \dots, M]$, i.e. on their contractual maturity, as no additional information is available. We start with the assumption of a uniform distribution and leave several different assumptions to our sensitivity analysis, in particular we will consider $V_t^M = V_t^n$ as a special case.²⁴ Using this perpetual inventory scheme, a stable distribution is reached for the time period of interest 1990–1996.²⁵

A second necessary assumption concerns the split between fixed and floating contracts. While for fixed term contracts the calculation of value added may proceed along the lines depicted by figure 1, floating term contracts will imply a fixed value added margin. For some components, for example term deposits, it seems reasonable to assume fixed term contracts, whereas for others like current account deposits or loans floating conditions are more appropriate. However, for other components, such as long-term credits, no

²³The proceeding for deposits is identical.

²⁴This assumption implies, for example, that all medium term contracts have a term to maturity of 4 years.

²⁵German unification in 1990.07 results in a large value of all the V_t^n . These increments were distributed according to the maturity structure of the outstanding loans and deposits. Hence, it was implicitly assumed that outstanding contracts in East Germany had the same term structure as in West Germany.

clear-cut a priori decision is possible. Therefore, we introduce exogenous parameters λ_j indicating the percentage of floating contracts in this category. The parameter values of the λ_j 's can be changed in the sensitivity analysis in order to check their influence on the results.

Using the assumptions just described we obtain estimates of the volumes of different categories of assets disaggregated by maturity, contracting time, fixed or floating terms, and sector. The next step consists in matching all these categories with relevant interest rates. Unfortunately, the set of interest rates published by the Deutsche Bundesbank is not very detailed and does not match all categories, even at a rather coarse level. This problem is particularly pronounced for loan rates.²⁶ Thus, we had to find a matching of our categories with available interest data and to use estimates of interest structures to approximate missing interest data.²⁷

For interest rates on housing loans we used published rates for three different maturities. The rates on other loans to firms were approximated by the rate on current account loans plus a term structure increment derived from the term structure on public bonds. The interest rate charged on non-housing loans to private households is approximated by the rate on installment loans. Finally, loans to the public sector bear the same rates as public bonds.

The returns on current account deposits were assumed to be equal to zero. For time deposits, the published data on deposits with maturity of up to three months were augmented by the term structure derived from public bonds. For saving deposits, interest rates for three different maturities are available and were used to interpolate a specific term structure. For saving certificates, only one interest rate is supplied by the Deutsche Bundesbank. Consequently, the public bond term structure was used to derive a term structure for all maturities up to ten years.

A final problem consists in the assignment of bearer bonds which contribute a large share to bank liabilities. Unfortunately, the data supplied by the Deutsche Bundesbank do not contain any information on this issue. Hence, we had to make an ad hoc choice by attributing this component to the private sector. Interest rates are available for different maturities, so we

²⁶Cf. Winker (1996), pp. 106ff.

²⁷As the description of all the details of our construction of interest rate series would be quite lengthy, we restrict ourselves to a short dissertation of the approach. Detailed information is available from the authors.

were able to construct an adequate term structure.

Using all this information, the total value added can be calculated for each category j of loans or deposits and each time period t . In order to do so, we had to keep from the generation of the maturity distribution information on the period when the contracts were closed. Let $V_{t,ct,j}^f$ denote the volume of category j contracted in period ct as fix term arrangement and still outstanding in period t , and $V_{t,ct,j}^{fl}$ its floating term counterpart. Then, value added by loans of category j in period t have been calculated according to

$$VA_{t,j} = \sum_{ct=t-M_j+1}^t V_{t,ct,j}^f (i_{ct,j}^f - i_t^*) + \sum_{ct=t-M_j+1}^t V_{t,ct,j}^{fl} (i_{t,j}^{fl} - i_t^*),$$

where M_j denotes the maximum maturity in category j , $i_{ct,j}^f$ the fixed term interest rate contracted in period ct and $i_{t,j}^{fl}$ the floating term interest rate in period t for loan category j , respectively. i_t^* denotes the marginal cost of refinancing in period t approximated in our application by the three month FIBOR. Value added from deposit categories is calculated accordingly, exchanging the order of the interest rate terms.

The loan rates are not corrected by loan write-offs which influence banks' cash flow. This restriction should be kept in mind together with the assumptions necessary to obtain a disaggregate view on valued added in margin services when looking at the numerical results in the next section.

6 Estimating the Revenue Loss from VAT Exemption of Loan and Deposit Services

Using the procedure described in the previous section it is possible to estimate the value added by loan and deposit services of the banking sector. In contrast to the aggregate view of the national accounts approach, the value added can be explicitly assigned to different sectors, i.e. VAT registered firms, and VAT exempt private and public households. As loan and deposit services offered to firms and public households should be treated as inputs to the production of these sectors, the differentiation is essential in order to obtain estimates for the net value added missing so far in national accounts. Furthermore, only this net value added can be subject to additional net VAT revenues.

The following tables give some overview of the importance of the different balance sheet items used for the estimation of value added components. All figures are for the Federal Republic of Germany after unification as no separate aggregate bank balance sheets were published afterwards. The table is restricted to loans and deposits to and from non-banks. The volume of loans and deposits between banks is considerable. However, for aggregate value added considerations it is (nearly) irrelevant due to consolidation.

Table 4: Loans to Domestic Non-Banks 1996.09 (bill. DM)

	Debtor		
	Public	Business	Private
short-term	29.6	507.6	86.2
medium-term	89.2	135.2	79.9
long-term	998.4	1401.2	1099.1
total	1117.2	2044.0	1265.2

Source: Deutsche Bundesbank, Monthly Report 1/97.

The figures in table 4 show that more than 80% of loans to private households (including non-profit organizations) are long-term loans which are mainly mortgage loans. The volume of business loans is some 60 percent larger than the volume of loans to private households. Furthermore, about one quarter of all business loans are short-term, i.e. current account loans.

For the asset side a disaggregation of banks' liabilities owed to domestic non-banks is shown in table 5.

Deposits by non-banks are clearly dominated by private households. The composition of deposits differs markedly between the three groups. While business deposits are mainly long-term, about two thirds of private households deposits are savings deposits. A further disaggregation shows that nearly 75 percent of savings deposits are held with legal period of notice (3 months). These deposits earn a very low interest rate and consequently entail a high value added component for financial intermediation.

As pointed out in the previous section, a more detailed view of the German banks' balance sheets is used for a first numerical estimation of the value added in banking attributable to the different sectors and hence giving rise

Table 5: Deposits by Domestic Non-Banks 1995.12 (bio. DM)

	Depositor		
	Public	Business	Private
Current Account	23.5	178.1	367.3
Fixed term deposits			
1 – 3 months	23.8	81.2	199.6
3 months – 1 year	10.4	29.2	51.8
1 – 4 years	1.5	5.0	5.0
more than 4 years	121.4	529.5	45.8
Savings Deposits	5.3	8.1	1084.0
Bank Savings Bonds	4.9	36.1	181.8
total	167.3	689.1	1568.0

Source: Deutsche Bundesbank, Monthly Report 1/97.

to an estimate of the fiscal revenue loss due to VAT exemption of financial services. In particular, we had to take care of a very important source of banks' refinancing, namely bank debenture bonds, amounting to a total of 1719.4 bill. DM in 1996.09.²⁸ The total number of loan categories considered (including the maturity dimension) amounts to 885, the number of deposit categories to 1722.

For the chosen indexing rate, the 3-months FIBOR,²⁹ our estimates of the value added in the banking sector in 1994 amount to 16.1 bill. DM for the public sector, 85.2 bill. DM for the business sector and 62.3 bill. DM for private households. Table 6 gives a more disaggregate view of the sources of value added in banking for the years 1990 to 1994. It should be noted that the figures for 1990 and 1991 may be biased by the effects of German unification.

As the bank services sold to the business sector are part of the value added chain, they will neither give rise to a change in total value added nor to additional tax revenue if a VAT on financial services was introduced. In contrast, the value added flowing to the final demand of public and private

²⁸Cf. Deutsche Bundesbank, Monthly Report 1/97.

²⁹The monthly means of the 3-months FIBOR ranged between 4.92% and 5.86% in 1994.

Table 6: Value added in German Banking Sector (bill. DM)

year	Firms		Private Households		Public Households	
	loans	deposits	loans	deposits	loans	deposits
90	12.91	24.67	-0.88	67.88	-8.31	5.17
91	11.26	30.23	-2.06	84.53	-11.36	6.52
92	16.70	32.35	-0.01	92.55	-12.46	6.91
93	47.65	18.62	22.35	52.78	1.75	2.52
94	77.08	8.12	42.29	19.98	16.20	-0.06

Source: Own calculations.

households, which amounts to 78.4 bill. DM, gives an estimate of the mis-measurement of total value added by the currently used methods of national accounting. Finally, the direct fiscal revenue loss due to exempting bank services from VAT can be approximated by the value added assigned to private households times the relevant tax rate, i.e. $62.3 \times 0.15 = 9.345$ bill. DM for the year 1994.

Fiscal revenue from charging a VAT on bank services is reduced by VAT credit claims of banks on their inputs. The latest available figures on non-deductible VAT from input-output tables for 1991 statistics are depicted in table 1 and exhibit a remaining VAT burden of 2.169 bill. DM for the whole banking sector. Introducing a VAT on financial services would allow the deduction of VAT on intermediate inputs. Consequently, the expected fiscal revenue loss due to VAT exemption is reduced by this amount. Our first rough estimate of the net fiscal revenue loss using an extrapolated value of 2.433 for the non-deductible VAT in 1994 becomes $9.345 - 2.433 = 6.912$ bill. DM. Further research will show how this estimate evolves over time and how robust it is with regard to our approximation of the correct interest rates for the different assets.

In order to assess the robustness of our results with regard to changes of the underlying assumptions we performed some sensitivity analysis. One crucial assumption is certainly the choice of the benchmark interest rate. Although our choice of the 3-month interbank rate (FIBOR) has been based on theoretical arguments, we repeated our calculations for reference rates

which deviate from the 3-month FIBOR by up to 100 basis points, i.e. $\pm 20\%$. Table 7 summarises the results.

Table 7: Value added 1994 for different reference rates (bill. DM)

FIBOR + x basis points	Firms		Private Households		Public Households		gross VAT revenue effect
	loans	deposits	loans	deposits	loans	deposits	
-100	94.36	-0.44	52.34	-6.82	24.96	-2.12	6.83
-50	85.72	3.84	47.32	6.58	20.58	-1.09	8.09
0	77.08	8.12	42.29	19.98	16.20	-0.06	9.35
50	68.44	12.39	37.27	33.38	11.82	0.97	10.60
100	59.79	16.67	32.24	46.78	7.44	2.00	11.85

Source: Own calculations.

As might have been expected from our prior analysis, value added attributed to loans depends negatively on the reference rate, whereas a positive relation exists between value added embedded in deposit services and the reference rate. Consequently, due to the composition of banks' balance sheets a lower reference rate will assign a larger part of value added to firms. The gross VAT revenue effect will decline as shown in the last column of table 7. Still, starting with the actual value of the 3-month FIBOR an increase by only a few basis points has quite a small revenue effect. We may conclude that the estimated order of magnitude for the fiscal revenue loss due to VAT exemption is robust with regard to slight changes in the definition of the benchmark rate.³⁰

Changes of the assumptions concerning the maturity distribution of new contracts have an even smaller impact on the final outcome. Increasing by about 50% the share of contracts with longer maturity within all categories results in an estimate of the gross revenue effect in 1994 of 9.23 bill. DM instead of 9.35 bill. DM. Using the extreme assumption that all new contracts have maximum term to maturity in the relevant category results in an estimate of the revenue of 9.09 bill. DM, whereas assuming minimum term

³⁰This result is in line with the empirical findings of Hancock (1991) and Fixler (1993, table 1).

to maturity within in each category results in an estimate of 10.22 bill. DM. It should be noted that the size and even the sign of this effect depends on the year under consideration, i.e. whether interest rates have fallen or risen during the preceeding years.

7 Conclusion

In this paper we discussed the fiscal revenue loss due to the current VAT exemption of commercial banking. The current approach in national accounting does not allow a separation of the value added by margin services between final demand and intermediate production. We use a balance sheet approach for the calculation of value added in margin services based on a real resource model of the banking firm. Using this approach it becomes possible to approximate the fiscal revenue loss of VAT exemption using aggregate bank balance sheet and interest rate data. The numerical results indicate that a lower bound of the net revenue loss of exempting bank services comes close to 7 bill. DM in 1994.

Our exercise is clearly a first attempt to approximate the revenue effects of exempting bank services and it is subject to several shortcomings which might be overcome in future research. Just to mention a few, we are considering only deposit and loan services and disregard the growing sector of other exempt activities, e.g. foreign exchange services, hedging services etc. The effect of bad loan write-offs is not reflected yet. The database used is the official bank statistic which is rather coarse and not well suited for our purpose. This problem can only be overcome if a study can be based on reliable bank data on individual transactions. Finally, the fiscal revenue effect was calculated on a *ceteris paribus* basis, i.e. ignoring changes of the input-output structure, which are likely to be induced by a change in the VAT rules. We think that more sophisticated estimates are urgently needed, as the potentially large revenue effects will stress the policy relevance and proposals for an inclusion of financial services in the VAT chain will have to be scrutinized by figures on the price effects triggered by an abolition of VAT exemption.

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