Financial Consumption and the Cost of Finance: Measuring Financial Efficiency in Europe (1950-2007)

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Abstract

This paper measures the unit cost of financial intermediation in Germany, France, the UK, and Europe more broadly, over the past 60 years. The contribution of this paper is threefold. First, because financial industry VA ignores banks' capital income (capital gains, dividends) it is an imperfect measure of the cost of intermediation. So long as capital income is not redistributed to bank customers, it is akin to an implicit cost of financial assets and liquidity management. Correcting financial VA to account for capital income, I show that the GDP share of finance has increased continuously in Germany, France, the UK and Europe as a whole. In contrast, plain financial VA to GDP increased before the 1990s but stagnated thereafter. Second, the unit cost of financial intermediation increased over the past 40 years, except in France where, overall, it stagnated. In addition, the European unit cost matches the US unit cost calculated by Philippon (2012). Finally, because financial intermediaries deal with nominal stocks and flows, and because the unit cost increases during periods of monetary difficulties, I focus here on nominal rates of interest to explain the evolution of unit cost. Using a simple banking model, I show that a rise in nominal rates of interest increases the spread of bank interest and reduces the production of financial services. These results are confirmed by the empirical analysis, so that 1970s and 1980s high unit costs are statistically explained by increases in short-term interest rates. On the other hand, post-1990s high values remain hard to explain, suggesting that overcost may have occurred in the past 20 years. (JEL codes E2, G2 and N2)

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Introduction

The main function of finance is to transfer resources from actors that have it to those that need it. In this process, financial intermediation pools the risks, provides liquidity and reduces information asymmetries that impede the transfer of funds. According to neoclassical models of growth, financial intermediation should enhance growth in two ways : it remunerates savers according to their risk aversion, thereby encouraging saving and investment ; and it allocates funds according to their best use. So long as financial intermediation facilitates the efficient allocation of funds, more finance should trigger more growth. The reality is far from being this simple, however. In particular, the frequency of financial crises upsets the idyllic vision of financial development and raises new questions about the effects of the size of the financial sector on stability (Haldane et al. 2010) and growth (Ductor and Grechyna 2011). The development of financial market activities, and the credit boom and bust that recently occurred in developing countries put in question the impact of financial development on allocation efficiency (Greenwood and Scharfstein 2013). Precisely because financial deregulation was designed to stimulate financial development, it proves to be an important – if not the main – aspect of the issue. Economic openness and the end of the Bretton Woods in 1971 began to challenge the existing institutional equilibrium and financial regulation had to adapt to the new set of constraints governing economic activities (see Acemoglu et al. 2006 for theoretical arguments and mechanisms). This led to a wave of deregulation, whose aim was to suppress all impediments to capital flow and to stimulate competition among financial intermediaries. The deregulation was not instantaneous though and it took time for a new financial environment to emerge. [1] By the late 1980s, however, the related transformation of the European financial system made financial market activity and financial innovation more important. Banks adapted to this new environment by extending their market-based activities and restructuring their business in order to take advantage of economies of scale and scope.

What were the consequences of such transformations on the efficiency of financial intermediation ? Examining the evolution of net interest margins in cross-country comparisons, various studies provide evidence of the negative effects of financial deregulation on intermediation costs (see inter alia, Demirguç–Kunt et al. 2004). Nevertheless, because they do not take an aggregate view of the intermediation process, these studies may have ignored certain potential costs brought about by deregulation. First, fees and remunerations in finance soared due to new, human capital-intensive activities (Philippon and Reshef 2012 and 2013) whereas

1. While the UK and the US began their financial deregulation in the 1970s, Germany and France, amongst others, did not deregulate before the mid-1980s.

no evidence has been found that active investors have been able to outperform the market (Fama and French 2010). Second, the deregulation encourages intermediaries to develop risk-taking businesses so as to maximize short-term, non-interest income (Diamond and Rajan 2009). Third, the "too big to fail" problem emerged following banks' restructuring, which increased their leverage ratio and encouraged risk-taking while creating privatized gains and socialized losses (Bludell–Wignall et al. 2009). Therefore, following Philippon 2012s study of the US case, this paper proposes to measure the domestic consumption of financial services and to calculate the unit cost of financial intermediation – that is, the cost of producing and maintaining one euro of financial asset during one year – for Germany, France, the UK, and Europe [2] as a whole from 1950 to 2007.

The domestic consumption of financial services is commonly assessed through the ratio of financial VA to GDP (Berger and Humphrey 1992, Philippon 2012, Philippon and Reshef 2013). This choice is straightforward : it ignores the hidden costs of systemic risk, but accounts for all fees and spreads. However, banking institutions have increased considerably the volume of securities held in their balance sheets over the past 30 years. These securities create income for banks in the form of dividends, interest on securities and capital gains not captured in a national accountant's perspective (Stauffer 2004). Because such income belongs to banks' risk management strategy (Diamond and Rajan 2009) and because banks increasingly substitute non-traditional income for interest income (Stiroh 2004), capital income must be included in the calculation. In fact, so long as capital income is not redistributed to banks' clients, it looks like an implicit cost of financial assets and liquidity management. Although this issue should not dramatically affect results for the US, due to the limited share of banking activities in total financial activity there, it could have a great impact in Europe, where banks are the principal financial intermediaries, even in the UK. In this respect, this paper proposes to "correct" financial VA, by adding the capital income of banks to the calculation. This correction proves to be of prime importance since, unlike plain financial VA, which reached a plateau in the 1990s in most European countries (Philippon and Reshef 2013), corrected financial VA increases continuously over the covered period. Correction for the US has almost no impact on the result, thereby confirming that Philippon 2012s estimates do not depend on the exclusion of banks' capital income.

The cost of finance is measured here in the manner of Philippon (2012). I calculate the unit cost of financial intermediation via the ratio of corrected financial VA to financial output.

2. Since the relevant data are not systematically available for all European countries, "Europe" here includes its largest countries, Germany, France, the UK, Italy, Spain and the Netherlands. This simplification is unproblematic because these countries account for almost 85 per cent of Europes GDP throughout the covered period.

Financial output aims to take into account all services produced by the financial industry — namely, transfer of funds, liquidity and advisory services. Assuming that a financial asset needs to be intermediated, either at the time of issue or during its life, I measure the output through the sum of extant domestic financial assets in the economy. The results show that national unit costs turn around two to three per cent and tend to converge after the 1990s along with financial globalization. Thus, it costs from two to three euro-cents to create and maintain one euro of financial asset in the considered period. More importantly, the unit cost increases over the period, except in France, where it increases during the 1970s then decreases in the early 1990s. Finally, comparing the result with the US series, I show that European and US unit costs follow a very similar path over the period.

The rising unit cost curve can be a consequence of numerous forces related to macroeconomic turmoil. Because financial intermediaries deal with nominal stocks and flows, and because the unit cost increases during periods of monetary problems, I focus my analysis on nominal rates of interest. Two mechanisms justify this choice. First, nominal rates of interest influence bank lending behavior, because of the opportunity cost of detaining unproductive deposits (Smith 2003, Paal, Smith and Yang 2013). This should increase the unit cost since, all things being equal, the augmentation of nominal rates reduces the ratio of credit to unproductive funds. Second, relying on a simple model of banking, I show that nominal interest rates influence the spread of bank interest and the quantity of financial services provided. So long as deposit rates are sufficiently rigid with regard to nominal rates, a rise in nominal rates increases interest spread and reduces the total bank loans. Theoretically, the combination of these effects will enlarge the unit cost. This is confirmed empirically by the positive correlation between short-term interest rates and the ratio of banks VA to banks' loans. Therefore, I show that 1970s and 1980s high unit costs are statistically explained by the evolution of nominal rates of interest. On the other hand, it is difficult to explain the post-1990s high values, suggesting the existence of financial intermediation overcost after that date. In the absence of output misspecification after that date, this apparent anomaly might be the consequence of financial intermediation inefficiency.

This result has some consequences for the debates about financial regulation. Regardless of the competition and stability trade-offs, it challenges empirical analyses showing that regulation increases the costs of financial intermediation (see Levine 2011 for a literature review). One possible explanation is that, unlike previous studies, I account for the whole financial industry, not just banks. In particular, unlike previous assessments of intermediation costs using net interest margins, this study takes into account all fees and spreads. The deregulation of banking may have reduced interest margins (Demirguç–Kunt et al. 2004)

because banks have developed profitable market activities on the shoulders of traditional ones. The development of shadow banking raised the number of transactions involved in the intermediation process (Greenwood and Scharfstein 2013) and thereby increased market-based income (most often capital income and fees) at the expense of bank-based (net interest spreads) income.

The rest of this paper is organized as follows : Section 1 explains the method used to calculate the unit cost of financial intermediation ; section 2 presents the German, French and UK cases in detail ; section 3 proposes an estimation of the unit cost of financial intermediation in the whole of Europe and section 4 explains unit cost evolution and identifies the sources of financial intermediation overcost.

1 Measuring financial consumption and financial output

Philippon 2012 made the first and, to my knowledge, only attempt to measure the unit cost of financial intermediation, compiling series to assess the output of the financial industry. He takes an aggregate view of the intermediation process and constructs series computing two macro data sets : the intermediation cost (the numerator) and the financial output (the denominator). The justification of the calculation is straightforward : If we note p the price of one euro of synthetic financial service and c the average cost of intermediary consumption, then the value added is given by : $VA^{\phi} = py^{\phi} - cy^{\phi}$. As we divide both sides of the equation by the output, we obtain : $VA^{\phi}/y^{\phi} = p - c$. This is the cost to the economy of obtaining one euro of intermediated financial service given the intermediary consumption involved in providing this service. This corresponds to the unit margin of financial intermediation, which also can be called the unit cost of financial intermediation (z). Let us look in detail at the method of calculation.

1.1 Financial consumption

Philippon uses the GDP share of financial VA as a proxy of the cost of financial intermediation. This choice ignores the hidden costs of systemic risk, but it captures all fees and spreads. However, it is not as simple to calculate value added in the finance sector as in other industries. Financial services do not depend only on fees charged by financial institutions. The VA also must account for 'financial intermediation services indirectly measured' (FISIM). The FISIM are calculated by the following formula : $FISIM = L(r_L - r) + D(r_D - r)$

where L and D are the amount of outstanding loans and deposits, r_L the rate charged to borrowers, r_D the rate paid to depositors and r the rate of reference, that is "a rate from which the risk premium has been eliminated to the greatest extent possible and which does not include any intermediation services" (System of National Accounts (SNA) 1993, paragraphs 6.127 and 6.128, quoted by Stauffer 2004).

A puzzle emerges as we compare the value added calculated by national accounts with the net incomes of financial institutions. In particular, banks have increased considerably the volume of securities held in their balance sheets over the last 30 years. Securities bring income to financial institutions – especially dividend, interest on securities and capital gains – that are not counted in a national accountant's perspective (Stauffer 2004). However, such income is directly related to banks' balance-sheet management and thereby part of their strategy of risk adjustment. In addition, it is well-known that banks use traditional activities to develop new market activities and vice versa. [3] Finally, capital income is directly related to the management of investors assets, though not redistributed to them. Because this income is redistributed neither to investors nor to borrowers, it can be seen as an implicit cost of financial intermediation. Although traditional incomes appear low, they can be more than offset by market activity income. For that reason, we should not rely only on a national accountant's perspective to address the issue of financial services consumption.

I use two different indicators of the consumption of financial intermediation, in this regard. I first take the "plain" value-added series calculated by the national accountant, and then I address the issue revealed by Stauffer (2004) using a bank's perspective of financial services. As shown by Fournier and Marionnet (2009), net banking income can be reconstituted from banks' VA plus capital income. So, I use OECD data on net banking income, but because the data does not cover the whole considered period, I use the average growth rate of the difference between banks value added and net banking income and assume that this rate is constant. I then add the estimated difference to the value added provided by national

3. This is the case when banks use securitization, which allows them to do business on trading markets while extending their volume of credit. To quote from an interview with John Reed – former chair and chief executive of Citycorp and Citygroup – in the Financial Times of September 9, 2013 : "when trading was small in proportion to everything you could have a group of high bonus professionals that you treated differently and it didnt affect the culture of the whole organization. As trading becomes more important then it becomes harder and harder to keep those cultures separated. And it began to work into the risk-taking culture as well. Risk officers would say to someone who wanted to make a loan : 'I dont like this credit. We arent going to do it. Stop. Period. But now they would recognize that if a certain transaction didnt go through, his colleague wasnt going to be paid that year. It became very difficult to say 'Sorry. Dont do it. Your colleague was being compensated for doing transactions It became infectious. (...) These cultures dont mix well and one tends to push out the other (...)."

accounts. I call this series corrected value added or corrected VA.

1.2 Financial industry output

Financial output is supposed to account for all services provided by financial intermediaries. The calculation includes transfer of funds, liquidity and advice services. The easiest way to manage this is to sum all real assets intermediated (Philippon 2012), assuming that a financial asset needs to be intermediated, either at the time of issue and or during its life. [4] Two questions emerge about this calculation. First, what is a real intermediated asset ? Second, is the calculation able to take all kind of financial services into account ? A real intermediated asset is an asset that provides a financial service to non-financial industry customers that must be intermediated. The volume of intermediated assets can, then, be estimated by the sum of domestic broad money, credit to non-financial sectors and market capitalization. The calculation does not add derivatives for three reasons. First, derivatives are indirectly taken into account in the calculation insofar as they "derive" from real assets. These contracts are thus of zero net supply. Second, although derivatives help spread the risk, this service is already indirectly taken into account. In fact, the positive effects of risk management are supposed to include that it increases the volume of financial services (e.g. the amount of domestic credit) and reduces borrowing costs. In both cases, it is taken into account in the output calculation and in the corrected VA. Third, the liquidity service related to shadow banking, if any, is captured by M3 monetary aggregate that account for shadow banking risk-free asset. [5]

The sum of credit and market capitalization accounts for both supply and demand sides of the transfer of funds services. Insofar as financial assets are most often owned by asset managers, capital management service is captured by the calculation. Because credit entails monitoring and screening services, and because market capitalization is related to the emis-

4. Philippon (2012) estimates the financial output compiling two different estimations. The first estimation is the one used in this paper. The second estimation use the flow of credit, money and security issuance. I do not use this method here due to data availability issue. It is however worth noting that both estimations are very similar in Philippon's study. There is thus no reason to think that this simplification could bias the results.

5. As theoretically explained by Gorton and Metrick 2012 and Sunderam 2012, shadow banking liabilities constitute substitutes for money. In particular, repos and money market funds share might be seen as shadow deposits. This is why I use M3 monetary aggregate to account for shadow banking risk-free assets. However, it is worth noting that the money service provided by shadow banking assets remains inferior to deposits and decreases with size. Shadow banking assets are not government guaranteed and rely on more volatile secondary markets. In addition, the money service declines with the quantity of shadow banking assets produced, as they tend to be backed by riskier assets.

sion of securities, both series capture financial services related to capital provision. Adding the volume of broad money to the calculation captures the specific service of liquidity provision. Last, since advisory services evolve in relation to the intensity of financialization [6], they are indirectly included in the calculation.

Finally, I add the volume of public debt arbitrarily discounted by a factor of ten, to account for financial services related to management of public debt. In fact, government debt is weakly intermediated, although debts must be traded and generate duration risk (Philippon 2012). It is therefore assumed that the management of public debt is less intensive.

1.3 The unit cost of financial intermediation

Given both parts of the calculation (corrected VA and financial output), the unit cost (z) of financial intermediation is obtained though the following formula :

$$z = \frac{VA^{\phi}}{credit + money + capitalization + 0.1debt}$$

I do not account for the intensity of intermediation ; I assume that it is as intensive to provide one euro of financial service today as 50 years ago. This hypothesis is, however, conservative as financial innovation tends to reduce the incentive for financial intermediaries to screen and monitor borrowers. This assumption and its potential effects on the result are discussed in section 4 below.

2 Three European cases : Germany, France and the UK

Because Germany, France and the UK account for more than 60 per cent of European GDP throughout the period under study, it is important to examine the specific evolution of the unit cost in those countries.

2.1 Germany

2.1.1 German bank-based system, some historical facts

Bank-based financial systems are characterized by the role of banks in capital allocation (Allen and Gale 2001). Germany is often considered the prototype of bank-based financial

6. This is particularly the case for mergers and acquisitions that are positively correlated to market capitalization. However, this represents only a minor part of financial services.

systems, with particularly powerful banks. [7] Along with the role of banks in capital allocation, Germany is also known for its so-called universal banks. The main characteristic of universal banking is that it follows companies all along their live, thanks to the scope of its financial activity. The costs and advantages of universal banking are hard to assess, though, depending crucially on regulation and on trade-offs between competition and stability (Carletti and Vives 2009). While universal banking may have ambiguous effects on risk taking, it is often argued that it decreases competition and increases the cost of financial services. Nevertheless, two points must be taken into account while considering the "universal" nature of German banks. First, financial markets were weak throughout the second half of the twentieth century (see figure 2.1.2 below) ; unlike in the US and the UK, the scope of bank activity in Germany was hampered by the difficulty of acting in financial markets, at least before the reforms of the 1990s. Second, as documented by Fisher and Pfeil (2004), business activities are highly separated among banking institutions. In particular, investment banking has not been a significant area of business for most saving and cooperative banks, so, universal banking in the modern sense – that is, banks doing business in both retail and investment banking – concerned only a small number of large commercial banks (Deutsche Bank, Dresdner Bank and Commerzbank) rather than German banking as a whole before the mid-1990s. The German bank-based system was, until twenty years ago, mostly characterized by banks whose role was to collect deposits and provide credit.

Whether regulation helped to shape or was dependent on this financial system is hard to know, but the Bundesbank was a fervent defender of the financial system status quo. Because of its anti-inflation policy, the central bank was comfortable with the existing financial system as it assisted its monetary policy objectives. Indeed, because the financial market can generate monetary instability, the Bundesbank feared losing control over monetary policy. As a consequence, financial reforms occurred later in Germany than in other European countries. The wave of liberalization and deregulation there did not start before the mid-1980s.

Although Germany was less regulated than other OECD countries till the 1980s [8], the liberalization of the German financial system began slowly, with the abolition of the "gentleman's agreement" in 1985. The possibility of a foreign financial institution being a lead underwriter of DM-denominated issues of foreign entities was a first step toward more competition. Nevertheless, because financial markets had been weak till the 1990s, the wave of deregulation and liberalization created by the European Directive of 1992 (implemented in

7. As documented by Vitols (2003), the proportion of banking system assets in total financial assets are 74.3 per cent in Germany and 24.6 per cent in the US.

8. Regulation of interest rates was abolished in 1967, while branching was permitted in 1959.

1994) on developing financial markets had significant effect. The full effects of the reforms are not clear, however. It appears that the German financial market, in particular, did not experience the success that reformers expected. Although IPOs increased quickly after the creation of the neuer market, this proved to be short-lived ; it was declared a failure in 2003. In addition, the distribution of German financial system liabilities by type of financial institutions barely changed between 1993 and 2003 (Vitols 2003), with banks keeping high market share despite the liberalization. On the other hand, bank deposit margins – that is, the difference between money-market rates and rates for time and savings deposits of equal maturity – decreased significantly with the opening of money market funds in 1994 (Domanski 1997 and Fisher and Pfeil 2004). However, this decrease might have been more than compensated for by a new pricing method, which evolved in proportion to assets managed, adopted by banks and mutual funds.

2.1.2 Financial consumption and financial output

One of the main problems in evaluating financial costs in Germany stems from the way banking income data are provided. Whereas the evaluation must account for domestic activities, the available data relies on German banking activity both in Germany and abroad. Since the data account for the subsidiaries of foreign banks but exclude the foreign subsidiaries of German banks, we might simply assume that foreign banks have to create subsidiaries in order to access the German market and vice versa. While the hypothesis might be correct in the first case, it is probably not correct in the latter. It is thus important to account for German banks' foreign activities. To be conservative, I use the trade balance of financial intermediation to adjust the series.

Figure 2.1.1 plots the evolution of GDP share of finance in Germany with both plain financial VA and with its corrected estimation adding banks' capital income. In both cases, the GDP share of finance increases over the covered period. Moreover, the figure shows that using banking incomes in the calculation has no impact on the shape of the curve before 1992, that is, until after the second European banking directive liberalizing market activities. After that year, the series diverge increasingly.

Figure 2.1.2 plots the ratio of financial output to GDP in Germany per type of assets. We can see that credit – in particular bank loans – is the major source of financial output in Germany throughout the period, confirming the bank-based character of the German financial system. Most of the increase that occurs after the mid-1990s is due to post-EU 1992 directive on market capitalization. This confirms the new orientation of German financial system, although, as argued in the preceding paragraph, this does not mean that non-bank

financial intermediaries kept banks out of market-based business.

2.1.3 The unit cost in Germany

Figure 2.1.3 plots the unit cost of financial intermediation depending on whether or not bank capital income is used in the calculation. This figure shows that overall, the unit cost increases when banking incomes are included. It also appears that the unit cost remains fairly constant from 1970 to today, suggesting that financial reforms, although not as tough as in France and the UK, did not have an impact on the cost of intermediation. Indeed, as shown in section 2.1.1, financial liberalization in Germany has not produced dramatic modification of the financial system. Nevertheless, this point of view remains controversial as potential covariates may have affected the unit cost in different periods.

This puzzle is all the more salient since the 'plain unit cost' increased during the 1970s then decreased in the 1990s, returning to its initial value. This result suggests that similar forces have pushed up both unit cost and plain unit cost in the 20 years following 1970. On the other hand, this force seems to have vanished in the 1990s, thereby reducing plain unit cost. High unit cost values that remained during the 1990s should thus be explained by factors asymmetrically affecting the unit cost and the plain unit cost after that date. As is shown in section 4 below, increases in nominal rates of interest during macroeconomic turmoil explain very well the rise in the unit cost before the 1990s. When nominal rates decreased, the plain unit cost decreased too. On the other hand, the unit cost remained high after that date. Because the difference between plain unit cost and unit cost series arises from capital incomes, those incomes – and all things promoting their development -- might have been responsible for the unit cost remaining high. It is as if bank capital income added up to financial VA without producing any significant financial service.

2.2 France

2.2.1 The French financial system after WWII : from the state to the market

The French financial system was subject to numerous evolutions in the second half of the twentieth century. From the Reconstruction to European monetary union, it had to adapt continuously to new economic and political agendas. From the end of the WWII to the early 1980s, the French government was broadly active in credit markets. Commercial banks supplied short and middle-term credits, while semi-public institutions (Crédit National, Caisse des Dépôts, etc.) provided long-term loans. The control of long-term credit was an element of the strategy of coordination that the French government pursued to accelerate econo-

mic recovery. The related semi-public banking system, with the French Treasury at its core, thus aimed to encourage investments in strategic sectors to spur economic growth (Monnet 2012a and Quennouelle–Corre 2000 and 2005). At the same time, the Bank of France aimed at controlling inflation and stabilizing the franc against the dollar. The discount rate followed the FED rate to prevent capital movement, while credit controls were used to manage inflation (Monnet 2012b). However, this strategy generated some market distortions. In particular, it discouraged competition, kept alive inefficient banks and created rents for incumbents. The financial system was not without consequences for the development of financial markets, either. The availability of low-cost credit discouraged firms from issuing securities for their investment (Marnata 1973) while the private sector was too small to provide the depth that the financial market needed to function correctly (Hautcoeur 1996).

During the 1970s, it became evident that the institutional environment inherited from the Reconstruction and the Bretton Woods era was not adapted to new circumstances. First, economic openness and the end of Bretton Woods changed dramatically the international equilibrium. National institutions had to adapt to a new set of constraints, which contributed to monetary instability (Loriaux 1991). Second, inflation grew too high to be ignored by the French government. In order to tackle inflation and monetary instability, the Bank of France was urged to put a permanent cap on commercial bank lending ('encadrement du credit'). However, the crisis of 1973 and its consequences for firms' profitability encouraged the government to intervene even more in the credit market. Thanks to subsidized loans, para-public banks – under control of the Treasury – were encouraged to extend their credits to support private investment and export. Because those banks were not subject to the Bank of France 'encadrement' policy, subsidized loans progressively crowded out commercial loans. The contradiction between the objectives of the Bank of France and those of the government exacerbated inflation (Blanchard 1997) and damaged the allocation efficiency of credits (Bertrand et al. 2007). In addition, firms became so highly indebted that new solutions had to be found to restore their financial health and profitability. The set of constraints that predominated in the early 1980s thus encouraged the structural reform of the financial system. Last but not least, because of public debt increase, the government found advantageous to open financial markets.

The related deregulation and liberalization were not instantaneous though, and it was not until 1984 – after the failure of the nationalization of the banking system – that Laurent Fabius' center-left government carried out a significant deregulation of the financial system which impacted on both financial and intermediaries markets. The reforms of 1984 and 1986 encouraged direct funding on the market, while the banking reform act of 1985 increased

bank competition and transparency (Lacoue–Labarthe 2001). The wide-ranging privatization reforms also gave the depth that financial markets needed to work more efficiently. Firms and investors were all encouraged to "play" on financial markets, since securities turned out to be readily tradable. The so-called "disintermediation" of the financial system was the most visible consequence of this structural change.

Banks also changed their model of business to integrate financial markets into their strategies (Lacoue–Labarthe 2001). They progressively extended their trading branches so that the weight of securities in French banks assets rose from 10 per cent in 1995 to 40 per cent in 2007 (Fournier and Marionnet 2009). From a centralized and controlled activity during the 30 years following the war, the French financial industry became progressively blurred, with large banks coordinating the system between market and credit businesses.

2.2.2 Financial consumption and financial output

As for Germany, although OECD data cites French bank activities in both France and abroad, banking income data include the subsidiaries of foreign banks in France but not the foreign subsidiaries of French banks. In order to correct the data for the overseas activities of French banks, I used Fournier and Marionnet's study (2009) that provides the domestic activities of French banks after 1994. Before 1995, I use the average share of domestic incomes to total incomes from 1995 to 1999 as the basis of calculation.

Figure 2.2.1 plots the evolution of GDP share of finance in France either with plain financial VA or with its corrected estimation that adds bank capital income. In both cases, the finance sector share of GDP increases over the covered period. The figure shows that using banking incomes in the calculation has no impact on the shape of the curve before 1990. After that, the ratio of financial VA to GDP decreases while the ratio of corrected financial VA to GDP continues to increase. It is also worth noting that, unlike in Germany, the difference between both series was already high in the 1980s.

Figure 2.2.2 deals with financial output. As in the German case, credit accounts for a large part of the financial output in France from the late 1960s to the early 1990s. Before the 1970s, liquidity management was the most important aspect of financial intermediation. The 1984-86 reforms show clearly in the data as the weight of market capitalization increases significantly in the 1980s. Unlike in Germany, market capitalization is not the only variable explaining post-1990s financial output increase in France. In fact, credit and broad money rose rapidly throughout the last 20 years of the sample. This is typical of blurred financial systems where bank-based and market-based businesses are tied closely together.

2.2.3 The unit cost in France

Figure 2.2.3 plots the unit cost according to whether bank capital income is included in the calculation or not. It shows that the unit cost is stagnant overall when capital incomes are used but decreases otherwise. Interestingly, we see that the post mid-1980s unit cost decreases, suggesting that, unlike in Germany, financial deregulation may have reduced financial costs in France. In addition, credit control and subsidized loans during the 1970s may have helped French banks to make rents (Monnet 2012a). This is all the more probable since firms could not turn their back on the banks because financial markets were not sufficiently developed to offer alternatives to bank loans. It is also worth noting that the unit cost returns to its pre-1970s value.

2.3 The UK

2.3.1 The UK market-based system, some historical facts

The UKs financial system did not follow the same path as the French and German ones. Although financial regulation was tough till the 1970s, the UK financial system allowed more room for financial market activity. Firms could offer long-term funds on the market, while banks helped enterprises in their need for short-term liquidity. The financial system was less centralized than in France and Germany despite financial intermediaries that behaved much like a cartel. The Bank of England had to comply with government economic policy and exchange controls. Its rates movement was mainly used to maintain sterling value while not jeopardizing government borrowing (Monnet 2012b). Like the Bank of France, the Bank of England resorted to credit ceilings to achieve its monetary objectives. So as to cope with new economic constraints (especially the development of international trade and inflation), the 1971 reform was the first attempt to deregulate the post-war financial system. The new approach called Competition and Credit Control (CCC) aimed at promoting competition among banks and used interest rates to control monetary growth and inflation. This reform was tailored to suppress credit ceilings and restrict banks so-called rents. However, it proved to be a monetary failure. By relaxing some of the previous lending constraints, the CCC encouraged financial institutions to increase their credit considerably, thereby increasing the amount of outstanding money and inflation. The Bank of England reacted at the end of 1973 with the Supplementary Special Deposit (SSD), a device forcing banks to make non-interest-bearing deposits with the Bank of England whenever their interest-bearing eligible liabilities grew too great. Nevertheless, the SSD did not prevent the banking crisis of 1974, and economic troubles and inflation continued to plague the economy, due to the 1973

petroleum crisis. The sterling crisis of 1976 then led the government to adopt monetary targets (Davies 2012) that remained in place for two decades.

The end of exchange control under the new conservative government of Margaret Thatcher was a major change. This rupture helped the application of monetarist principles. Along with the privatization of the economy and the reduction of state spending, the government aimed to control inflation through monetary policy. Furthermore, the big bang of 1986 put an end to fix commission and brokers single capacity, encouraging market funding and financial innovation in an increasingly internationally competitive environment (Michie 1999). Freed from previous restrictions, financial intermediaries started to deal with new financial market businesses. This encouraged universal banking business, wherein economies of scope helped banks to grow rapidly and to concentrate. The 'small bank crisis of 1991-94 marked a rupture. Many small banks collapsed thanks to their ineffective efforts to mimic the US model of investment banking in a highly deregulated and globally competitive environment (Logan 2000). The activity of Wall Street investment banks squeezed both merchant bank resources and profits. The restructuring took many years — especially after the UK's short-lived commitment to the European Monetary System (1990-92) – and it was not before the 2000s that the UK financial system really stabilized. The stabilization came, however, at the cost of financial enterprises passing into foreign hands ; between 1995 and 2000, a large part of the investment banking sector was sold to overseas owners (Roberts 2005). [9] Nevertheless, the legal framework of UK financial market activity proved to be so attractive that London became a central hub of the world capital market.

2.3.2 Financial consumption and financial output

Accounting for financial costs in the UK is difficult because of the increasing role played by the London financial market : it is hard to separate domestic from international financial services. The first thing to do is to control for trade balance of financial activity, but this is not sufficient to account for capital gains made by UK banks abroad. I therefore make the

9. To quote Roberts (2005) : "As the investment banking business globalised, the UK merchant banks found themselves struggling because of the huge advantage enjoyed by the US firms, whose domestic market constituted half the world market. (...) [T]he sales of UK merchant banks in the 1990s were shrewd cash outs at the top of the market cycle from an industry which had been artificially cosseted by barriers to entry and cartel-like practices. (...) ". In other words : "By the beginning of the twenty-first century more than half of the Citys workforce worked for foreign banks or foreign financial firms, and amongst the top international investment banks not one was British. It was a state of affairs sometimes compared to Wimbledon tennis tournament, for which the UK provides the venue and sells the strawberries and cream but where most of the players, and winners, are foreigners".

conservative hypothesis that the share of domestic capital gains is the same as the share of domestic financial VA. It is also worth noting that banking income data account for largest banking group [10] activities in the UK and abroad. While the data does not account for foreign banks business in the UK, it does include the overseas activities of UK banks. Therefore, the fact that the UK banking system is highly concentrated may help to account for the many activities of bank subsidiaries, especially market activities that are most often declared in tax havens.

Figure 2.3.1 plots the GDP share of finance, using financial VA in its plain and corrected forms. It shows that the GDP share of finance increases overall during the period. It also shows that a major change occurred in the early 1980s, that is, after the financial reforms of 1979. This is evidence of the impact of the liberalization and deregulation of the UK financial system on the role played by the financial industry. A comparison of the two series shows that corrected financial VA tends to move away from financial VA in the late 1990s, that is, with the boom in financial market activity.

Figure 2.3.2 plots the GDP share of financial output. The UK financial output increases at the same pace as GDP till the early 1980s. After that, this ratio increases steeply until 2008. Unlike in Germany and France, the role of market capitalization is very important throughout the covered period, so that credit development - in particular, banking credit – helps to explain most of the financial output increase over the last 30 years of the period. Interestingly, the credit development inflection point corresponds to 1979. As in France, credit volume and market capitalization increase together after the mid-1990s, thereby feeding each other. This is why the financial output share of GDP reaches the astonishing value of 457 per cent in 2006, with credit explaining 45 per cent of financial output compared with 34 per cent in 1979.

2.3.3 The unit cost in the UK

Figure 2.3.3 plots the unit cost according to whether banking incomes are included in the calculation or not. It shows that the unit cost increases overall when banking incomes are used in the calculation. However, it increases during the 1970s then decreases in the 1990s to come back to its initial level when the unit cost is calculated with plain financial VA. It is

10. Barclays Group ; Bradford and Bingley Group (included in the coverage starting 1999) ; HSBC Bank Group ; Lloyds Banking Group (comprising the former LloydsTSB Group and HBOS Group, included in the coverage starting 1996) ; Northern Rock Group (included in the coverage starting 1997) ; Santander UK Group (including the former Abbey National Group, the Alliance and Leicester Group, included in the coverage starting 1996) ; Royal Bank of Scotland Group. Prior to 1996, the Standard Chartered Group was included.

worth underscoring that the shape of the unit cost follows specific historical facts. First, the increase occurring from mid-1970s to early 1990s corresponds to the period of deregulation but also to the Bank of England's monetarist policy. Second, the decrease during the 1990s corresponds to banking restructuring. Third, the increase following 2000 is characterized by the development of new market business such as trading and financial innovation, following the rebirth of London as a financial center.

Finally, it is important to note that the plain unit cost decreases during the 1990s, moving away from the unit cost. Like in the German case, it appears that nominal rates of interest explain the evolution of the plain unit cost (see section 4). The unit cost increase after 2000 might have thus been caused by bank capital income too.

2.4 Accounting for banks capital income in the US

Because Philippon (2012) does not account for bank capital income, this section proposes to "correct" the US estimation of the unit cost. Hence, I merely substitute VA in banking for banking income. Because data are not available before 1980 I use the same process as for Germany, France and the UK, to extrapolate the series from 1950 to 1980.

Figure 2.4.1 plots the GDP share of finance using plain VA and corrected VA. We see that the series move away from each other during the mid-1980s but remain stable thereafter. Unlike in European countries, accounting for capital gains does not greatly affect the US series. This is probably due to the lesser importance of banking in the US financial system. As a comparison, while the financial VA share of the Federal Reserve bank, credit intermediation and related activities decreases from 51 per cent in 1978 to 45 per cent in 2007 in the US, the financial VA share of banking goes from 75 per cent to 68 per cent in Germany.

Figure 2.4.2 plots the unit cost of financial intermediation in the US using both corrected VA and plain VA. Although the unit cost is a little higher from the mid-1980s to 2007, the general shape of the curve is not really affected by the correction of the series. Philippon's main finding thus remains.

2.5 Comparing national series

To give a broader view of the co-evolution of national unit costs, figure 2.5.1 plots all national series calculated hitherto. This figure also adds the US unit cost calculated by Philippon (2012). Although national unit costs evolve in a quite similar way over the period – increasing during the 1970s and stagnating thereafter, with the exception of France, where it decreases after 1990 – differences can be substantial across countries. However, the series

tend to converge progressively over the period (figure 2.5.2). The US unit cost is close to the mean value, suggesting that the US case is "normal". On the other hand, the French unit cost appears far higher throughout the covered period. The liberalization of capital markets in the 1980s might explain why the French unit cost decreases after 1988 while the unit cost in other countries stagnates.

It is finally worth noting that national unit costs converge around 2 and 2.3 per cent after the liberalization of capitals movement occurring in the 1980s. This coincides with alternative measure of the cost of financial intermediation in the US (see Mehra et al. 2011 and Gennaioli et al. 2013). In other words, in all four countries for which the unit cost has been calculated, it costs about 2 and 2.3 cents to create and maintain one monetary unit of financial asset in 2007.

3 Estimation of the European unit cost

So far, this study has focused on national series, ignoring banks foreign activities. However, the national view does not account for all European financial business, especially in the case of the UK, which exports many financial services to other European countries. Calculating the unit cost for Europe avoids this problem.

To obtain the indicator of the unit cost of financial intermediation for Europe additional hypotheses are needed. This section provides two different methods of calculation. The first uses the sum of the countries corrected value added divided by the sum of their financial output. The second method uses the weighted sum of countries unit cost based on the share of each country in the total GDP. In both cases, the overseas activities of financial intermediaries are captured in the calculation. Those activities are assumed to be provided in favor of other European countries. In other words, Europe is seen as a closed economy, in which financial activities are unequally spread over its individual parts. This point is particularly important in the case of the UK since the calculation accounts for its positive financial intermediation trade balance. Nevertheless, because banking income data do not always account for banks overseas activities, the aggregate corrected VA can be either overestimated or underestimated. It will be underestimated if the data does not capture such activity in countries that export a lot of financial services. It will be overestimated if the data accounts twice for banks off-shore activities, which will be the case if these activities are counted in countries both exporting and importing financial services. Finally, it is worth recalling that the data are not systematically available for all European countries so the calculation includes only Germany, France, the UK, Italy, Spain and the Netherlands. This simplification

is unproblematic because these countries account for almost 85 per cent of Europes GDP throughout the period under study.[11] Since data is not available before 1970 for Italy and Spain, nor before 1961 for the Netherlands, the unit cost is estimated with the remaining countries before those years.

3.1 Method 1 : Summing national series

In this subsection, the unit cost of financial intermediation is estimated using the sum of countries corrected value added divided by their financial output. Three different calculations are proposed. The first ("Europe 1") takes all the countries of the panel (Germany, France, the UK, Italy, Spain and the Netherlands) into account and runs from 1970 to 2007. The second ("Europe 2") takes Italy and Spain out of the equation and runs from 1961 to 2007. The third calculation ("Europe 3") takes out Italy, Spain and the Netherlands, and runs from 1951 to 2007. Due to data restrictions, the final European series is estimated using "Europe 3" from 1951 to 1961, "Europe 2" from 1961 to 1969 and "Europe 1" from 1970 to 2007. Comparing the three series also helps assess the robustness of some of the hypotheses used to estimate the European unit cost. It helps to know first, whether data unavailability before 1970 biases the series and second, whether the series is over- or underestimated. While Germany, France and the UK use a "parent view" (activities of national banks and foreign subsidiaries in the country) of banking income, Italy, Spain and the Netherlands use a "country view" (banking activity inside country regardless of the national origin of the banks). If those differences are significant, then the series should diverge significantly.

In order to gauge the robustness of the final series, let us look at the evolution of the ratios of the corrected financial VA to GDP and financial output to GDP. Figure 3.1.1 shows the results of the ratio of the corrected financial VA to GDP using all types of calculations. The three calculations provide close results. Overall, the ratio displays an increasing trend throughout the period as the GDP share of financial income equals 2.2 per cent in 1950 and 8.3 per cent in 2007. Similarly, figure 3.1.2 plots the ratio of financial output using all three calculations. Results are also very close, whichever set of countries is used in the estimation. The ratio increases slowly before the 1990s and exponentially thereafter. In both figures 3.1.1 and 3.1.2, the series are almost the same whatever type of calculation is used. Therefore, the hypotheses used to estimate the European unit cost before 1970 should not have distorted the results. This result is not really surprising as Germany, France and the UK account for

11. It is worth noting too, that Luxembourg and Ireland, countries in which financial activity is particularly important because of their tax-haven status, are not included because of data problems. As a consequence, the European unit cost estimation might have been undervalued.

almost 80 per cent of all six countries' GDP before 1975. Finally, figure 3.1.3 plots the unit cost of financial intermediation using all three calculations. As with the previous results, the series prove to be very similar. The set of selected countries used in the calculation seems not to distort the estimation of the European unit cost.

Figure 3.1.3 shows that the unit cost of financial intermediation increases throughout the considered period. A sharp rise occurs during the 1970s and the 1980s – that is, during the period of restructuring of financial systems and macroeconomic troubles. The unit cost then tends to decrease during the second half of the 1990s and increases again after 2000. Overall, the unit cost never returns to its initial level of the 1960s, demonstrating that it is costlier to obtain one unit of financial service today than it was 50 years ago. Indeed, it cost 1.4 cents to create and maintain one euro of financial asset in 1960, while it cost 2.4 cents to create and maintain one euro of financial asset in 2007.

Nevertheless, some questions might be raised about this conclusion. In particular, it could be argued that the series are not homogenous. In order to address such potential criticism, another method of aggregation is proposed.

3.2 Method 2 : the country-weighted view

In this section, the unit cost of financial intermediation is estimated using the weighted sum of countries unit costs based on the share of each country in total GDP. The series is built using Germany, France and the UK from 1951 to 1960 ; it adds the Netherlands from 1961 to 1969, and includes all selected countries after 1969. Figure 3.2.1 plots this new series along with the series calculated using the first method. It shows that differences between the two series are small. There is thus no evidence of bias related to aggregation methodology.

Because the results are very similar regardless of the method used for the calculation, it is possible to deconstruct the financial output per type of financial asset without the risk of generating misleading facts. Figure 3.2.2 shows that the distribution of financial assets in Europe is not greatly different today than it was in the 1960s. In fact, the relative size of each component did not change dramatically except in 1970s and 1980s, because of a reduction in market capitalization. This is an important fact, as value differences between 1951 and 2007 unit costs do not depend on the relative weight of each series in the financial output calculation.

3.3 Comparison with the US unit cost

In order to ensure the robustness of this calculation, it is useful to compare the European unit cost with the US one, calculated in section 2.4. In addition, comparing these series using banking VA in lieu of banking income provides new clues about the effect of capital income on the shape of the unit cost curve. The "plain" unit cost is calculated using the first method - that is, with the ratio of the sum of selected countries' VA to the sum of selected countries financial output.

Figure 3.3.1 shows that European and US unit costs follow a very similar path over the period. Both increase during the 1970s and reach a plateau in the 1980s. The European unit cost appears slightly higher from the early 1970s to the mid-1990s, then joins that of the US in the late 1990s.

Comparing "plain" unit costs provides interesting facts, too. In particular, figure 3.3.2 shows that US and European unit costs follow the same path until 1990 but diverge thereafter. This is evidence of the increasing role of bank capital income in European financial intermediary business. The deregulation of financial systems seems thus to have increased bank capital income in larger extent in Europe than in the US. This result is probably due to the internalization by European banks of new financial businesses.

3.4 Robustness check

Because the way banking incomes are estimated in the UK accounts for all UK banking group business, including their overseas subsidiaries, overlapping data with other European series could overstate the European unit cost. [12] Hence, the unit cost was calculated using UK plain financial VA instead of banking income. This prevents the calculation from taking UK banks' capital income into account, thereby understating the unit cost. Figure 3.4.1 shows that, despite such underestimation, the European unit cost still increases over the covered period. A small difference emerges with regard to the initial estimation after 1999, probably due to the boom of market activity and banks' capital gains in the UK after that date.

12. It is worth noting, however, that the UK series does not account for foreign bank activity in the UK. This therefore underestimates the corrected VA and might compensate for any overestimation. In addition, because Luxembourg and Ireland are not included in the calculation, the estimation is naturally biased downward.

4 Explaining the unit cost evolution : the role of nominal rates of interest

Looking at the shape of unit cost series, either in their plain or corrected forms, it is easy to identify higher values during the 1970s and 1980s. Those years were a period of macroeconomic turmoil which affected nominal variables. Nominal interest rates are important in the case we are dealing with because financial intermediation aims to manage nominal stocks and flows. In other words, nominal interest rates are directly related to the way financial intermediaries fix the price of their services. It is thus essential to account for this variable to explain the unit cost evolution.

4.1 The effect of nominal rates of interest

According to Smith (2003) and Paal, Smith and Yang (2013) the effect of nominal interest rate on the unit cost depends on the bank function as liquidity provider. So long as the quantity of money is fixed exogenously, these scholars show, banks have to cope with a contradiction between liquidity provision and investment strategy. Keeping unproductive funds in the vaults in order to meet depositors demands for cash is considered an opportunity cost whose value increases as nominal interest rates rise. Banks are consequently encouraged to expand their credit when nominal rates increase, at the expense of their cash reserves. Such a trade-off means that the ratio of credit to deposit (k) is a positive function of the nominal interest rate (r). Assuming that the interest spread (i) between loan and deposit rates is constant, a banks unit cost is given by : $z \equiv 1 - \frac{1}{k(r)}$, which increases in r. Although the impact of an increase in nominal rates of interest on i is ignored, the unit cost of financial intermediation increases with nominal rates of interest.

Another effect of the nominal interest rate emerges with the asymmetric evolution of nominal rates and deposit rates. Based on a simple banking model (see annex for details), I show that, so long as deposit rates are sufficiently rigid in relation to nominal rates, a rise in the latter increases the spread between lending and deposit rates and reduces the total of a bank's loans. In addition, it is important to note that the reduction of outstanding loans also has important consequences for financial market activity. The financial market is less efficient when it is not "nourished" by credits. Financial assets tend to lose their value when the volume of transactions drops dramatically. The combination of those effects should increase the unit cost of intermediation.

The positive impact of nominal rates of interest on interest margins can be easily tested by comparing short-term interest rates with the ratio of bank VA to bank loans. Figure 4.1.1

demonstrates the positive relationship between those variables in Germany, France and the UK. Although the fit appears tenuous in the case of the UK, it is particularly accurate in the case of France and Germany, countries in which credit depends on banks. Another result of the model is that the volume of credit decreases as nominal rates of interest decrease. I tested the effect of nominal rates of interest on the ratio of loans to GDP for all three countries of interest but also with a pool of 12 countries [13] using panel fixed-effect or GMM estimations. All results converge to show that short-term interest rates are negatively and significantly correlated to this ratio (results available upon request to the author).

Because nominal rates of interest are directly related to interest margins, it is valuable to compare them with plain unit costs. In fact, the plain unit cost does not account for bank capital income, which does not directly depend on interest rates (see discussion below). Instead of comparing the two series directly, I used a lowess-smoothing of short-term rates to deal with the volatility of the series. Past rates continue to affect financial intermediation for some years. Figure 4.1.2 shows that short-term interest rates explain the plain unit cost in all three countries [14] of interest and in Europe as a whole. [15]

The consequence of this result is straightforward : whereas the cost of traditional activities is largely explained by the evolution of nominal rates, new financial intermediation costs remain hard to elucidate due to the capacity of intermediaries to source new income from underlying trading businesses. In other words, high unit cost values following financial liberalization cannot be explained by traditional arguments about the production costs of financial services.

4.2 Identifying and explaining financial overcost

The link between nominal rates and unit costs before the 1990s shows that post-1990s high values can be seen as an overcost. What might explain this overcost ? First, since the calculation of the output does not account for the intensity of intermediation, the overcost could be due to output misspecification. Second, it might be the consequence of asset substitution effects. Let us assume two kinds of assets, A and B ; the management cost of A

13. The countries are : Canada, Denmark, France, Germany, Italy, Japan, the Netherlands, Norway, Spain, Sweden, the UK and the US.

14. Because short-term interest rates were reduced in France before 1960 as a specific policy of the Bank of France (Monnet 2012a), I focus on post-1960 data for that country. Furthermore, data is not available for the UK before 1958.

15. Since there were no European short-term rate data until recently, additional calculations (and hypotheses) are needed to build the European series. Hence, the European rate is estimated using the GDP share of selected countries' interest rates.

is higher than the management cost of B. If the ratio of asset A to asset B increases, then the cost of asset intermediation increases proportionally. Should both assets provide similar financial services, the overcost would be explained by systemic inefficiency. Third, the overcost might be caused by waste of resources. Even though fees paid by investors to beat the market — which is impossible to do by definition — decreased over time — at least in the US (French 2008) —, the increasing volume of asset managed by "money doctors" after the mid-1980s — either due to financial deregulation or wealth accumulation — resulted in an augmentation of fees paid per financial asset (Gennaioli et al. 2012 and 2013). Fourth, given the development of universal banking and the increasing concentration of the banking industry, the overcost might come from a "too systemic to fail" effect that encourages banks to take risks. Because systemic banks access finance at low cost while taking significant risks, they take a risk premium on their asset while not paying any risk premium on their liability. Fifth, the concentration of banking may have reduced competition and resulted in market inefficiencies. These explanations would mean that the overcost is due to financial inefficiencies, unless a misspecification of the output can be shown. We should discuss this point in detail. First, credit development is largely due to mortgage credit, whose collateral size tends to discourage monitoring and screening behavior (Manove et al. 2001). At the same time, because rating agencies use hard information such as credit scores or loan-to-value ratio for notations, banks relied increasingly on hard information too (Rajan et al. 2008). In addition, securitization tends to lead to lax screening (Keys et al. 2012). These effects should diminish the intensity of intermediation. Second, the rise of market capitalization in Europe is largely due to the wave of privatization occurring from the mid-1980s to the late 1990s, activity for which intermediation intensity should not have been great. Third, so long as diseconomies of scale do not prevail at the industry level, there is no reason for financial wealth management to be more intensive today than it was in the 1960s. Fourth, as shown in section 3.4 above, the weight given to output components does not affect the results.

Another potential misspecification could stem from private financial wealth-management oversight (Gennaioli et al. 2013). However, the calculation of the financial output largely accounts for this particular service. The circular relationship between financial assets and liabilities implies that the sum of credit, public debt and market capitalization should predict private financial wealth quite well. Using the data proposed by Piketty and Zucman (2013) about Germany, France, the UK and the US, Figure 4.2.1 shows that it is indeed the case.

Lastly, it is important to note that tax havens may have had an impact on the output calculation. Nonetheless, this should not artificially increase the unit cost. Two examples can help account for the consequences of capital transfers on the unit cost. First, let us suppose

that a French bank manages a mutual fund affiliated in Luxembourg. The bank transfers 1$ from France to Luxembourg at no cost. We know that 1$ of liquidity generates a VA of α\$. This transfer of funds has two opposing effects on the unit cost of financial intermediation in France. The transfer of 1$ of liquidity reduces the financial output by 1$ and reduces the VA by α\$. Therefore, the unit cost of financial intermediation decreases if $\alpha > z$, that is, higher than the average cost of producing 1$ of financial service. Second, let us suppose that a French investor invests 1$ in a hedge fund domiciled in Jersey. We know that 1$ managed by a hedge fund generates a VA of β\$ while an investment of 1$ provides the French investor with a VA of μ\$ when invested in a French financial institution. Therefore, the unit cost of financial intermediation decreases if $\mu < \beta$.

Although it is hard to know whether $\alpha > z$, there are two reasons to think that $\mu < \beta$. First, hedge funds activities are opaque and largely unregulated. This provides them with substantial market power over investors even though investors earn significant benefits thanks to the defining characteristics of a tax haven. Second, limited liability encourages some of these institutions to take excessive risks in order to raise their profits. Because they keep the gains when they succeed but do not suffer the losses when they fail, β must be higher than μ. Therefore, since a large share of those activities are not counted in the French VA – though they use French investor capital and can work on French territory – the unit cost of financial intermediation may be undervalued.

According to these facts, the overcost should not have been caused by a misspecification of the output. So, perhaps there were inefficiencies. But identifying one particular cause remains difficult, especially since the post-1990s European financial system assisted in the development of new assets, increased the scale and scope of bank activity and raised investor spending in order to beat the market. The combination of these developments may have produced financial intermediation overcost.

Conclusion

This paper aimed to measure the cost of financial intermediation in the largest European countries (Germany, France and the UK) and to estimate it for Europe more broadly. Using the methodology proposed by Philippon (2012) I calculated the unit cost of financial intermediation using financial intermediaries income divided by financial output. In order to obtain a European series, I compiled national series, taking national financial intermediation trade balances into account.

The main results have shown that the European largest countries unit costs globally

increase (Germany and the UK) or stagnate (France), while the series tend to converge throughout the period. The European unit cost also appears to increase overall. In all cases, the unit cost increased during the 1970s, after the end of the Bretton Woods system. I show that 1970s and 1980s high unit costs can be explained by the increase of nominal rates of interest following macroeconomic turmoil, which increased interest spreads and reduced the production of financial services. On the other hand, high unit cost values after the mid-1990s remain puzzling. In the absence of output misspecification, this apparent anomaly might be the consequence of financial intermediation inefficiency. It is finally worth noting that comparison with US unit cost shows that the US and European series follow the same trend over the considered period, suggesting that similar causes have produced similar effects.

Annex A : Nominal interest rates, interest spreads and credit development

Assume N agents who own a deposit sum D. When lent to a bank, the deposits earns r_D. Each agent has the opportunity to run a project requiring K units of capital, which costs her $r_L(K-D)$. Each project yields y_j ; it is assumed that the agents' projects are not of the same quality. An agent is thus encouraged to start a project if :

$$y_j - r_L(K-D) > r_D D \tag{1}$$

The agents projects can be categorized according to their yields. I assume, without loss of generality, that project earning takes the following form :

$$y_j = y_0 - ua^b \tag{2}$$

With y_0 the best project yield, a the share of started project and $b > 0$ and $u > 0$. In order to calculate the number of financed projects, I determine the marginal project for which $y_j - r_L(K-D) > r_D D$. Based on this condition and using (2), the share of project demand corresponding to the marginal project is given by :

$$a = \left[\frac{y_0 - r_L(K-D) - r_D D}{u}\right]^{\frac{1}{b}} \tag{3}$$

A bank collects deposits and provides loans to agents. To meet the demand for loans, the bank can use its deposits, but also borrows funds from other banks at the market rate $r > r_D$. If its deposits do not cover loans demand, what is set true by hypothesis, the profit function of the bank is given by :

$$\pi = N[r_L a(K-D) - (1-a)r_D D - r(a(K-D) - (1-a)D)] \tag{4}$$

The first term of equation (4) is the bank interest incomes, the second term represents deposit spending, the third term accounts for money market spending. Using (4), the bank has to determine the interest rate maximizing its profit. Setting $r_L = i + r_D$, where i is the interest spread between lending and deposit rates, the bank maximization program sets :

$$i^{eq} = \frac{K[b(r-r_D) - r_D] + y_0}{(1+b)(K-D)} \tag{5}$$

We see clearly from (5) that the interest spread increases with the nominal rate of interest r. This is because a higher nominal rate increases the bank lending rate, despite the consecutive decrease in demand. Interestingly, it is also clear from (5) that the interest spread

decreases along with a decrease in deposit rates. This result is due to the opportunity cost of starting a project.

Replacing (5) in (3) the optimal share of financed projects is given by :

$$a^{eq} = \left[\frac{y_0 - (r_D + i^{eq})(K - D) - r_D D}{u}\right]^{\frac{1}{b}} \tag{6}$$

We see from (6) that a^{eq} decreases with r. Indeed, any augmentation of the nominal rate of interest increases the lending rate and reduces agents demand of funds. Since $r(a(K - D) - (1 - a)D)N$ is a profit made by outside banks on the market, the unit cost is equal to :

$$z = (r_D + i^*)(K - D) - \frac{1 - a^{eq}}{a^{eq}} r_D D \tag{7}$$

Since $\partial i^{eq}/\partial r > 0$ and $\partial a^{eq}/\partial r < 0$ it is immediate that $\partial z/\partial r > 0$. In this respect, the unit cost of financial intermediation increases as the nominal rate of interest augments.

So far, the model has not discussed the potential increase of deposit rates as nominal rates rise. In case of perfect flexibility of deposit rates $dr_D/dr = 1$, so that $\partial i^{eq}/\partial r < 0$. On the other hand, as $dr_D/dr < 1$ the effect discussed above can remain. To know the extent to which deposit rates change along with nominal rates, I compared the gap between both variables in function of nominal rates. Figure A1 shows that the gap between both variables increases as nominal rates rise. The gap appears particularly important in the case of France and the UK. It is less important in the case of Germany but still highly significant. This result confirms that an increase in nominal interest rates can raise the unit cost of financial intermediation in all three countries.

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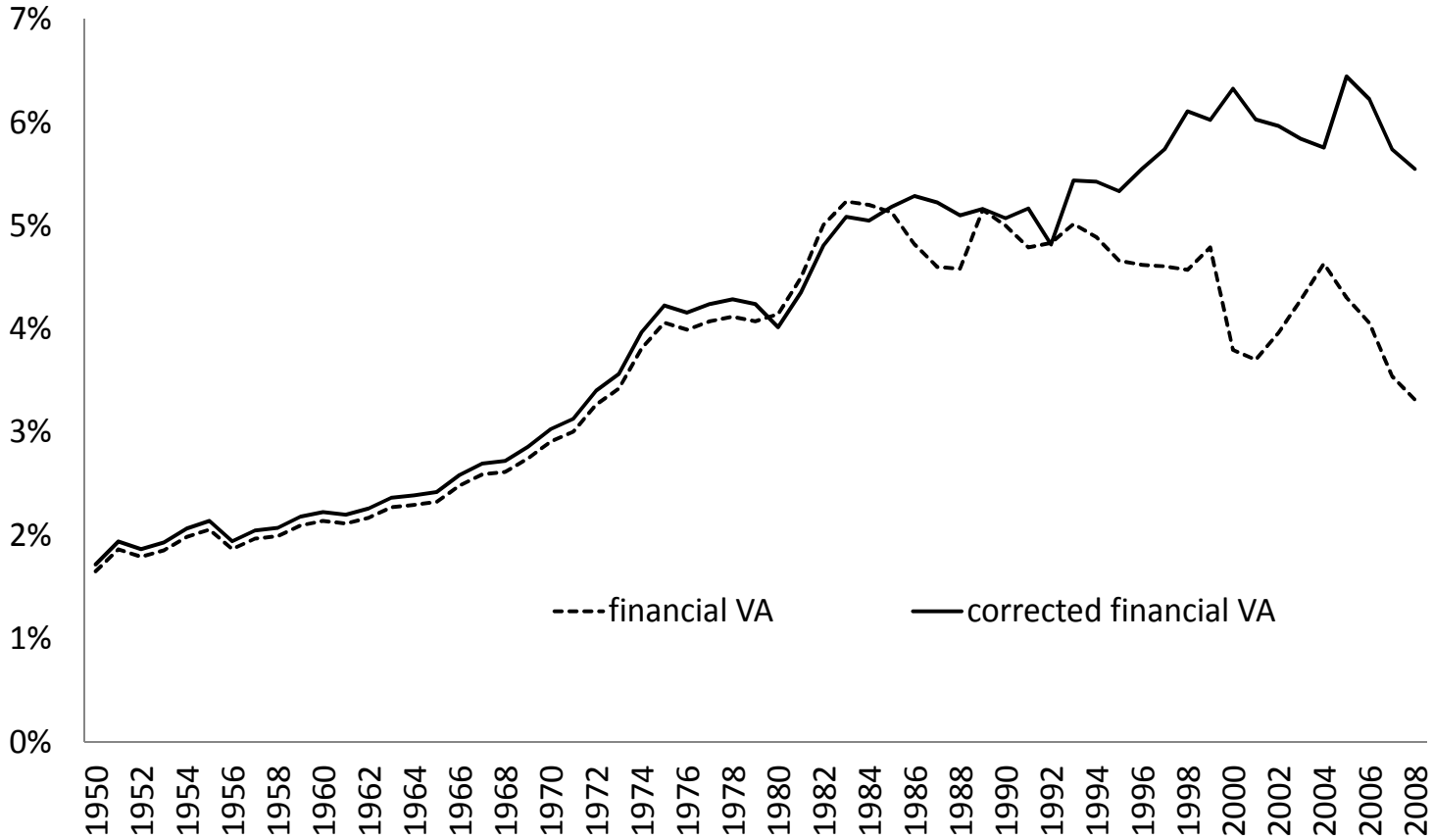
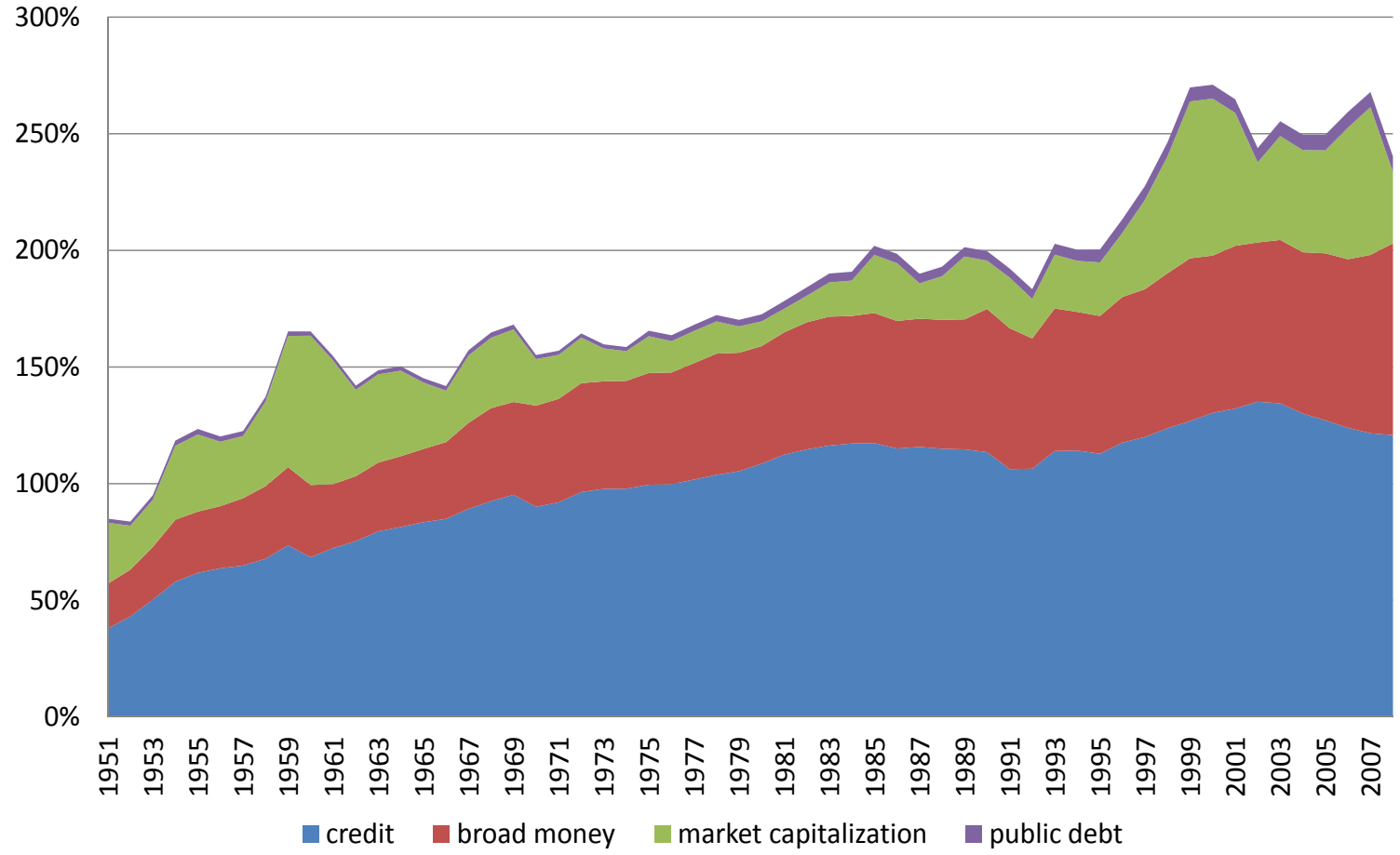
Figure 2.1.1: GDP share of finance in Germany



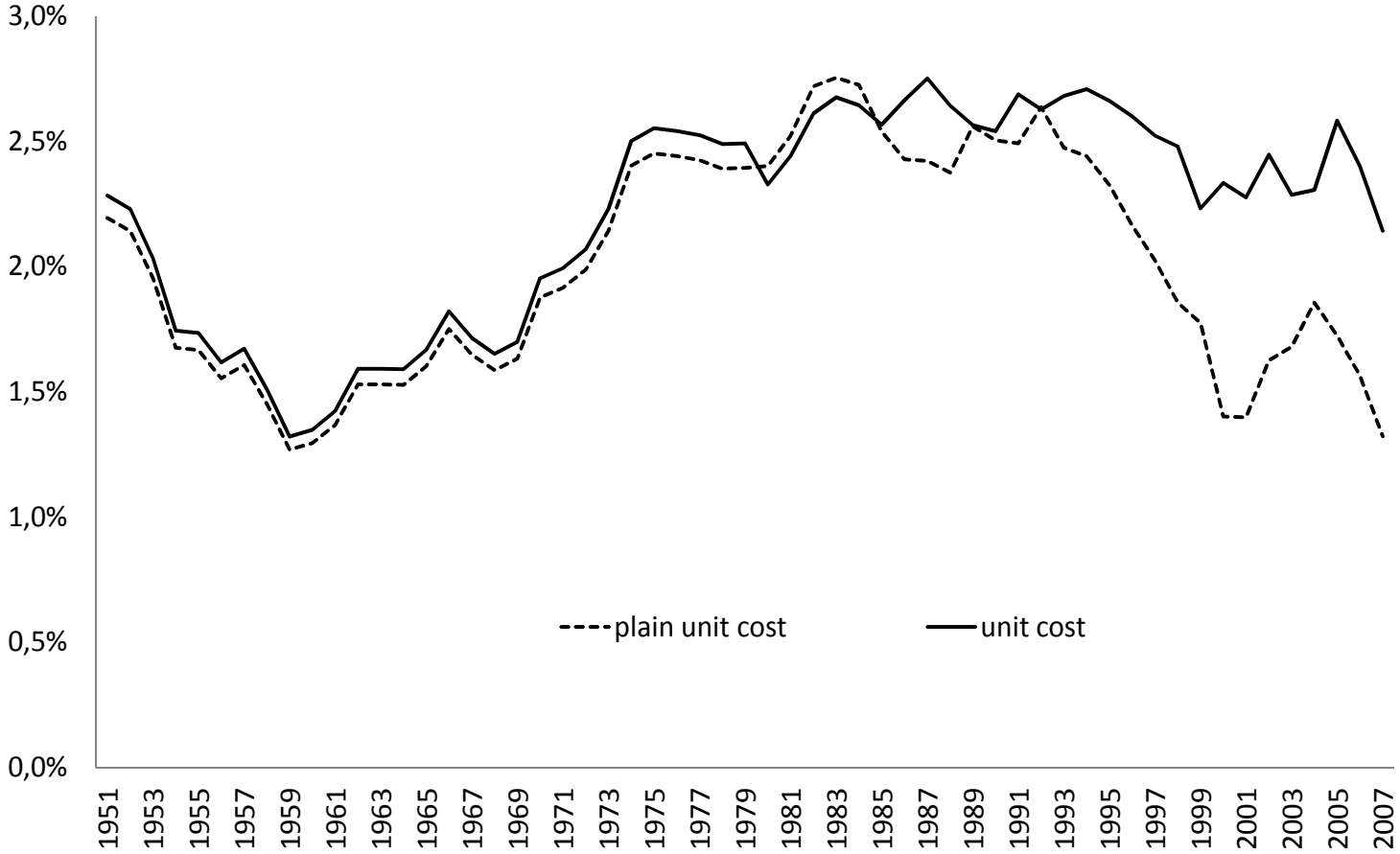
Note: corrected financial VA is the addition of net banking incomes + VA of insurances + VA of other financial intermediaries. The data for net banking incomes is available from 1979 to 2008. Before 1979 the corrected VA is estimated assuming that the difference between this series and financial VA decreases at the same pace as the growth rate of this difference between 1980 and 1990.

Figure 2.1.2: Financial output to GDP in Germany per output components



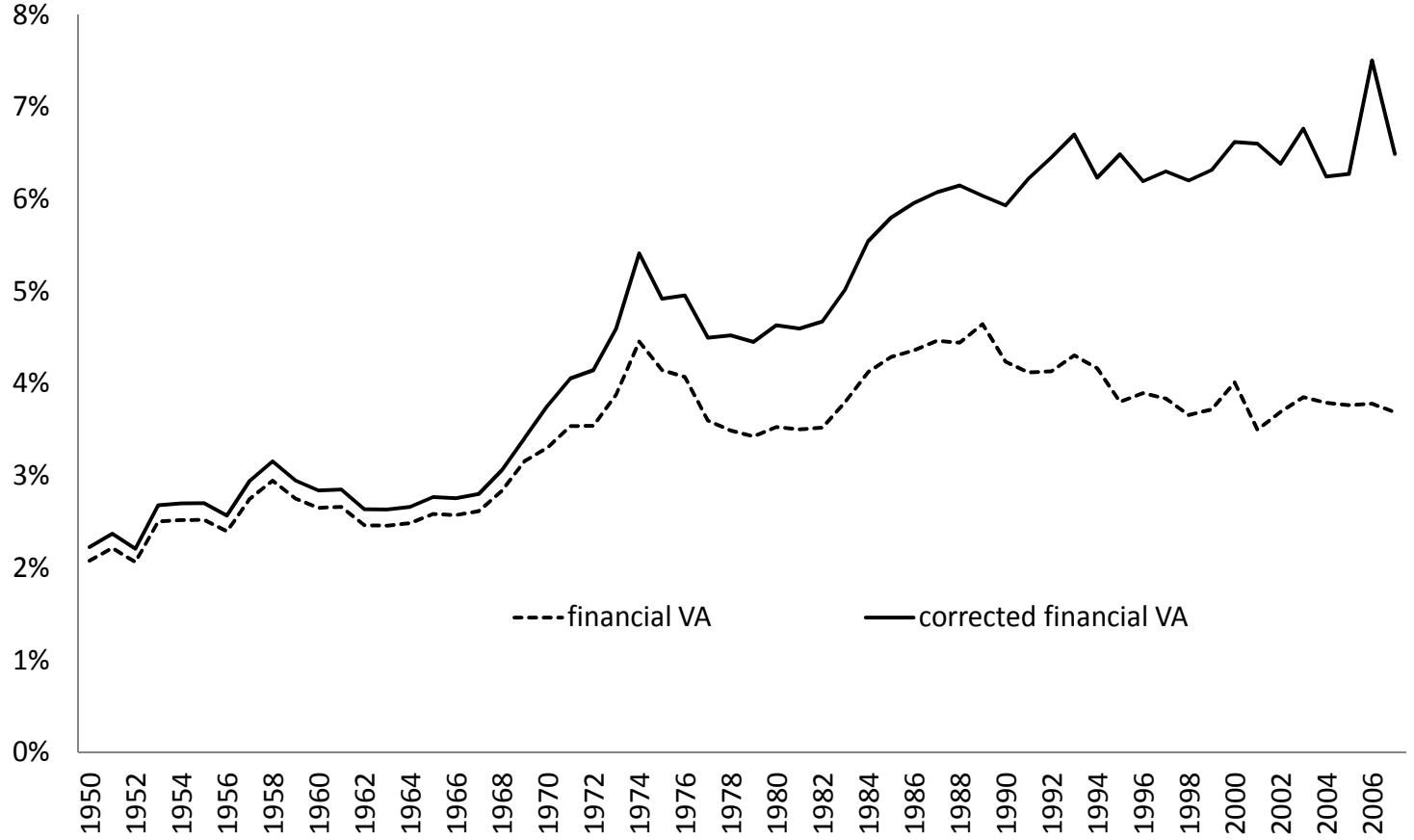
Note: the financial output is estimated through the sum of private credit, broad money, market capitalization and public debt discounted by a factor of 10. Sources are provided in the data appendix.

Figure 2.1.3: Unit cost of financial intermediation in Germany



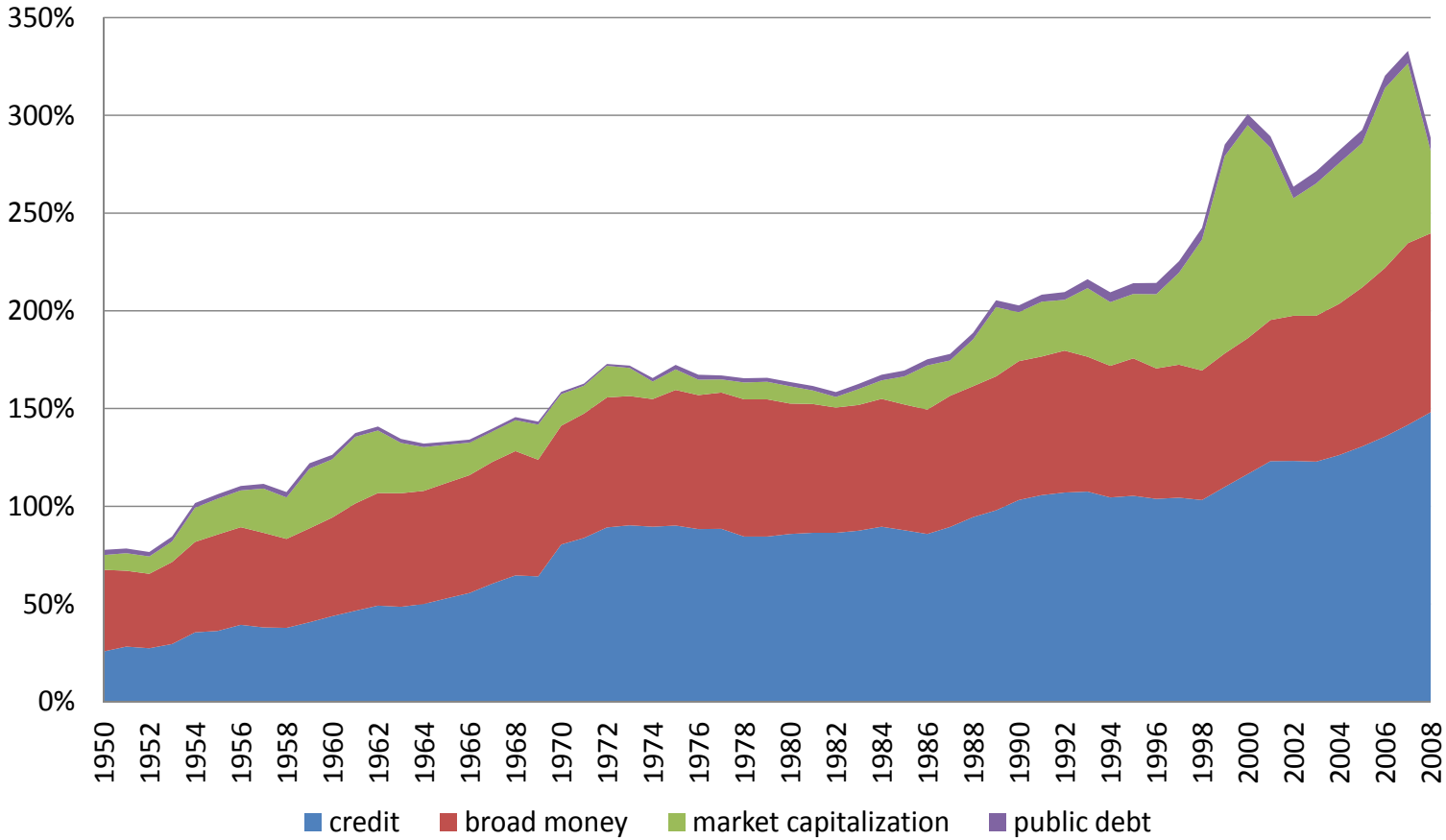
Note: The plain unit cost uses financial VA, while the unit cost uses corrected VA.

Figure 2.2.1: GDP share of finance in France



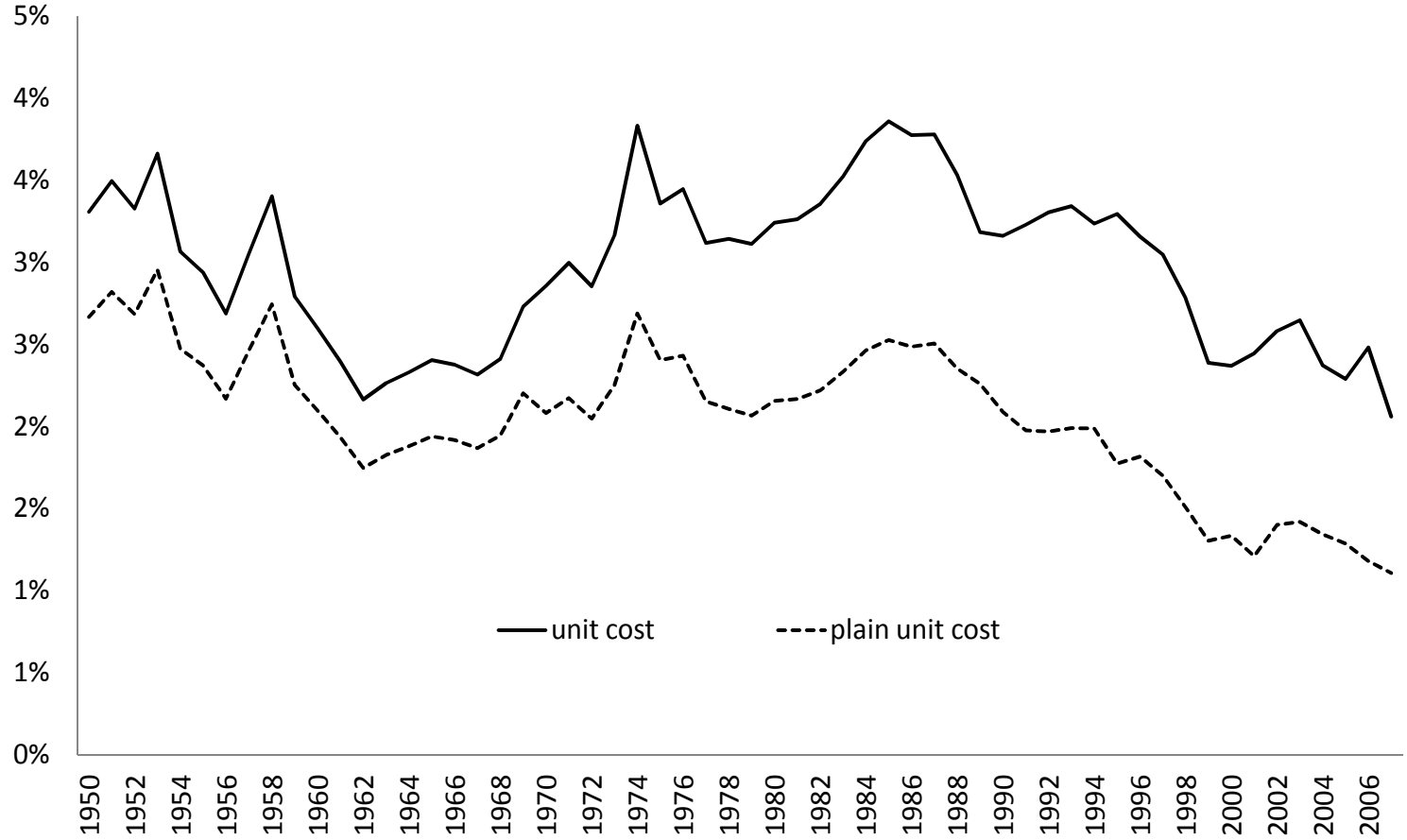
Note: corrected financial VA is the addition of net banking incomes + VA of insurances + VA of other financial intermediaries. The data for net banking incomes is available from 1988 to 2008. Before 1988 the corrected VA is estimated assuming that the difference between this series and financial VA decreases at the same pace as the growth rate of this difference between 1988 and 1995.

Figure 2.2.2: Financial output to GDP in France per output components



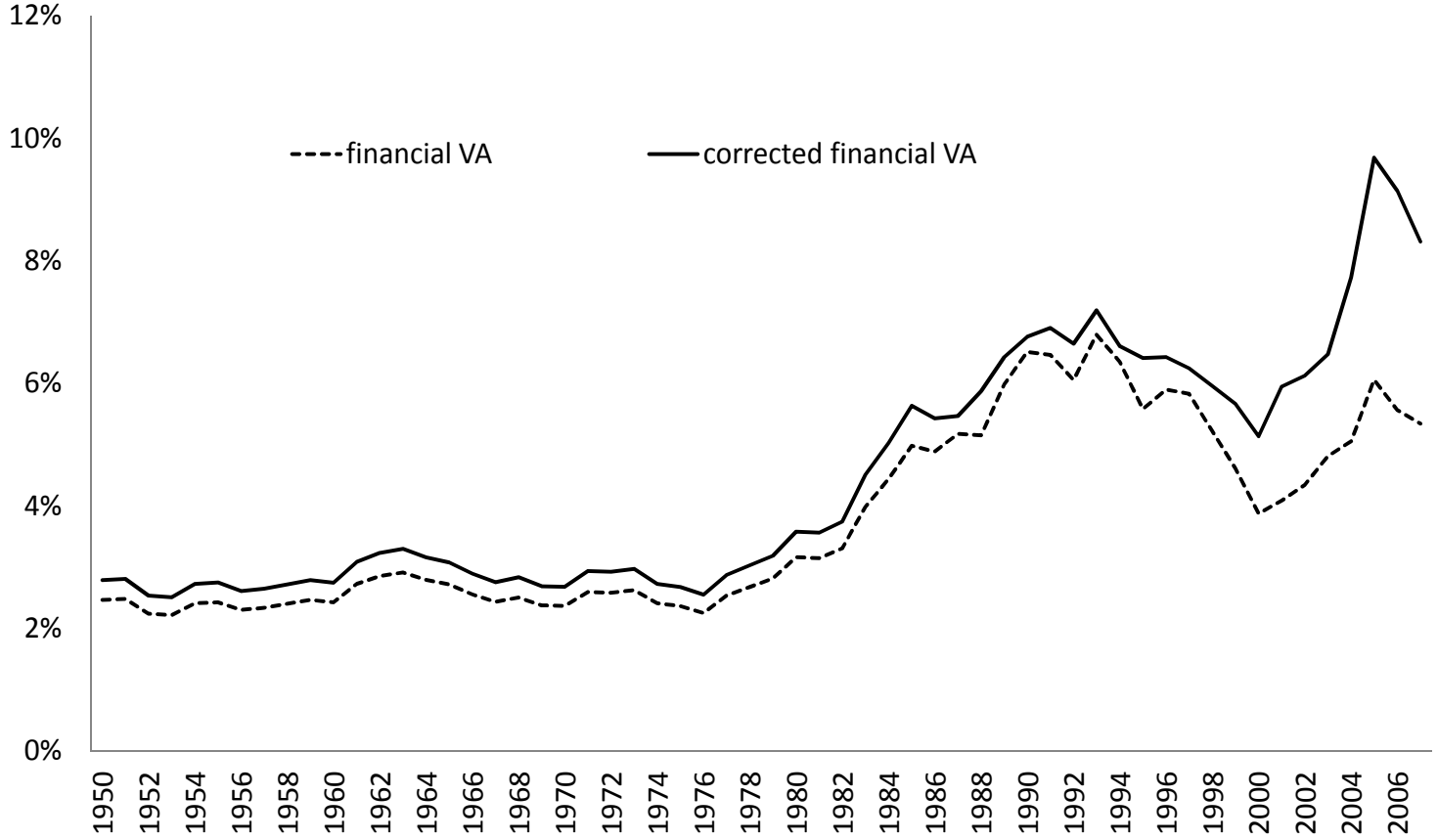
Note: the financial output is estimated through the sum of private credit, broad money, market capitalization and public debt discounted by a factor of 10. Sources are provided in the data appendix.

Figure 2.2.3: Unit cost in France



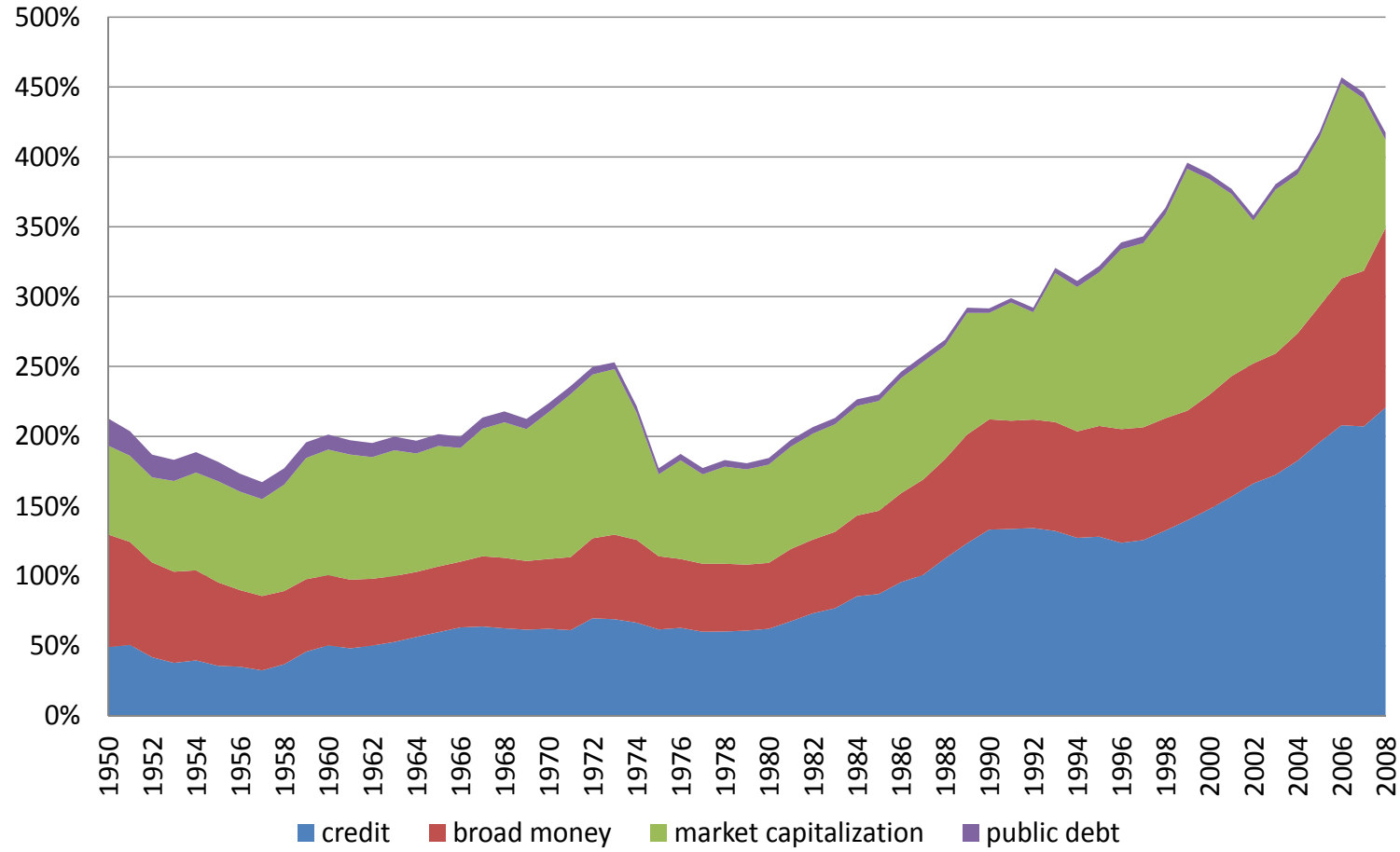
Note: The plain unit cost uses financial VA while the unit cost uses corrected VA.

Figure 2.3.1: GDP share of finance in the UK



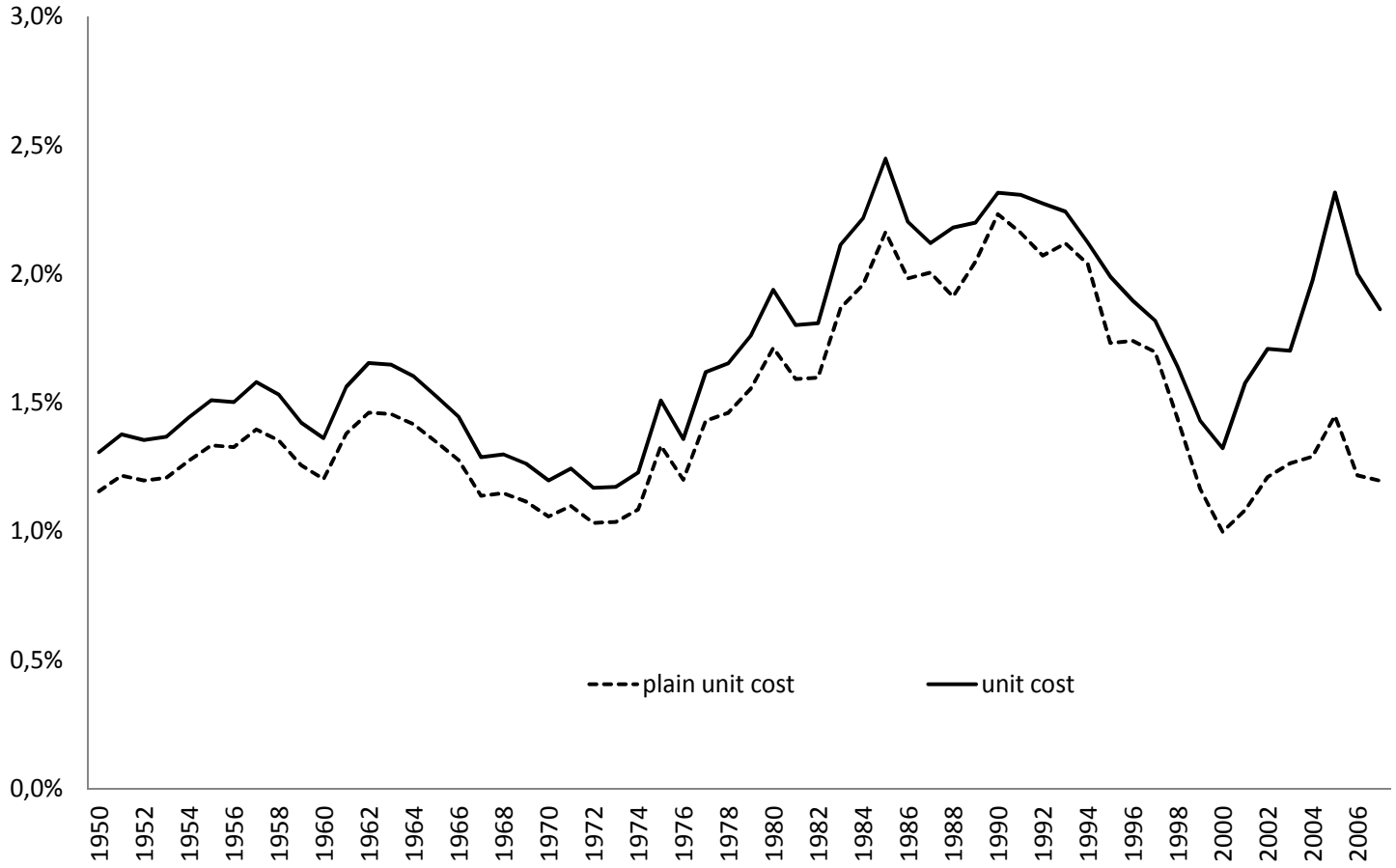
Note: corrected financial VA is the addition of net banking incomes + VA of insurances + VA of other financial intermediaries. The data for net banking incomes is available from 1980 to 2007. Before 1980 the corrected VA is estimated assuming that the difference between this series and financial VA decreases at the same pace as the growth rate of this difference between 1980 and 1990. Both series are adjusted to account for trade balance of financial services.

Figure 2.3.2: Financial output to GDP in the UK per output components



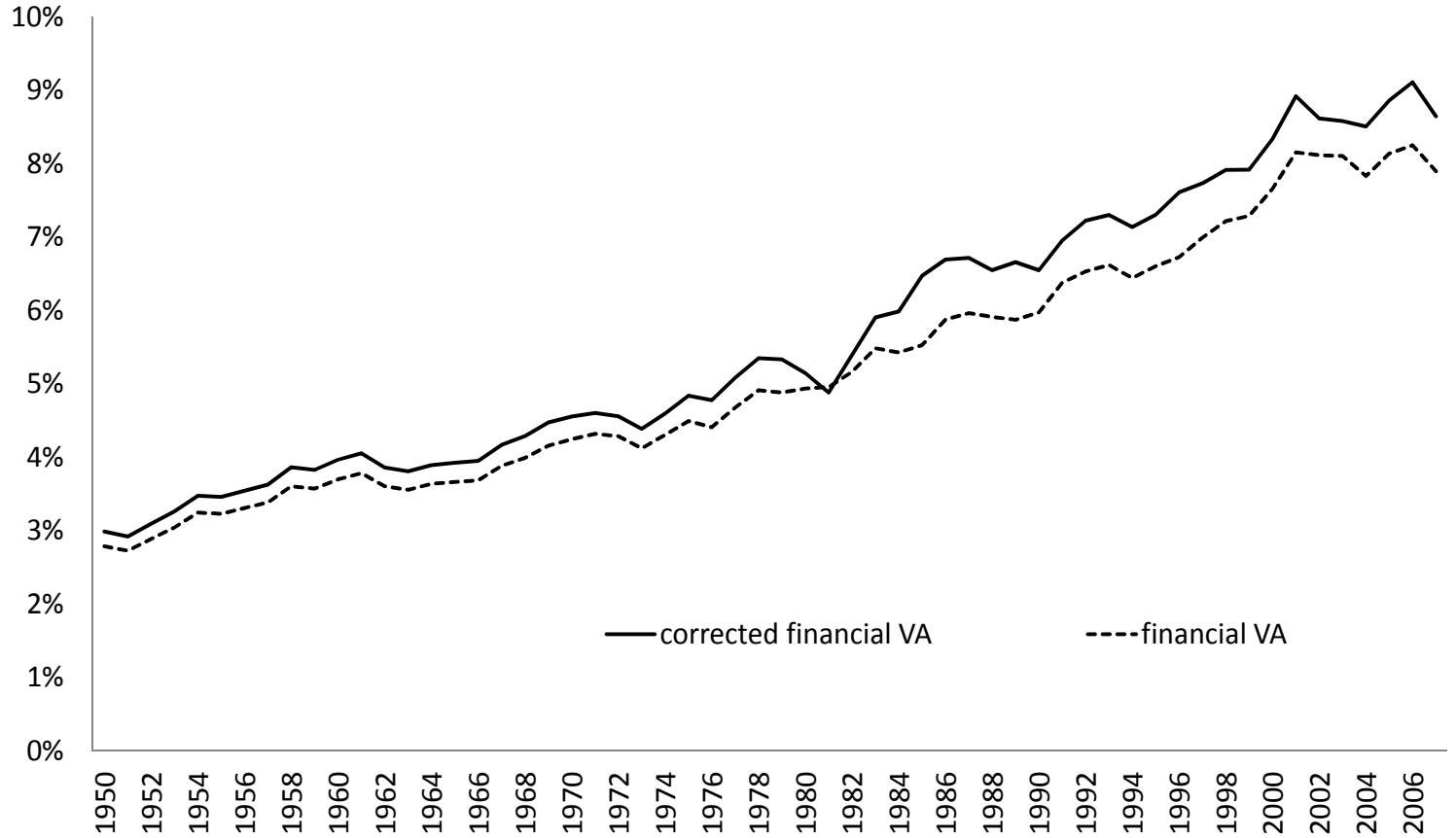
Note: the financial output is estimated through the sum of private credit, broad money, market capitalization and public debt discounted by a factor of 10. Sources are provided in the data appendix.

Figure 2.3.3: Unit cost of financial intermediation in the UK



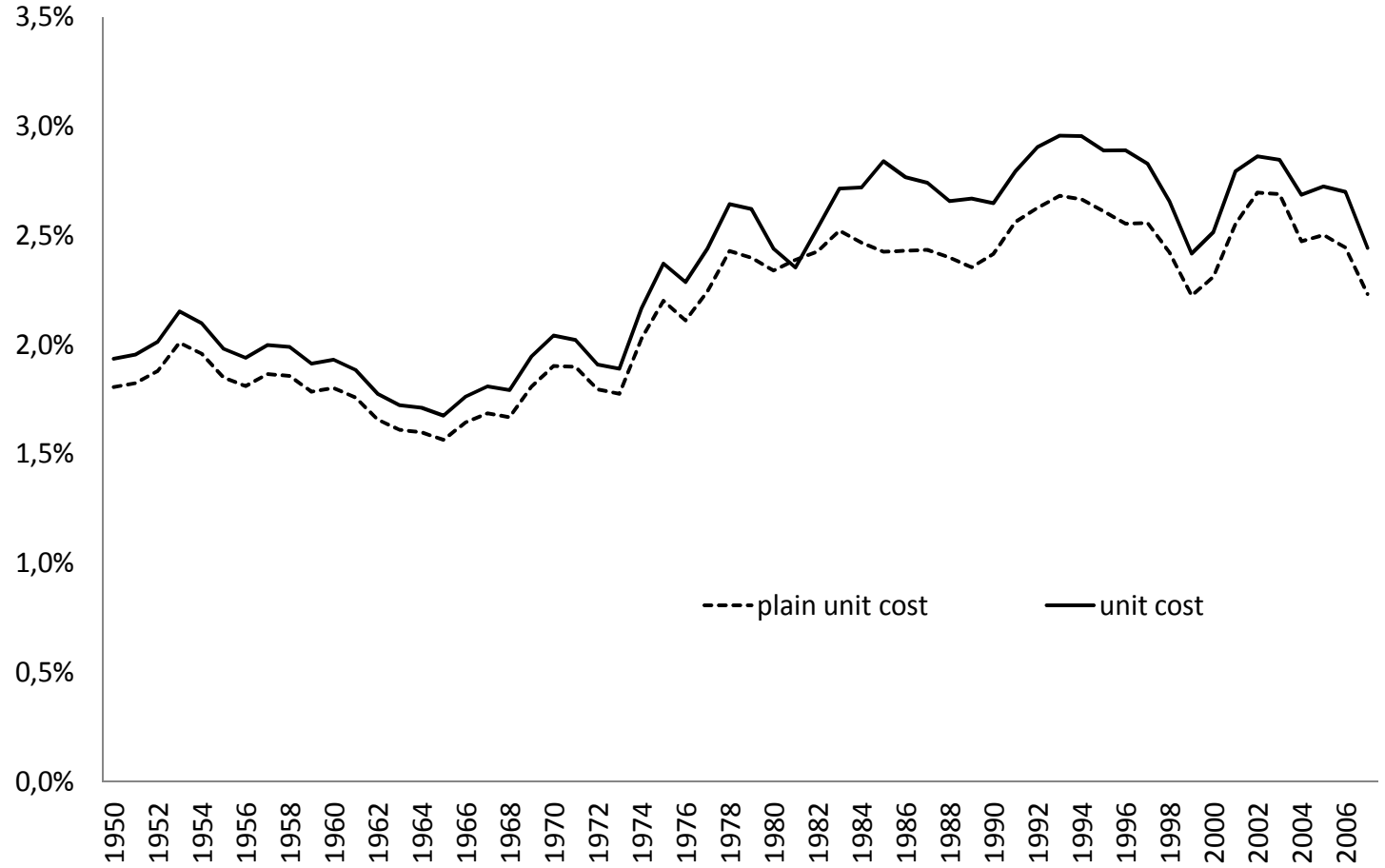
Note: The plain unit cost uses financial VA while the unit cost uses corrected VA.

Figure 2.4.1: GDP share of finance in the US



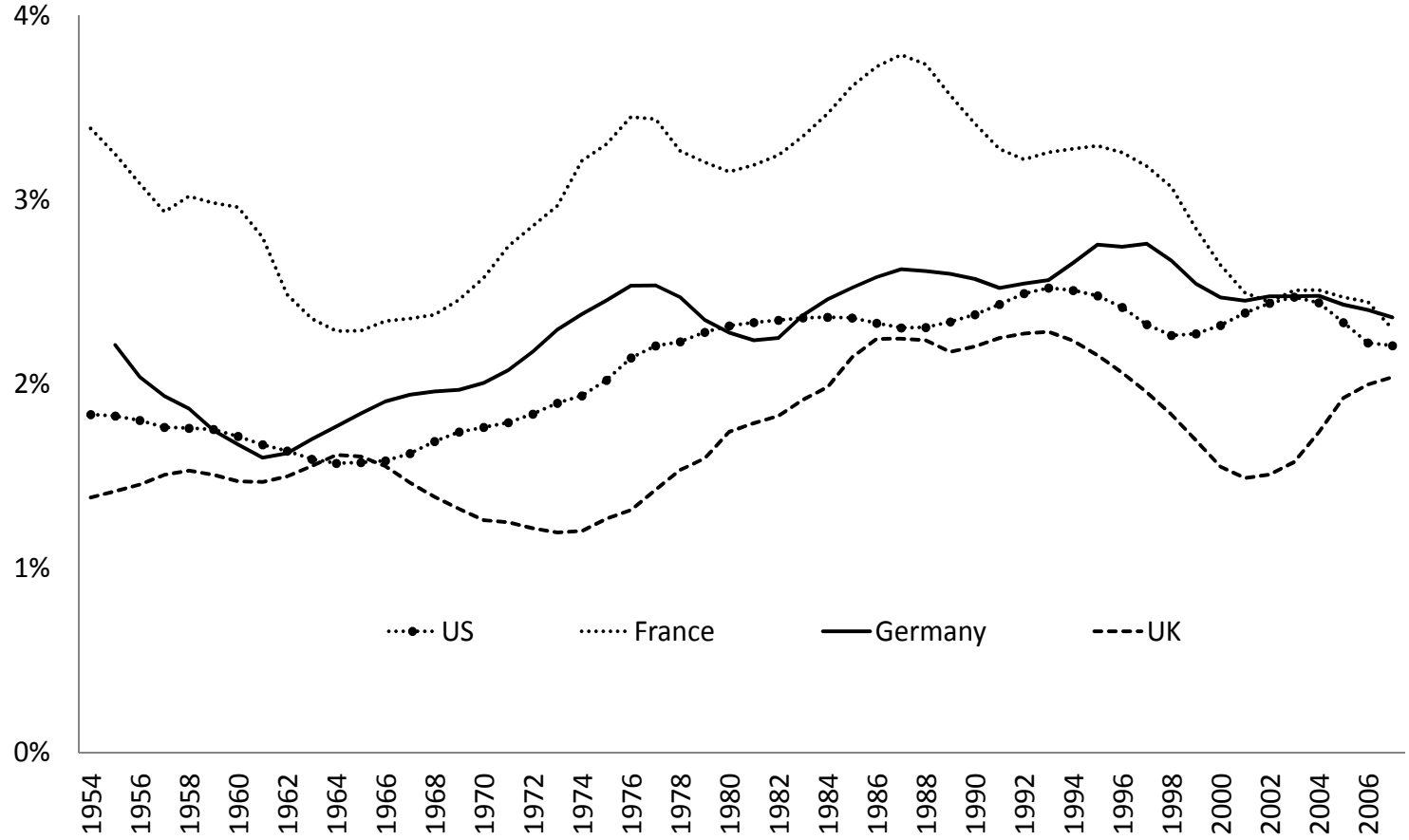
Note: corrected financial VA is the addition of net banking incomes + VA of insurances + VA of other financial intermediaries. The data for net banking incomes is available from 1980 to 2007. Before 1980 the corrected VA is estimated assuming that the difference between this series and financial VA decreases at the same pace as the growth rate of this difference between 1980 and 1990.

Figure 2.4.2: Unit cost of financial intermediation in the US



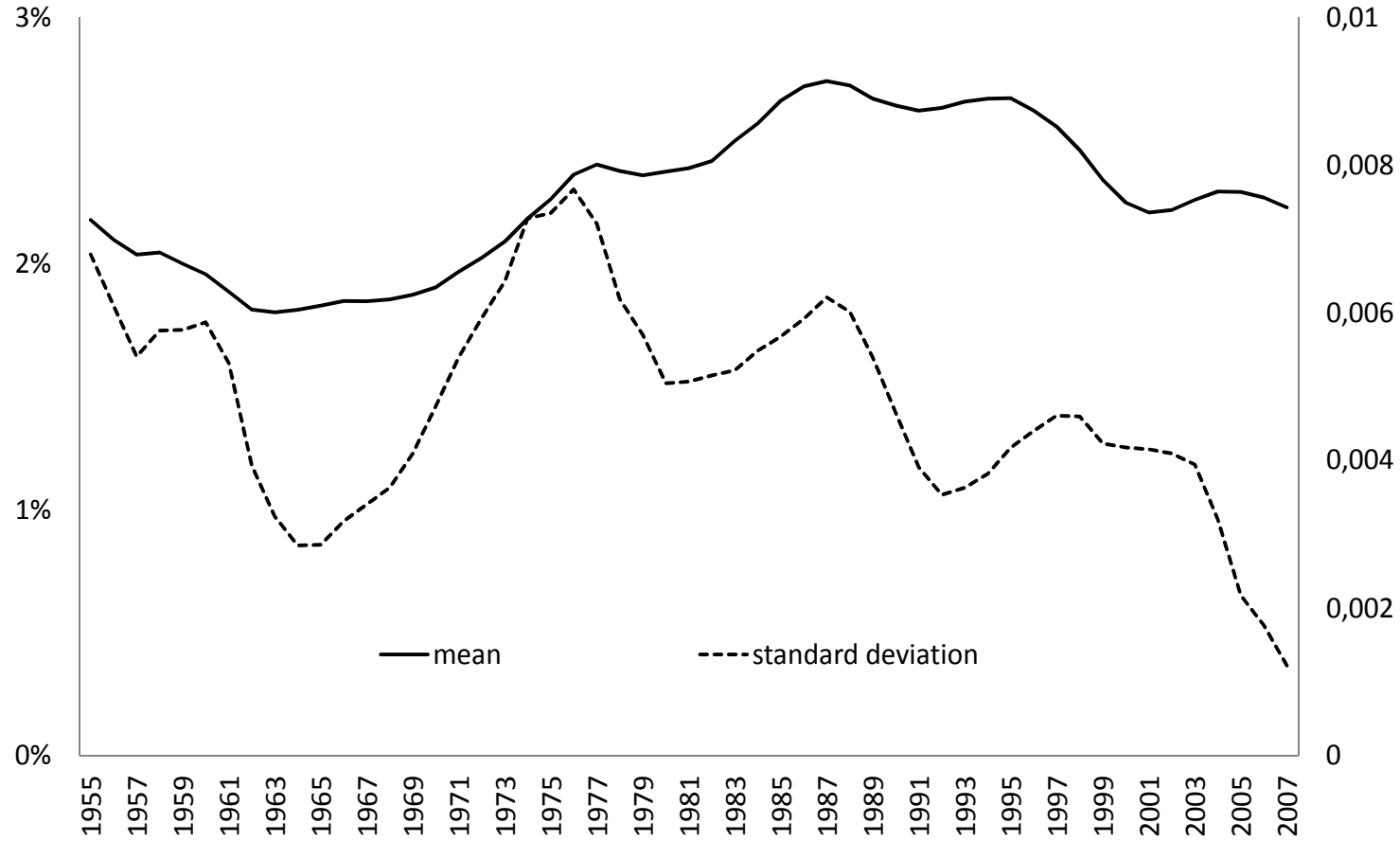
Note: The plain unit cost uses financial VA while the unit cost uses corrected VA.

Figure 2.5.1: National unit cost (4-year moving average)



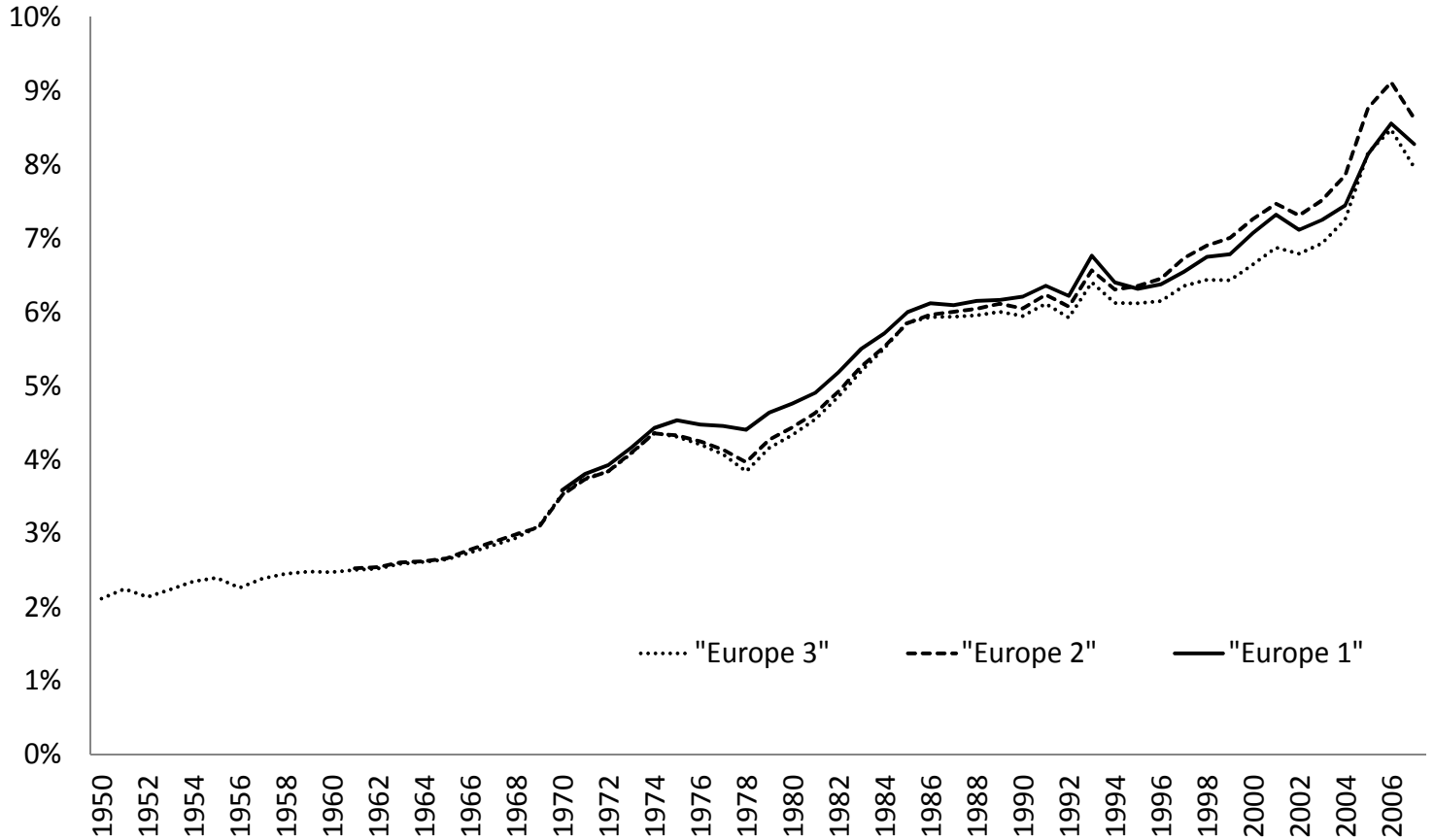
Note: US unit cost from Philippon (2012), level estimation. The US series does not use bank capital gains. Unit costs calculation details for Germany, France and the UK are provided in the preceding paragraphs of this section.

Figure 2.5.2: National unit costs and mean values and standard deviation



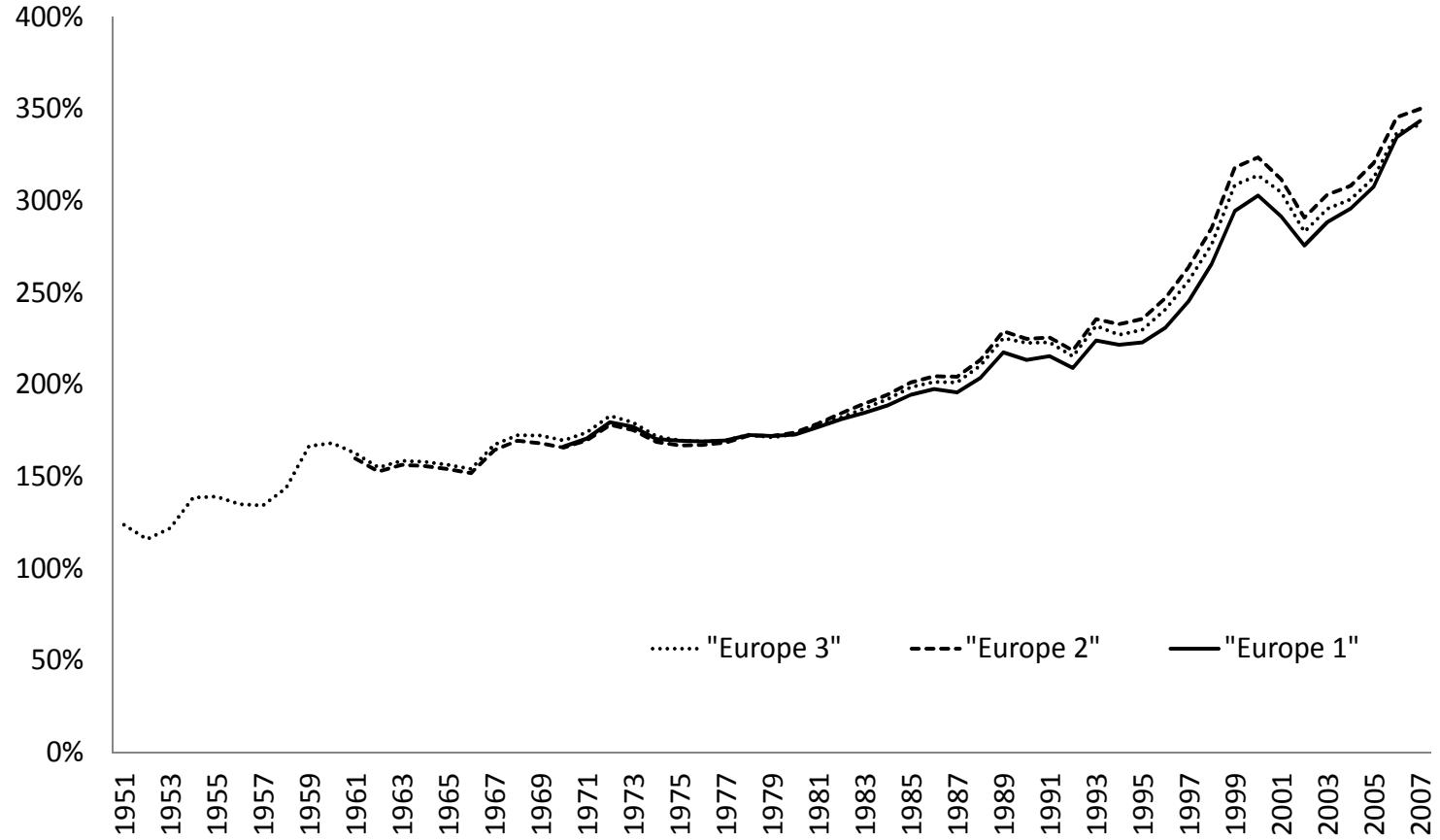
Note: the mean and standard deviation calculation use un-weighted national series. Mean on the left axis, Standard deviation on the right axis.

Figure 3.1.1: Corrected financial VA to GDP, European estimation, first method



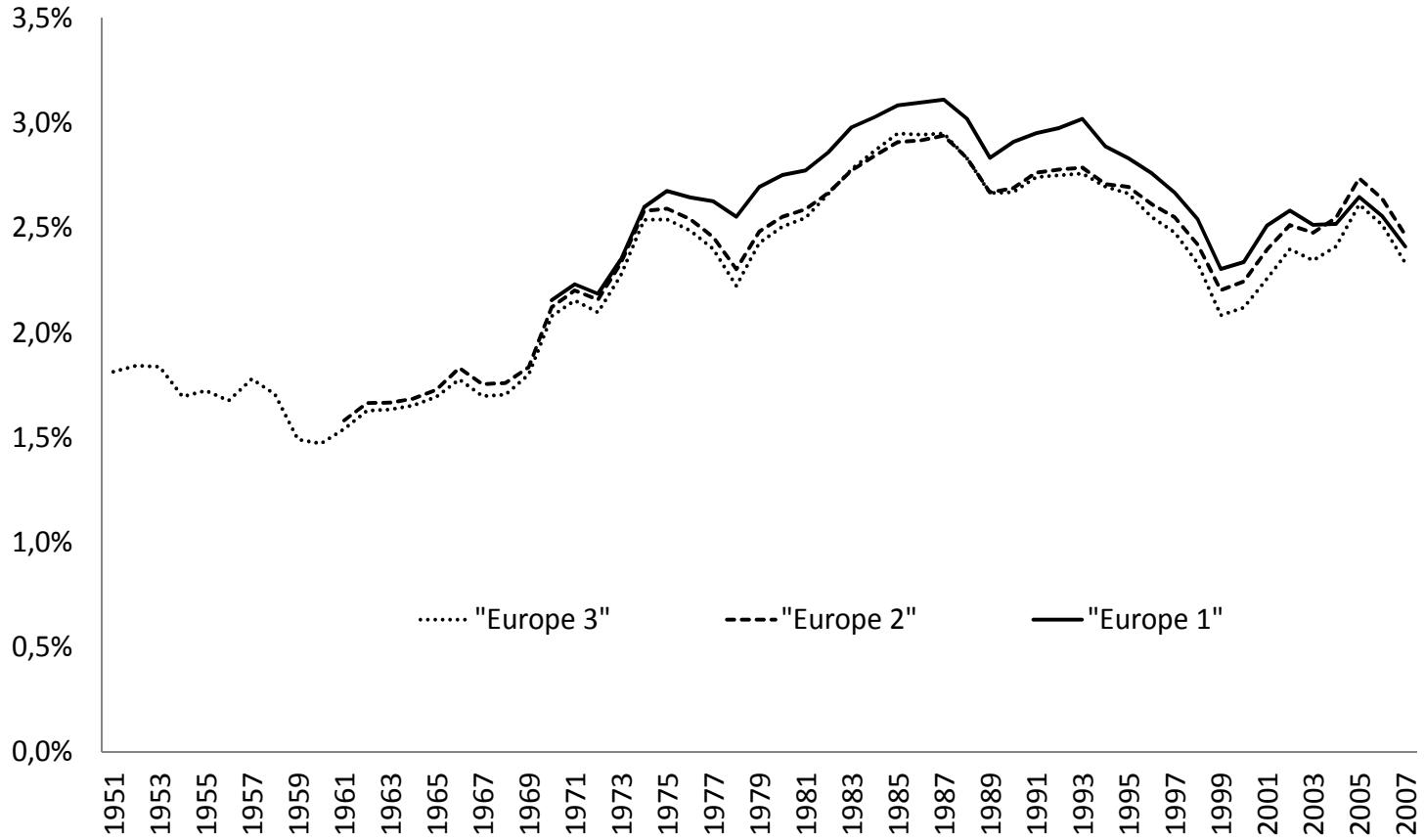
Note: The first method uses the sum of the country series – that is the ratio of the sum of countries' corrected financial VA to the sum of countries' GDP. "Europe 1" accounts for Germany, France, the UK, Italy, Spain and the Netherlands. "Europe 2" accounts for Germany, France, the UK and the Netherlands. "Europe 3" accounts for Germany, France and the UK.

Figure 3.1.2: Financial output to GDP, European estimation, first method



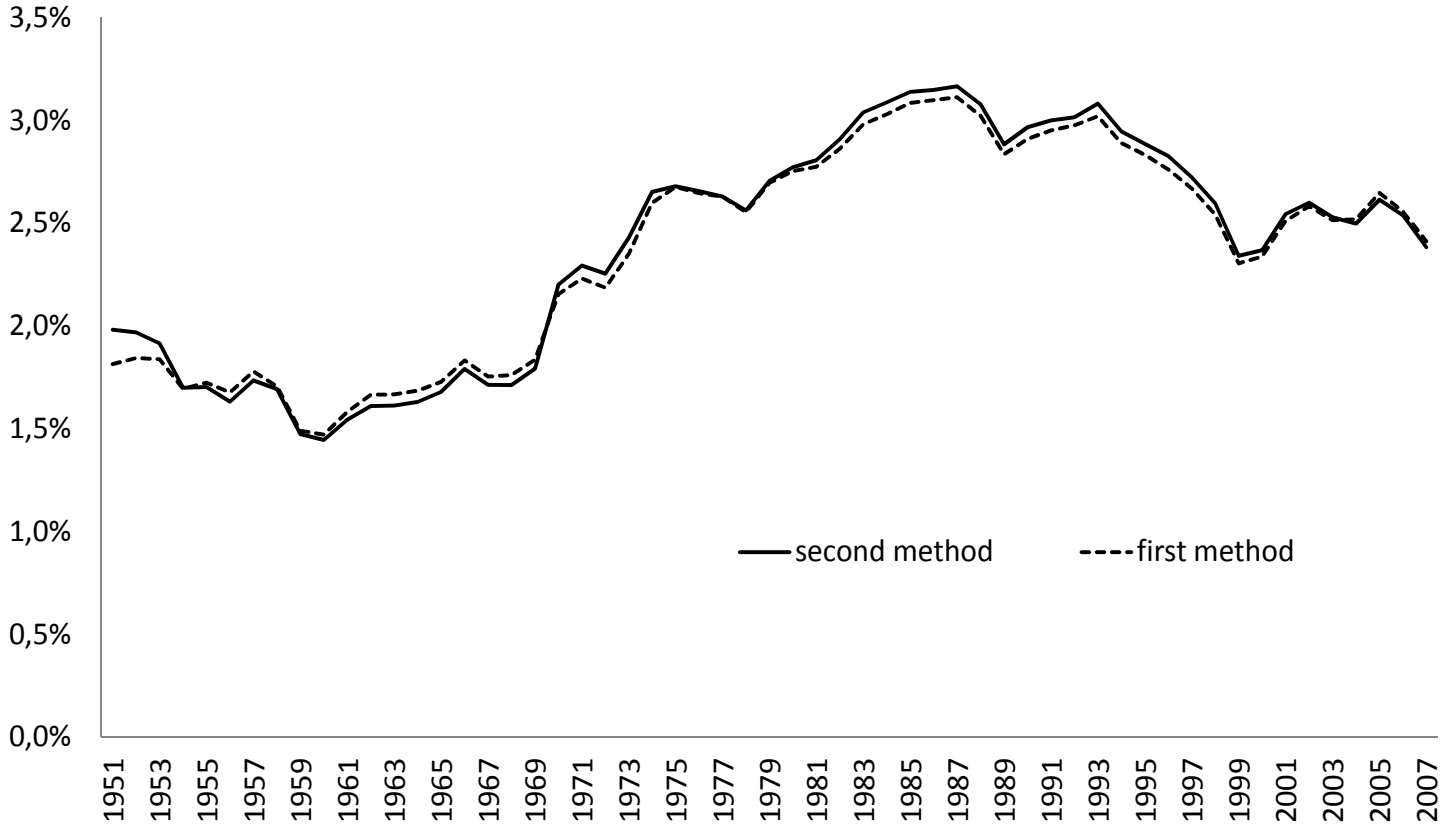
Note: The first method uses the sum of the country series – that is, the ratio of the sum of countries' financial output to the sum of countries' GDP. "Europe 1" accounts for Germany, France, the UK, Italy, Spain and the Netherlands. "Europe 2" accounts for Germany, France, the UK and the Netherlands. "Europe 3" accounts for Germany, France and the UK.

Figure 3.1.3: Unit cost of financial intermediation, European estimation, first method



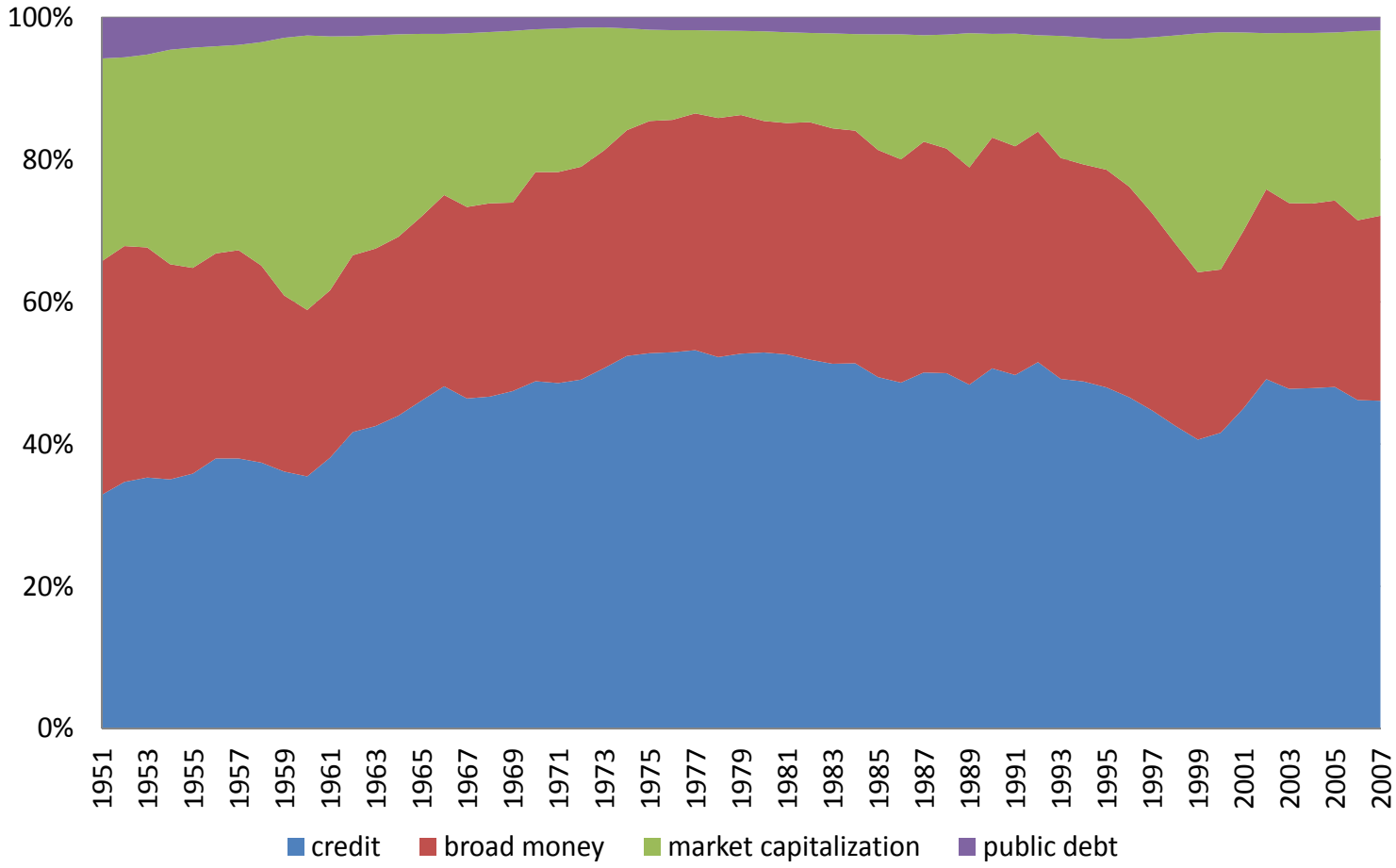
Note: The first method uses the sum of the country series – that is, the ratio of the sum of countries' corrected financial VA to the sum of countries' financial output. "Europe 1" accounts for Germany, France, the UK, Italy, Spain and the Netherlands. "Europe 2" accounts for Germany, France, the UK and the Netherlands. "Europe 3" accounts for Germany, France and the UK.

Figure 3.2.1: Unit cost of financial intermediation, European estimation, first and second methods



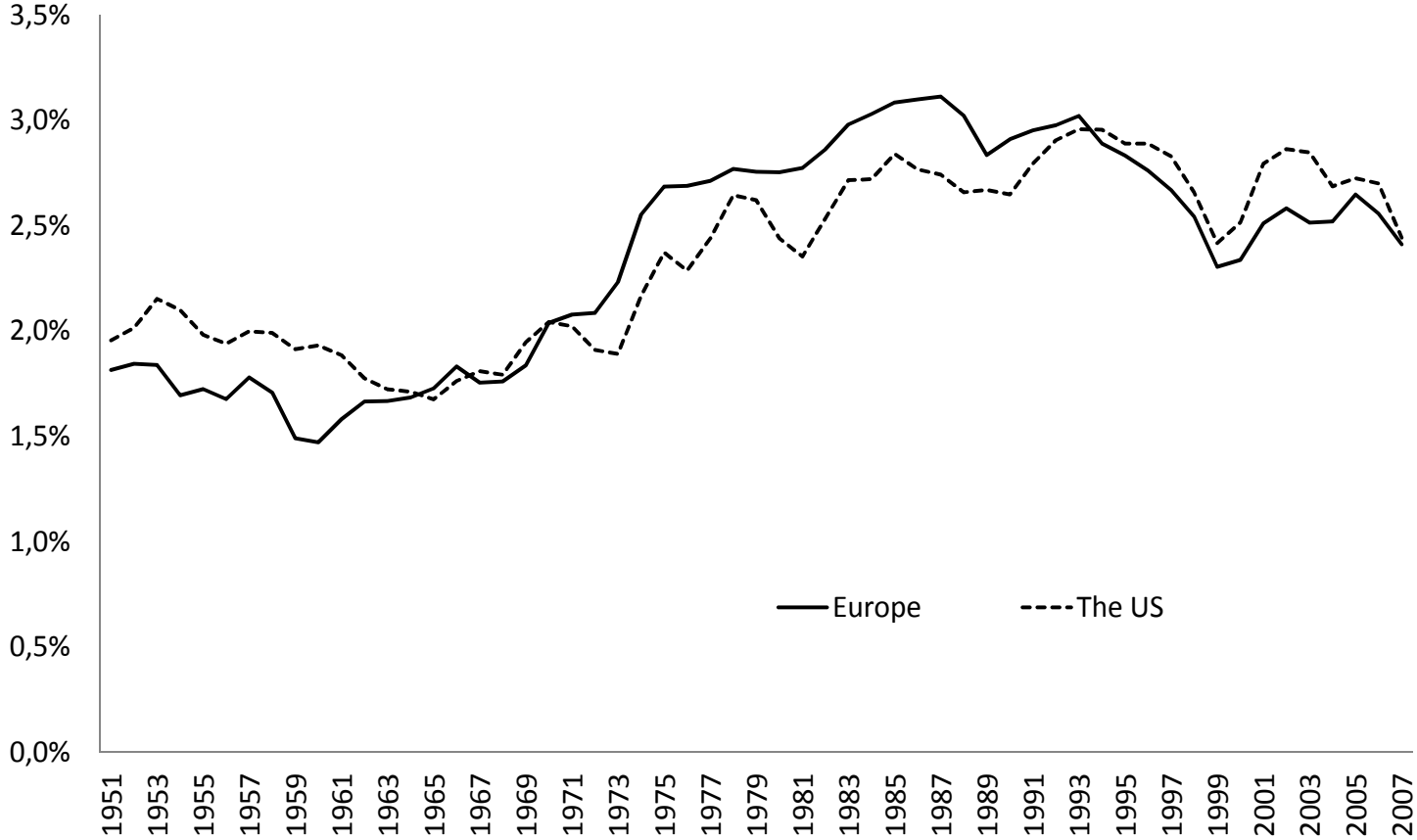
Note: The first method uses the sum of country series – that is, the ratio of the sum of countries' corrected financial VA to the sum of countries' financial output. The second method uses the weighted sum of countries' unit cost based on the share of each country in total GDP. Both series are built using Germany, France and the UK from 1951 to 1960, Germany, France, the UK and the Netherlands from 1961 to 1969, and Germany, France, the UK, Italy, Spain and the Netherlands from 1970 to 2007.

Figure 3.2.2: Financial output decomposition per asset



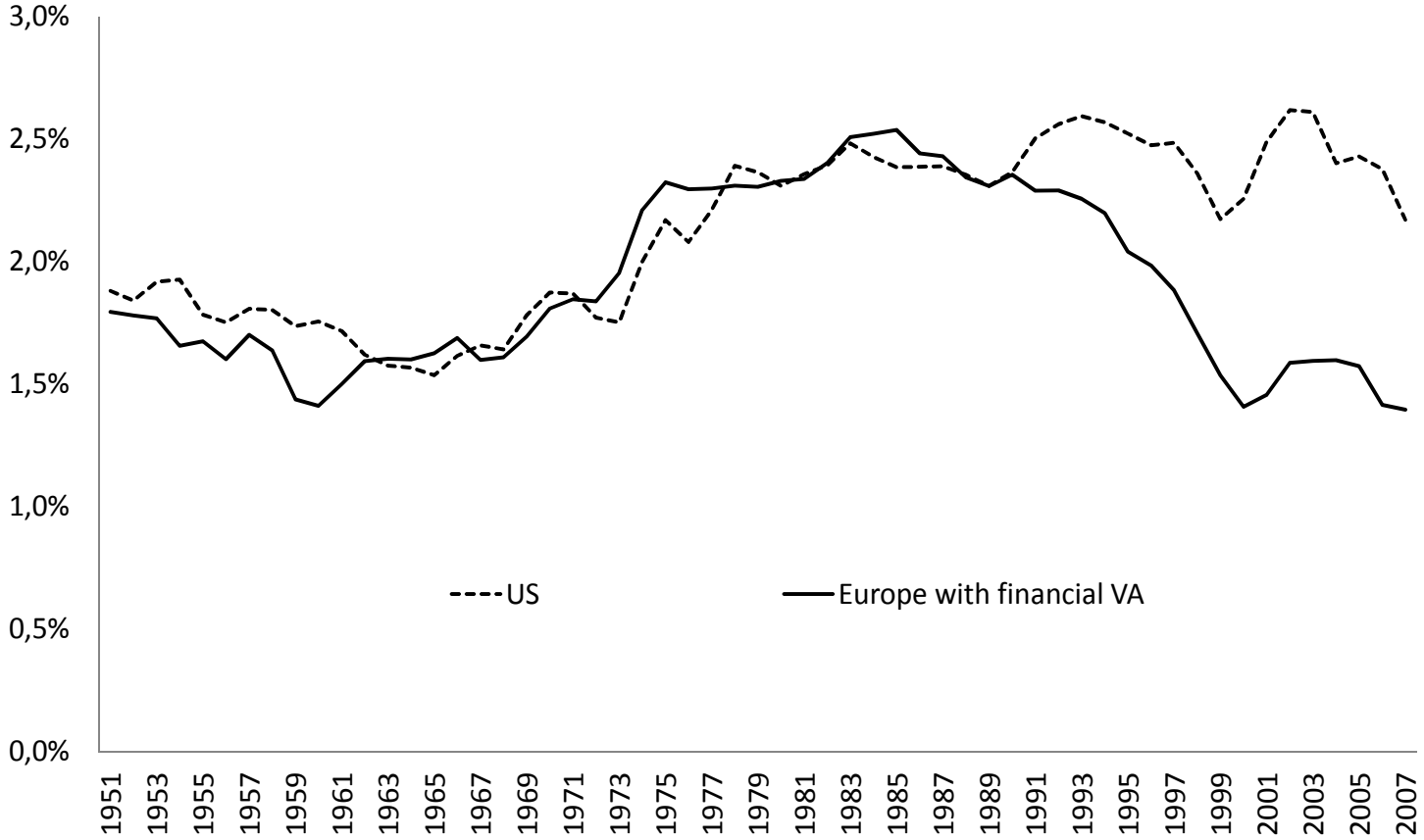
Note: each series is calculated summing countries' assets weighed by their GDP share.

Figure 3.3.1: Comparison of European and the US unit costs



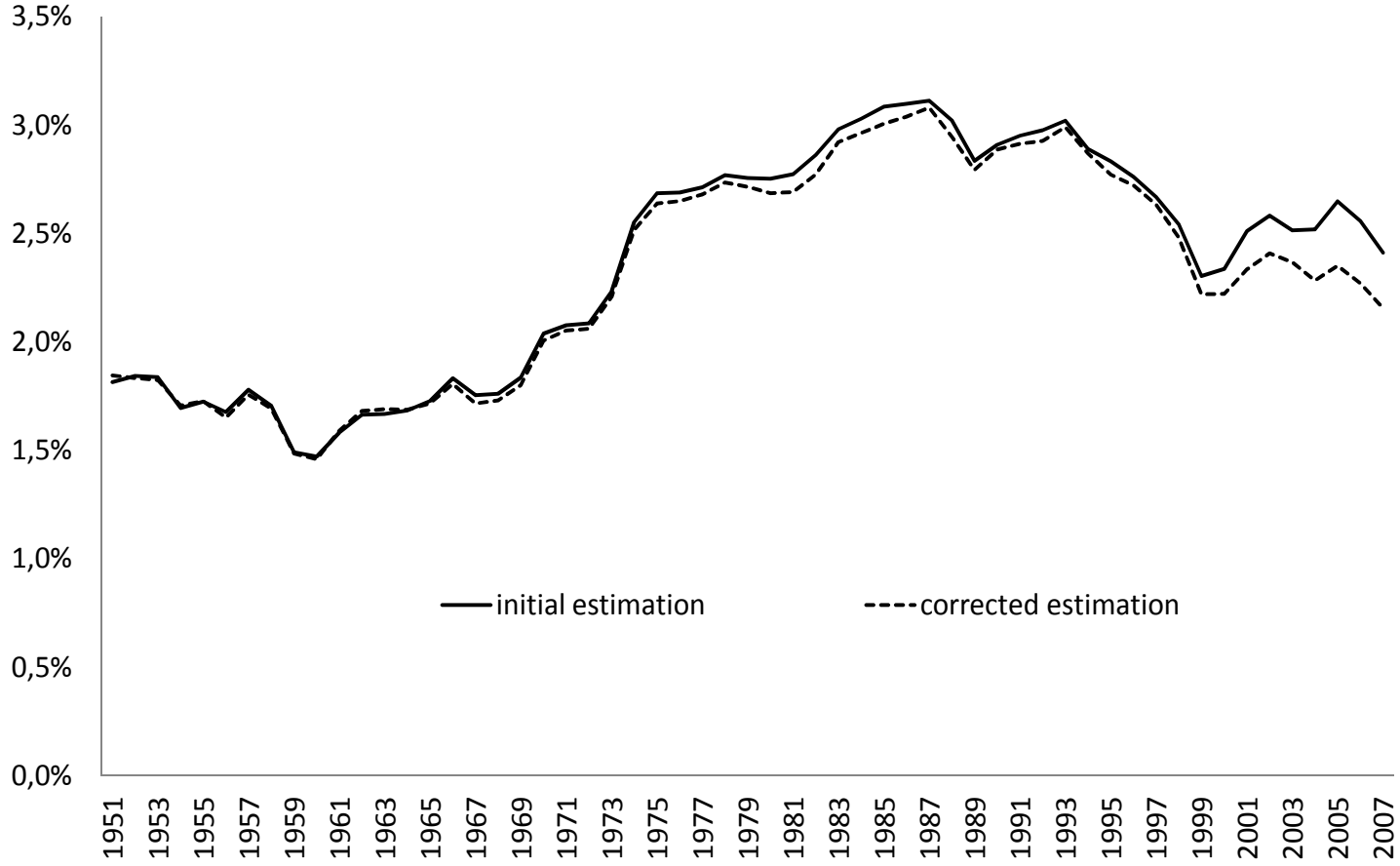
Note: The first method uses the sum of country series – that is, the ratio of the sum of countries' corrected financial VA to the sum of countries' financial output. Both European and the US unit costs account for bank capital income.

Figure 3.3.2: Comparison of European and the US plain unit cost



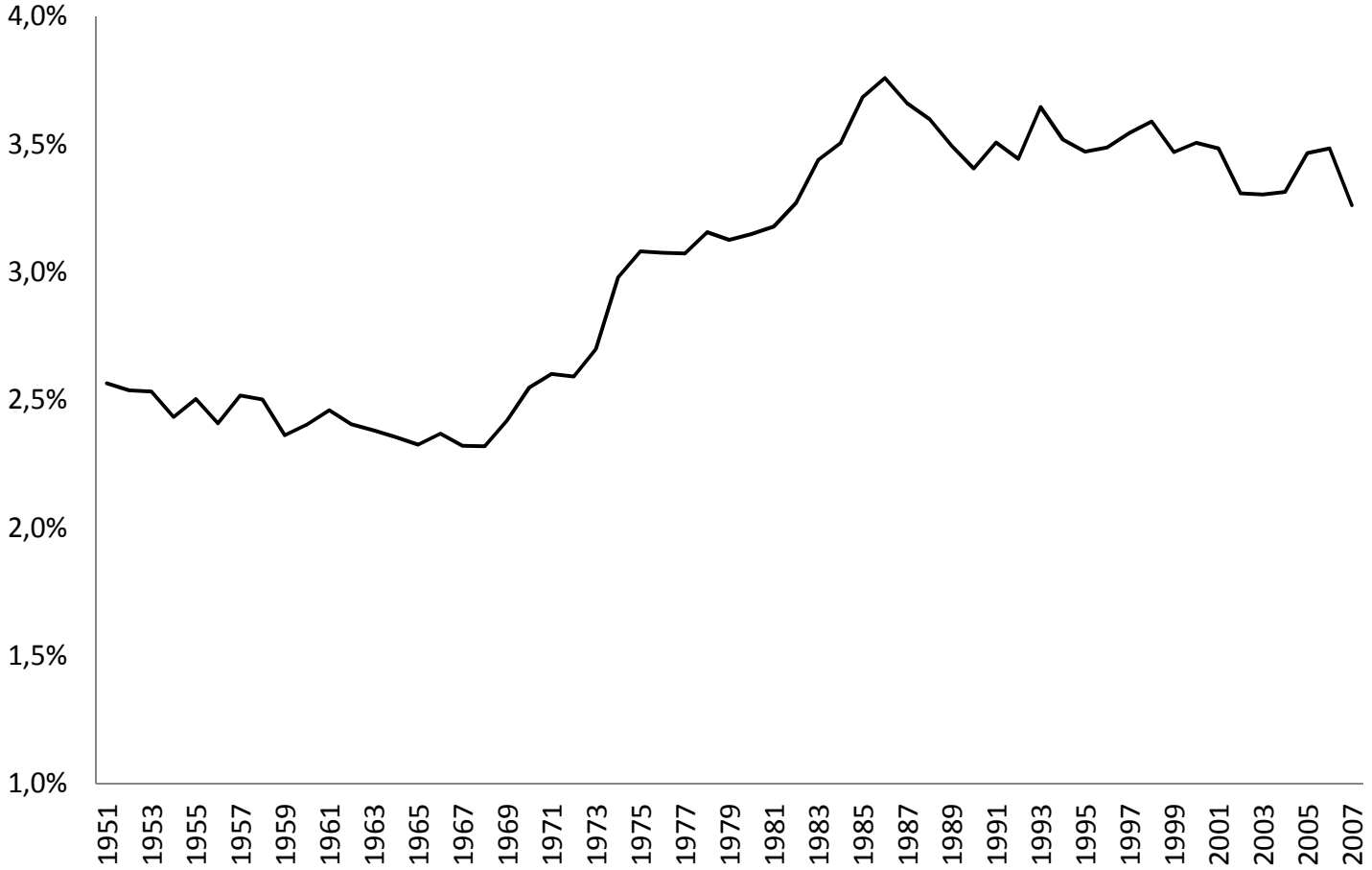
Note: "Plain" unit cost does not account for bank capital income, instead using plain financial VA. The European series is calculated using the sum of country series – that is, the ratio of the sum of countries' corrected financial VA to the sum of countries' financial output. The US series is from Philippon (2012) 'level estimation'.

Figure 3.4.1: Unit cost robustness check



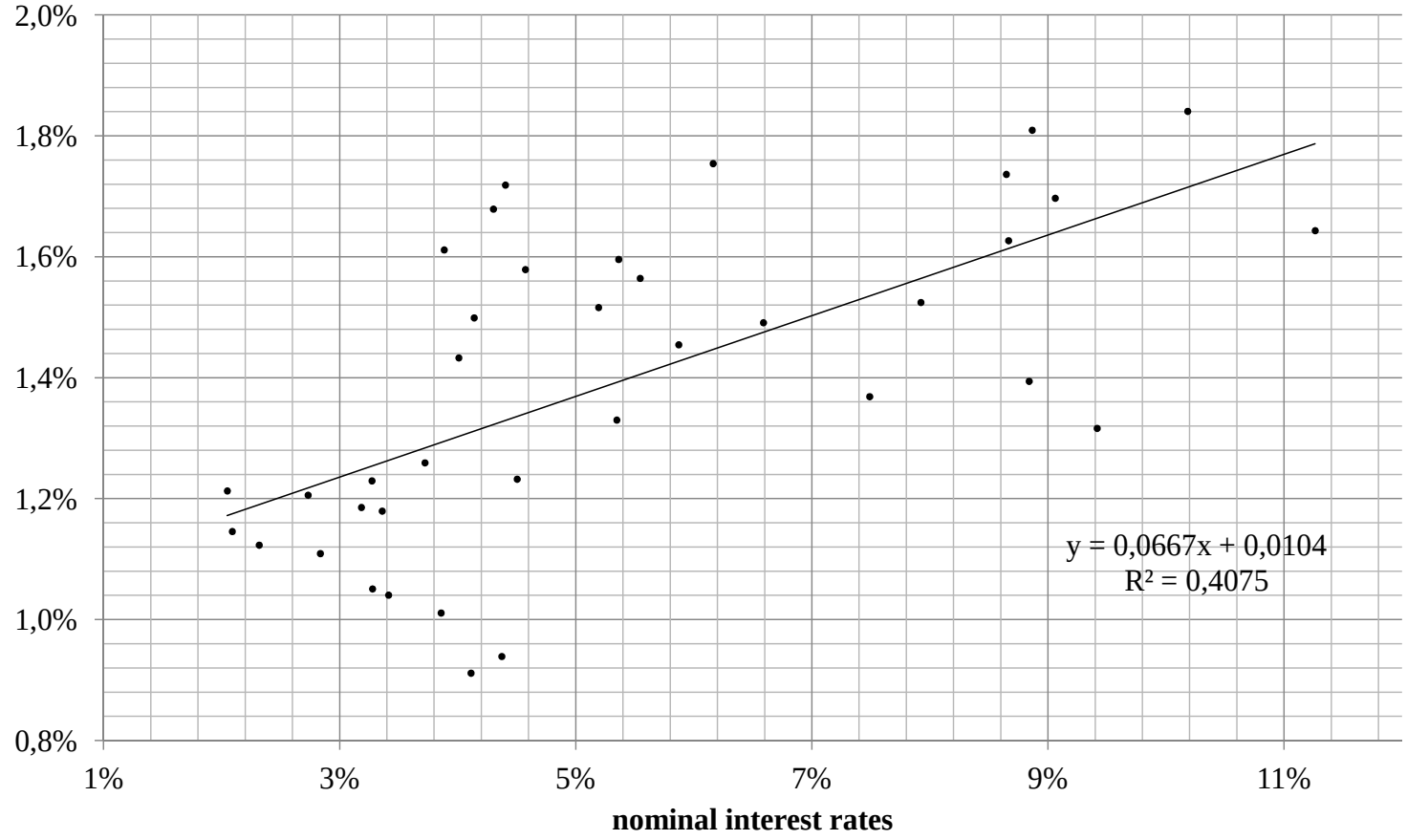
Note: the initial estimation refers to previous series, the corrected estimation uses UK financial VA instead of banking income.

Figure 3.4.2: European unit cost, alternative measure



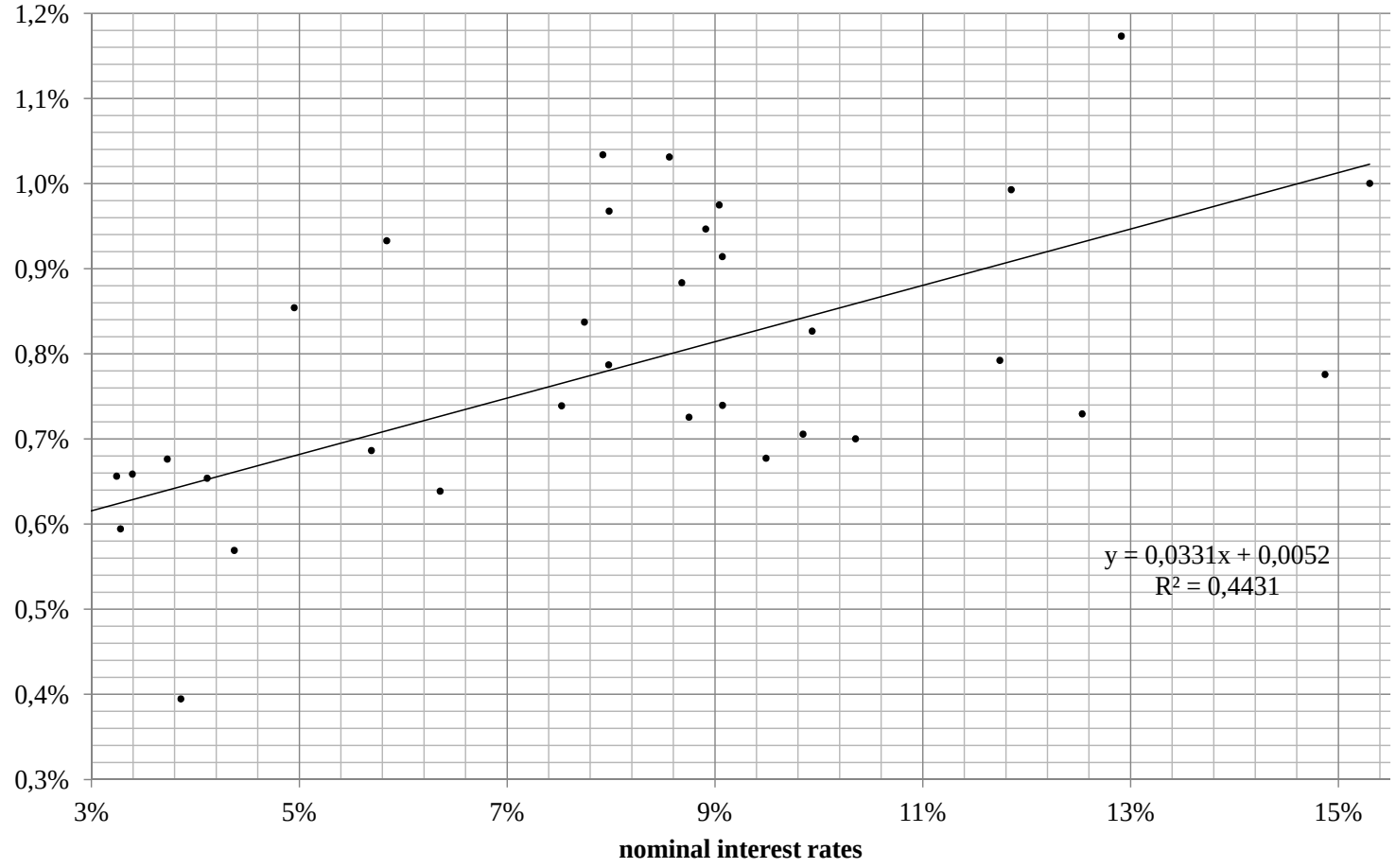
Note: the alternative unit cost removes market capitalization from the financial output.

Figure 4.1.1a:
Ratio of banking VA to banks loans in function of nominal rates of interest in Germany (1970-2007)



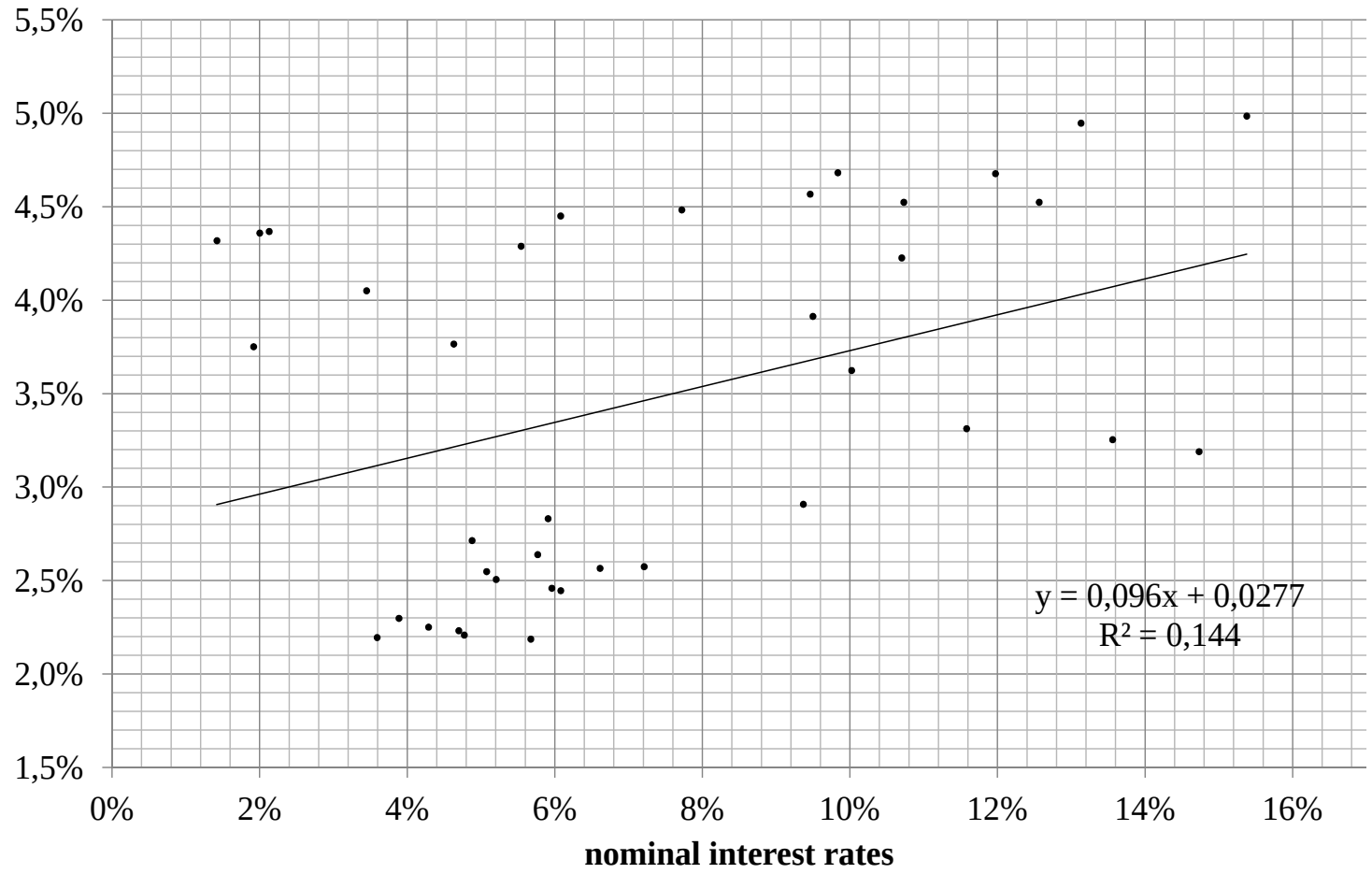
Note: nominal interest rates are short-term interest rates, that is, call-money loan rates.

Figure 4.1.1b: Ratio of banking VA to banks loans in function of nominal rates of interest in France (1970-2007)



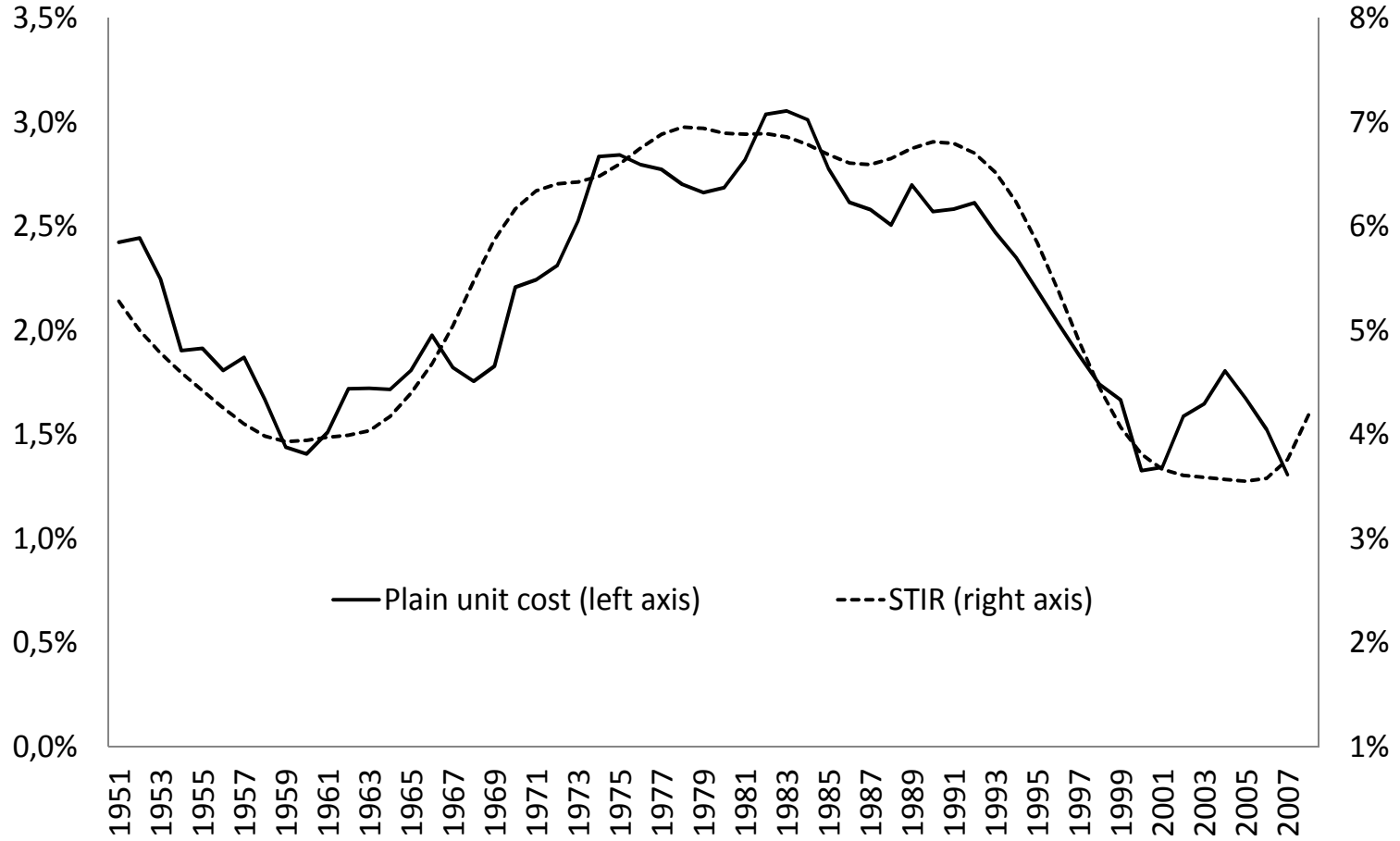
Note: nominal interest rates are short-term interest rates, that is, call-money loan rates.

Figure 4.1.1c: Ratio of banking VA to banks loans in function of nominal rates of interest in the UK (1970-2007)



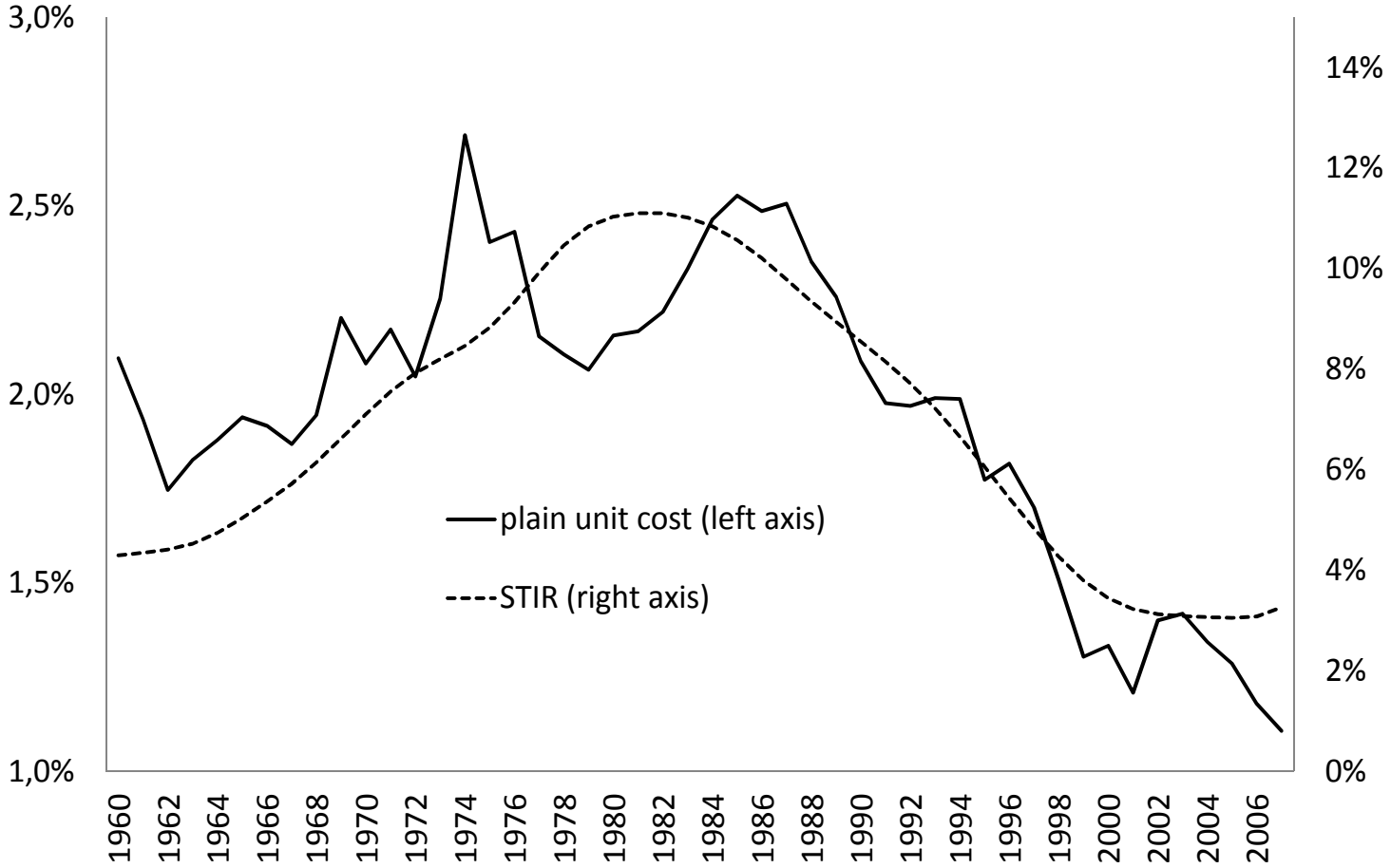
Note: nominal interest rates are short-term interest rates, that is, call-money loan rates.

Figure 4.1.2a: Plain unit cost and short-term interest rate in Germany



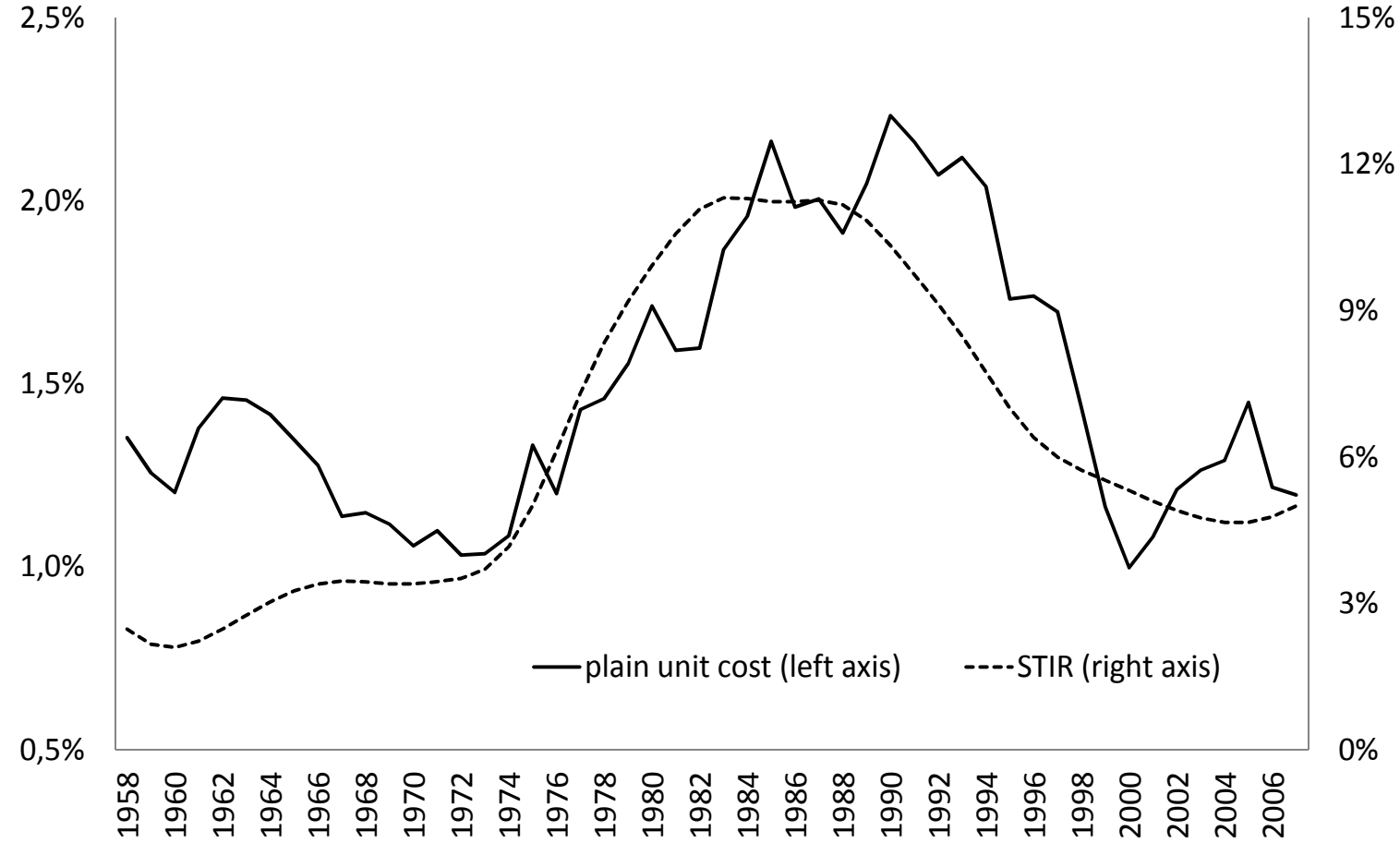
STIR is the lowess-smoothing of short-term interest rates of band width 0.3. $R^2 = 0.82$

Figure 4.1.2b: Plain unit cost and short-term interest rates in France



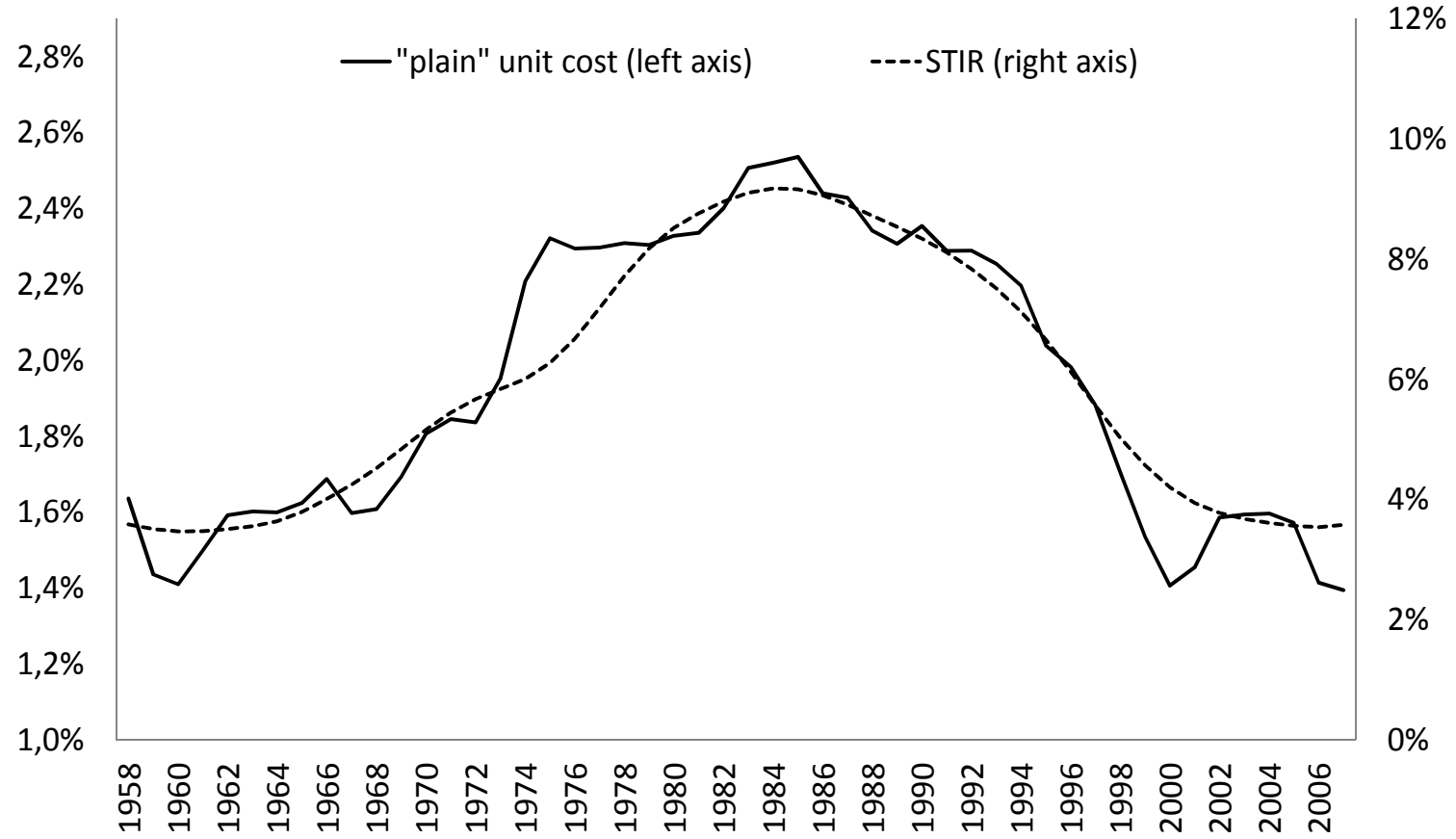
STIR is the lowess-smoothing of short-term interest rates of band width 0.3. $R^2 = 0.78$

Figure 4.1.2c: Plain unit cost and short-term interest rates in the UK



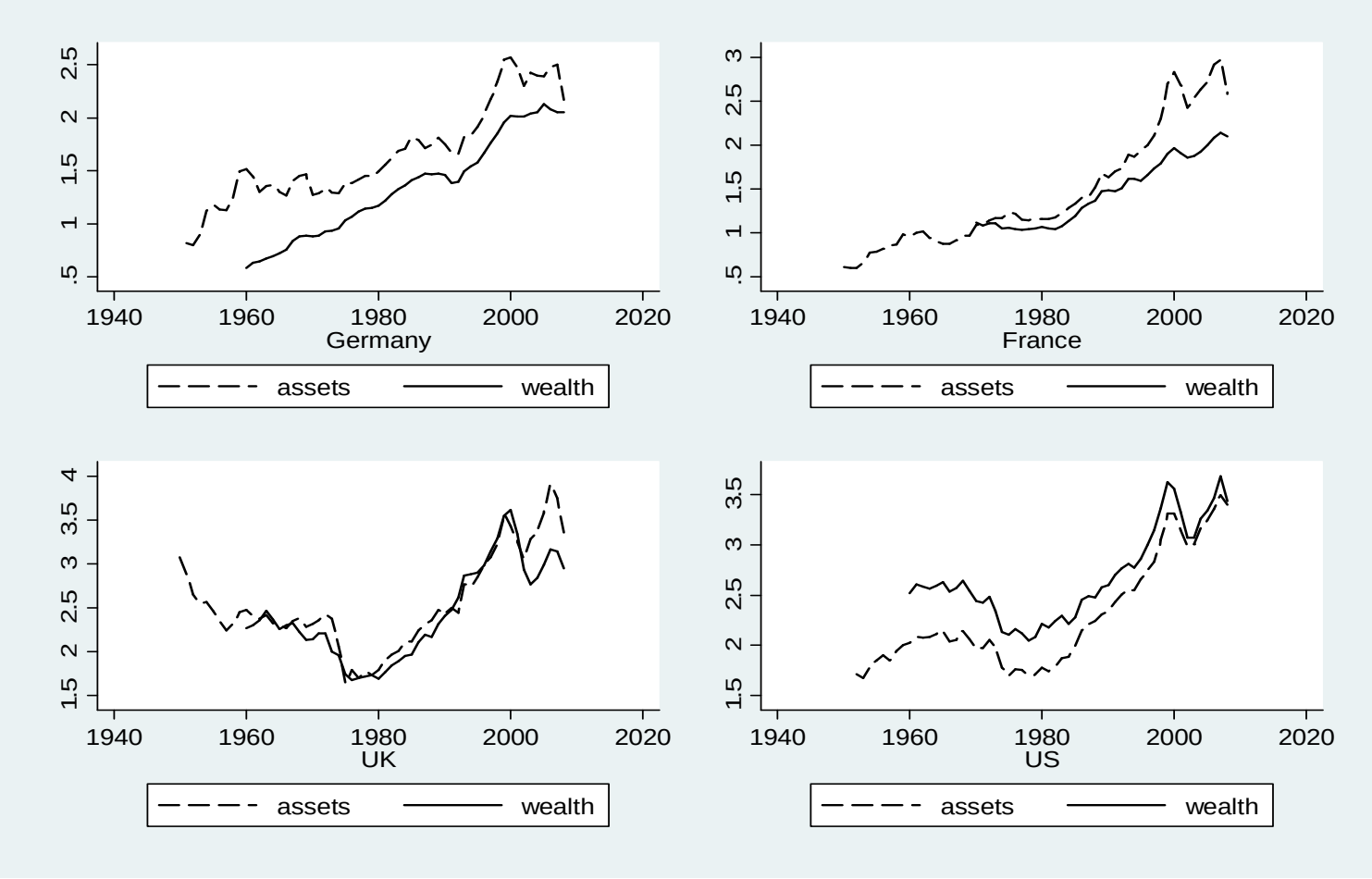
STIR is the lowess-smoothing of short-term interest rates of band width 0.3. . $R^2 = 0.63$

Figure 4.1.2d: Plain unit cost and short-term interest rates in Europe



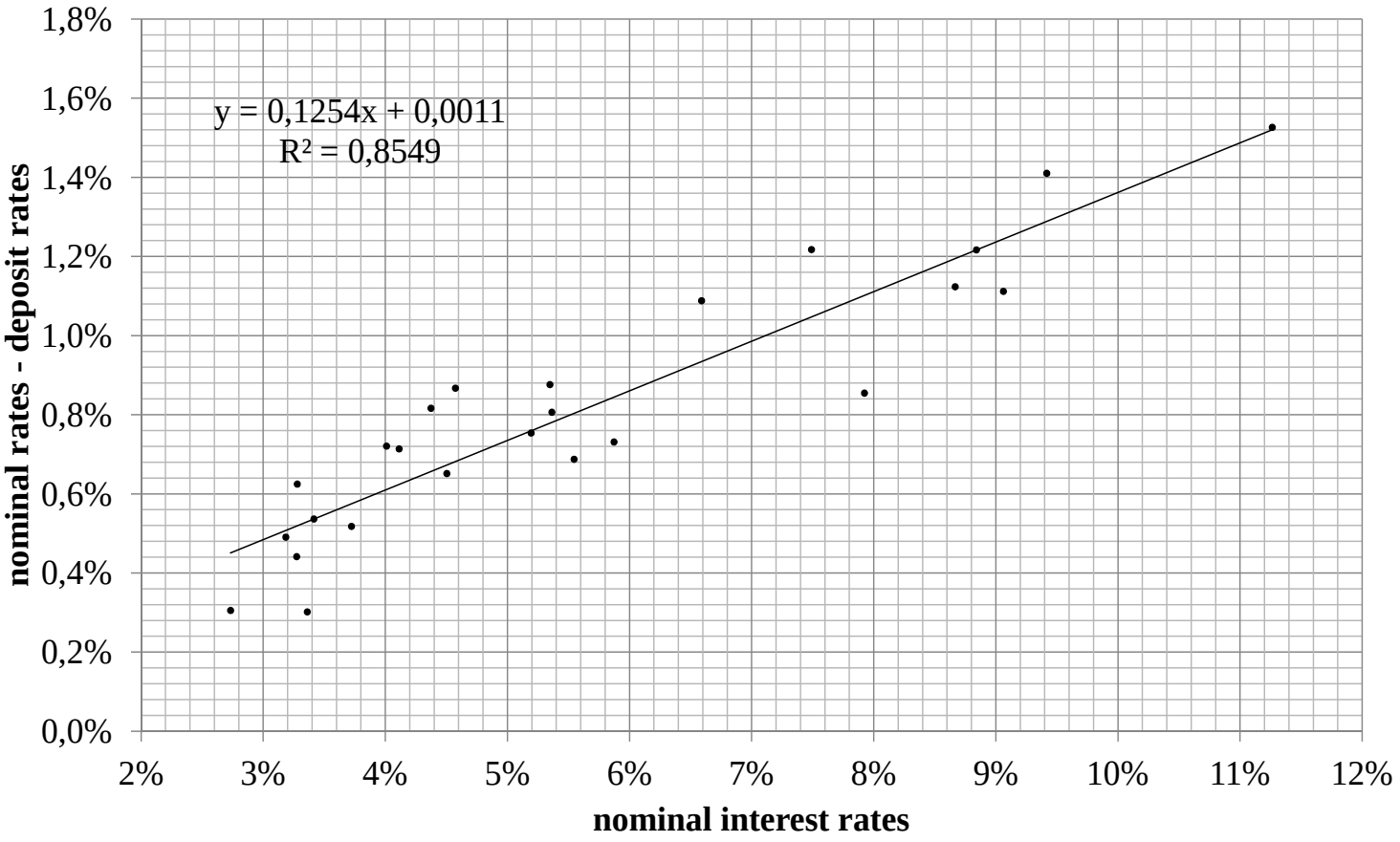
Note: STIR is the short-term interest rates transformed by a lowess smoothing of band width 0.3. Interest rates have been estimated using countries' GDP share as weighted method. $R^2 = 0.84$

Figure 4.2.1: Comparison of the ratio of private financial wealth to GDP and the ratio of financial assets to GDP



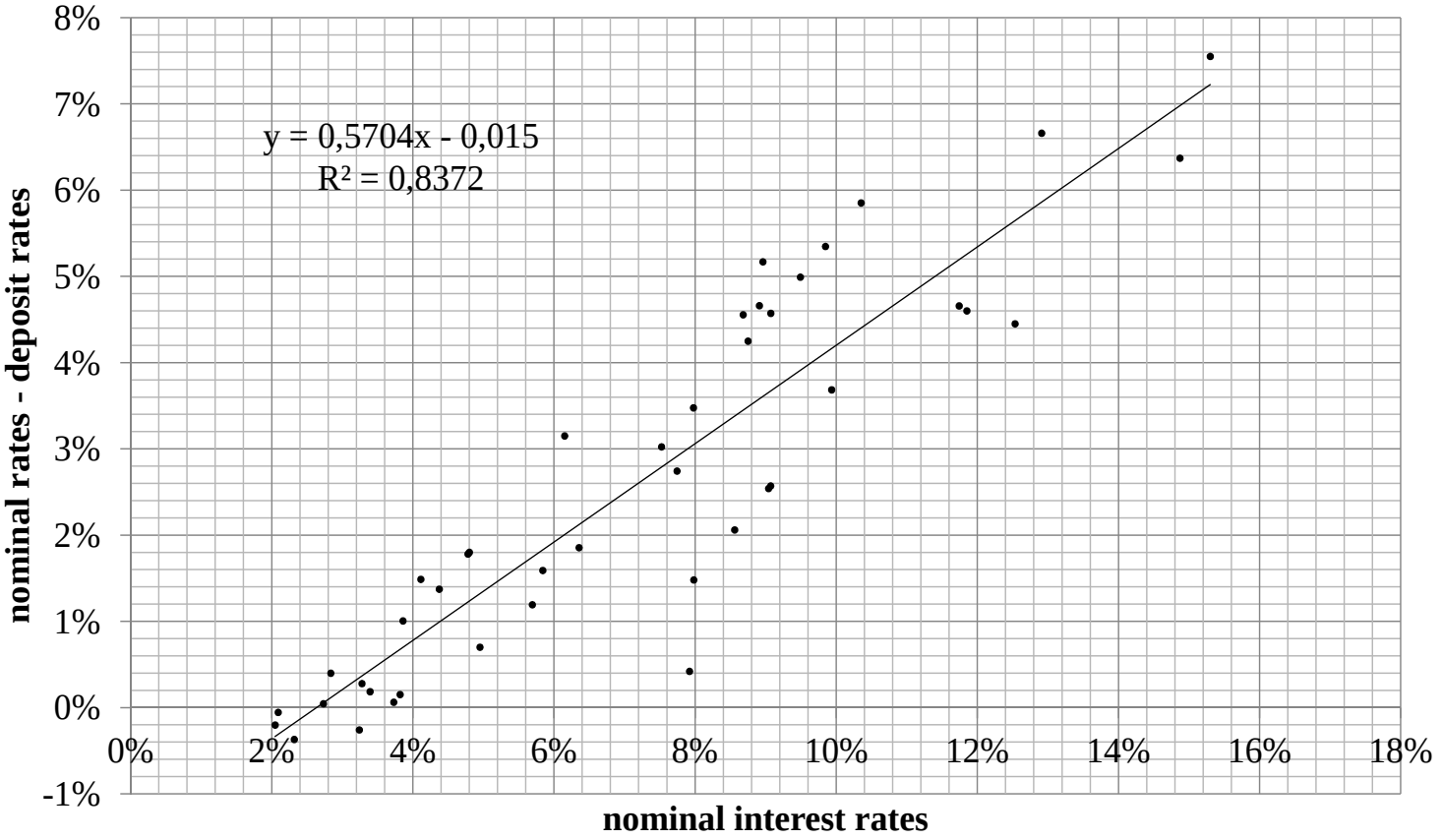
Note: 'assets' is the ratio of credit, market capitalization and public debt to GDP; 'wealth' is the private financial wealth to GDP (Piketty & Zucman 2013).

Figure A1a:
Relationship between nominal interest rates and deposit rates in Germany (1978-2002)



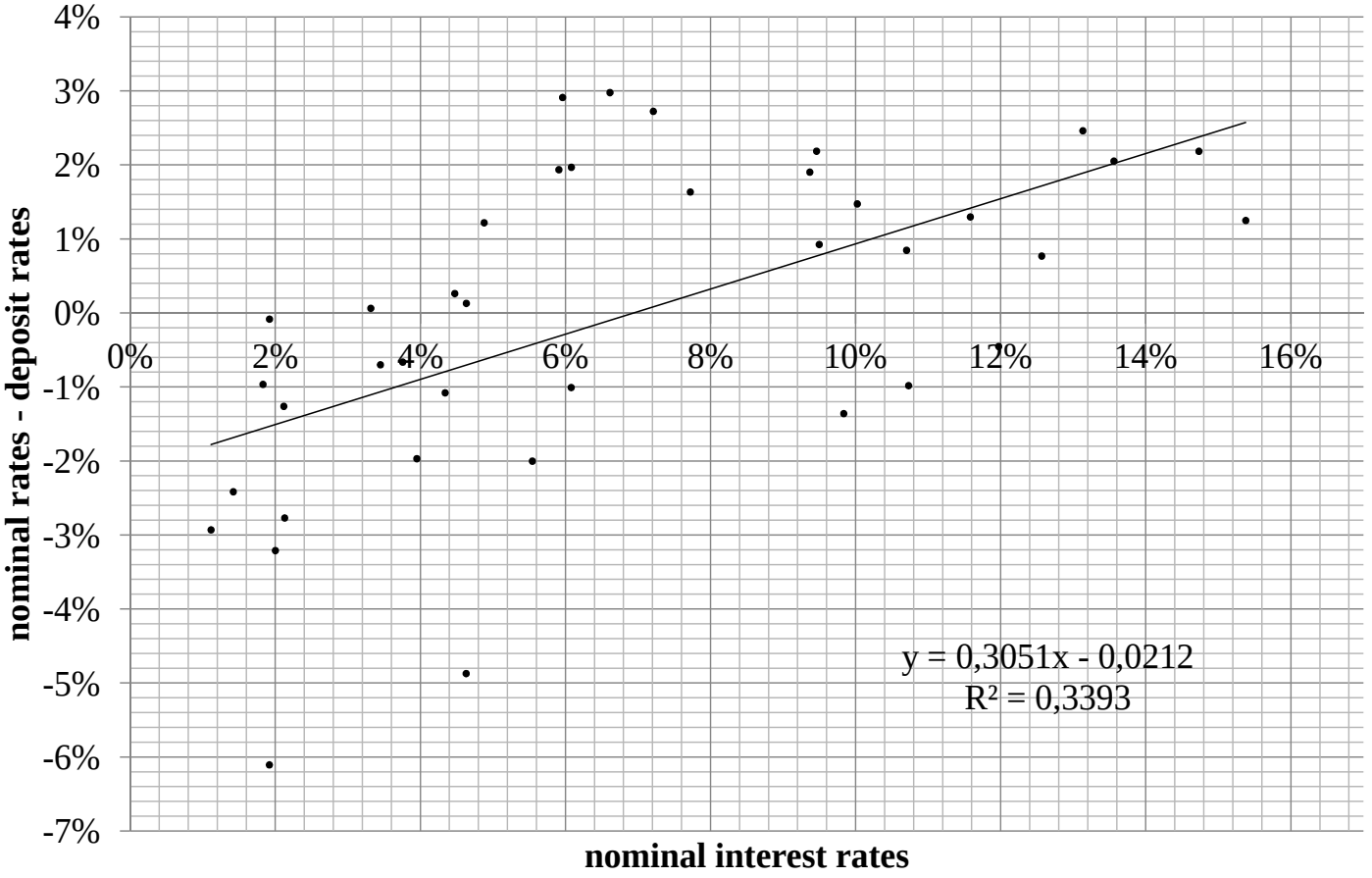
Note: nominal interest rates are short-term interest rates, that is, call-money loans rates.

Figure A1b:
Relationship between nominal interest rates and deposit rates in France (1966-2008)



Note: nominal interest rates are short term interest rates, that is, call-money loans rates.

Figure A1c:
Relationship between nominal interest rates and deposit rates in the UK (1960-1998)



Note: nominal interest rates are short term interest rates, that is, call-money loans rates.