

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

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## Abstract

*This paper proposes to measure the 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, and interest on securities) it is an imperfect measure of intermediaries' income. Using banking income instead of banking VA to measure the consumption of banking services, I show that the GDP share of finance has increased continuously in Germany, France, the UK, and Europe as a whole. Second, the unit cost of financial intermediation has increased over the past 40 years, except in France where, overall, it has stagnated. Third, the European unit cost matches the US unit cost calculated by Philippon (2014). Finally, I rely on recent financial intermediation theories to discuss the puzzling evolution of unit cost. I show that the rise of nominal rates during the 1970s and the 1980s coincides with the increase of unit costs while post-1990s high unit costs coincides with the joint development of the securities industry and credit intermediation. (JEL codes E2, G2 and N2)*

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# Introduction

The main function of finance is to transfer resources from actors who have them to those who need them. In this process, financial intermediation pools the risks, provides the liquidity, and reduces the information asymmetries that impede the transfer of funds. According to this view, 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. However, other factors may reduce this effect. In particular, the frequency of financial crises has upset the idyllic vision of financial development and raises new questions about the effects of the size of the financial sector on financial efficiency (Haldane et al. 2010, Philippon 2014). A key question in the debate is whether recent financial developments justify the accrued importance of finance in our economies and whether, as some commentators propose, regulation should be aimed at reducing its importance.

The reduction of regulatory barriers and the increasing size of the financial industry since the early 1980s have come with financial innovation but it also raised new intermediation costs. First, fees and remunerations in finance have soared due to new, human capital-intensive activities (Philippon and Reshef 2012, 2013) although no evidence has been found that active investors have been able to outperform the market (French 2008, Fama and French 2010). Second, entry by financial intermediaries as financial wealth increase means that investor portfolios may shift to riskier and more expensive financial products (Gennaioli, Shleifer and Vishny (GSV henceforth) 2014). Third, the “too big to fail” problem emerged following banks’ restructuring, which increased banks’ leverage ratio, encouraged risk-taking, and raised profits (Acharya 2009 and Acharya, Schnabl, and Suarez 2013). Following Philippon’s (2014) study of the US case, this paper proposes to calculate the unit cost of financial intermediation for Germany, France, the UK, and Europe<sup>1</sup> as a whole from 1950 to 2007 as a way to account for positive and negative consequences of financial deregulation on the cost of finance. This unit cost, defined as the average cost of producing and maintaining one unit of a synthetic financial service for one year, is calculated from the ratio of the domestic income of the finance sector to the quantity of domestic financial services produced.

The income from financial services is commonly assessed through financial VA (Ber-

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1. Since the relevant data are not systematically available for all European countries, “Europe” here includes its largest economies, Germany, France, the UK, Italy, Spain, and the Netherlands. This simplification is unproblematic because these countries account for more than 85% of Europe’s GDP over the period covered.

ger and Humphrey 1992, Philippon 2014, and 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 considerably increased 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 and interest on securities and capital gains that are not captured from 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 is akin to an implicit consumption of financial services. This generates a transfer of income from the economy to the financial industry which is not transferred to banks’ investors—e.g. depositors. 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—along with their subsidiaries—are the principal financial intermediaries, including in the UK. In this respect, this paper proposes to “correct” financial VA, using banking income instead of banking VA in the calculation. This correction proves to be of prime importance since, unlike the ratio of “plain financial VA” to GDP, which leveled off in most European countries in the 1990s (Philippon and Reshef 2013), the ratio of “corrected financial VA” to GDP increased continuously over the period covered.

The “financial output” series aims to take into account all services produced by the financial industry—namely, transfer of funds and liquidity provision. In order to provide those services, financial intermediaries produce and manage financial assets. Assuming that a financial asset needs to be intermediated, either at the time of issue or during its lifetime, I measure the output through the sum of extant domestic financial assets in the economy regardless of the economic usefulness of those assets and their risk. For all the countries under study, the ratio of financial output to GDP increased quickly and continuously after financial deregulation.

The unit cost calculation shows that the cost of producing financial services in Europe turned around 2% to 3%. Thus, it cost from two to three euro-cents to create and maintain one euro of financial asset in the period under consideration. In addition, national unit costs tended to converge after the 1990s along with financial globalization. More importantly, the unit cost increased over the period, except in France. European economies pay more to intermediate their financial assets today than in the 1960s, regardless of the risk and composition of the assets. Comparing the result with the US series, I show that European and US unit costs followed very similar paths over the period considered. Lastly, the unit cost does not decrease whatever the hypotheses used in the calculation, including the hypothesis

of stable intensity of financial intermediation. Therefore, higher intensity of intermediation due to risky borrowers access to credit cannot explain high unit cost values in the 1990s and the 2000s.

Finally, I rely on recent financial intermediation theories to discuss the puzzling evolution of unit cost. I first look at nominal interest rates based on the opportunity cost of detaining non interest bearing money (Lucas 2000) and deposit rate rigidity (Flannery 1982). I find that the high unit costs in the 1970s and 1980s can be explained statistically by changes in the nominal rates of interest. The unexplained part of unit cost—assessed through the residual of a regression explaining the unit cost by nominal rates of interest—tended to rise after the 1990s in Germany, the UK, and Europe more broadly. Second, as shown by Greenwood and Scharfstein (2013), recent credit intermediation models helped financial intermediaries source new income through the development of the securities industry (capital income and transaction fees) at the expense of interest income. Using the credit intermediation index (CII)—that is, the number of steps a monetary unit takes as it passes from investors to end users—to capture the joint development of the securities industry and credit intermediation (Greenwood and Scharfstein 2013), I find a positive and robust correlation between the unexplained part of unit cost and the CII. Because financial income depends less on interest income due to the joint development of credit intermediation and the securities industry, the reduction of nominal rates of interest in the 1990s does not dramatically affect the unit cost.

All those results finally challenge empirical analyses showing that regulation increases the costs of financial intermediation (see Demirguç-Kunt et al. (2004) among others and Levine (2011) for a review of literature). One possible explanation is that, unlike these studies, this calculation accounts for the whole financial industry, not just banks and interest spreads. In fact, the deregulation of banking may have reduced interest margins 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 (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 for the whole of Europe ; and section 4 relies on recent financial intermediation theories to discuss the evolution of unit cost.

# 1 Measuring financial consumption, financial output, and the unit cost of finance

The heterogeneity of financial services makes it impossible to use pricing to measure unit cost. To measure the cost of finance, I therefore rely on aggregate data. The methodology used in this paper is inspired by the work done on US data by Philippon (2014) and relies on macroeconomic data for the finance sector. It aims to measure a unit cost of financial intermediation, defined as the real cost of creating and maintaining one euro of financial service over one year. The unit cost thus corresponds to the ratio of the domestic income of the finance sector to the quantity of domestic finance services produced.

## 1.1 Financial consumption

The income of the finance industry, measured as a percentage of GDP, gives an idea of the rhythm of the annual growth of domestic financial consumption and of the economic significance of the finance industry. According to national accounting principles for calculating value added (VA), this income can be measured in two ways : first, as the sum of revenues received by the finance industry minus the consumption required for the production of financial services and, second, as the sum of profits, wages, and taxes distributed by the financial industry for its services. However, the specificities of the finance sector mean that these two measures cannot always be equated, especially in the banking sector. Indeed, some activities are not considered in the national accounts to be the products of financial intermediation, even though they give rise to profits, wages, and taxes.

Therefore, 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 the volume of securities held in their balance sheets considerably over the last 30 years. Securities bring income to financial institutions—especially dividend and interest on securities and capital gains—that are not counted from a national accountant’s perspective (Stauffer 2004) even though they raise wages and profits.<sup>2</sup> Because it is akin to a transfer of income from the economy to the financial industry which is not transferred to banks’ investors—e.g. depositors—those incomes constitute an indirect cost of financial intermediation. This is particularly true since the 1990s as banks use traditional activities to develop market-based

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2. It appears in particular that the compensation share of finance has become much higher than the GDP share of finance over the past 20 years even though the compensation series ignores “other remunerations”—like stock options or fees back—that soared during the period.

activities.<sup>3</sup> While banking VA measures banking intermediation in a limited way, notably to respect the homogeneity of the accounting framework in other economic sectors (the calculation of VA ignores income from property or from capital gains in other sectors), banking income measures intermediation in a broad sense. For that reason, we should not rely exclusively 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 services, in this regard. I first take the “plain” value-added series calculated by the national accountant. Second, I address the issue revealed by Stauffer (2004) using a bank’s perspective of income using OECD data on banking income.<sup>4</sup> Because the data does not cover the whole period under consideration, I use the average growth rate of the difference between banks’ value added and banking income to extend the series to 1950. So as to measure financial income I simply add insurances and other intermediaries’ value added to banking income. 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 transfers of funds and liquidity services. Because financial intermediaries create and manage assets to provide financial services, the easiest way to measure the total production of financial services intermediated is to sum the real financial assets intermediated (Philippon 2014).<sup>5</sup> Two questions emerge about this calculation. First,

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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 9 September 2013 : “when trading was small in proportion to everything you could have a group of high bonus professionals that you treated differently and it didn’t 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 don’t like this credit. We aren’t going to do it. Stop. Period. But now they would recognize that if a certain transaction didn’t go through, his colleague wasn’t 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 don’t mix well and one tends to push out the other (...).”

4. Along with differences vis-is capital income, it is worth noting that some charges are excluded from the VA but included in banking income. Those charges are mostly related to the definition of intermediary consumption. Furthermore, they represent a small and constant part of banking income, at least in Germany and France.

5. Philippon (2014) estimates the financial output by compiling two separate estimations. The first estimation is the one used in this paper. The second estimation uses the flow of credit, money, and security

what is a real intermediated asset? Second, is the calculation capable of taking all kinds 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 real assets are intermediated because they require the intervention of a financial intermediary at the moment of their creation and thereafter during the course of their life. For example, in making a loan to a business, a bank creates a debt that it manages until its term is reached. In return, this debt appears in the form of deposits or securities—after securitization—the management of which also depends on financial intermediaries. Thus, the volume of services produced by the finance industry depends on the volume of intermediated real financial assets. These assets are loans, transferable securities (stocks and bonds), public debts, and the money supply in the broad sense. The loans, public debts, and transferable securities correspond to the activity of the transfer of funds; the broad money indicator corresponds to the service of liquidity, including the creation of liquid assets in the parallel banking sector that operates outside banking regulations. 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 calculation (see the discussion in section 3.5). Because credit entails monitoring and screening services, and because market capitalization is related to the issuing of securities, the series capture financial services related to capital provision.

The calculation does not add derivatives for three reasons. First, derivatives “derive” from real financial assets. These contracts are of zero net supply. Second, although derivatives help financial intermediaries gain access to external funds by spreading the idiosyncratic risk of financial assets, the related positive effects of risk management are supposed to include the fact that it increases the volume of financial services (e.g. the amount of domestic credit). This is thus accounted for in the output calculation. Third, any liquidity service related to shadow banking is captured by the broad money aggregate that accounts for shadow banking risk-free asset creation. As theoretically explained by Gorton and Metrick (2012) and Sunderam (2014), shadow banking liabilities are substitutes for money. In particular, repos and money market fund shares might be seen as shadow deposits. This is why I use broad monetary aggregate—M3 for European countries and M4 for the UK—to account for shadow banking risk-free assets creation.<sup>6</sup> Lastly, some derivatives are supposed to provide

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issuance. I do not use this method here due to data availability. It is worth noting, though, that both estimations are very similar in Philippon’s study. There is thus no reason to think that this simplification might bias the results.

6. It is worth noting that the money service provided by shadow banking assets remains inferior to

a direct service to the economy especially through risk management—e.g. interest rate risk management through plain vanilla swaps. This represented less than 10% of all derivatives in 2007 according to the BIS. Based on ISDA data, 10% of world "gross credit exposure"—that is, gross market value of derivatives (total OTC) after netting, which reflects the amount of risk managed through derivatives—corresponds approximately to B\$ 330, that is, less than 0.5% of European total assets intermediated. Therefore, ignoring such services does not have any effect on the series.

In compiling financial assets into one synthetic series it is important to account for the intensity of asset intermediation. The "intensity" of intermediation is defined as the quantity of intermediation an asset needs to keep the same risk-adjusted pay off as a safe asset. Because such information is hard to obtain quantitatively, I assume that each asset need the same intensity of intermediation, normalized to unity, except in the case of public debt which is discounted by a factor 10.<sup>7</sup> By the same token I assume that it is as intensive to provide one euro of financial service today as 50 years ago. This hypothesis is not unrealistic as financial innovation tends to reduce the incentive for financial intermediaries to screen and monitor borrowers. This can offset the increase of intermediation intensity needed to lend to low-cash firms and poor households. Because those assumptions may affect the results, I discuss their potential effects on the shape of the unit cost curve in sections 2.5 and 3.5.<sup>8</sup>

### 1.3 The unit cost of financial intermediation

Given both parts of the calculation (domestic consumption of financial services and financial output), the unit cost ( $z$ ) of financial intermediation is obtained from the formula :

$$z = \frac{\textit{financial consumption}}{\textit{credit} + \textit{money} + \textit{capitalization} + 0.1\textit{debt}}$$

According to the financial consumption indicator used in the calculation, two different series are produced. The first uses corrected financial VA and is simply called "unit cost" ;

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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.

7. In fact, government debt is weakly intermediated, although debts must be traded and generate a duration risk (Philippon 2014). It is therefore assumed that the management of public debt is less intensive.

8. It is worth emphasizing that price series in service industries rarely account for quality. For instance, everyone knows that the average price of a square foot in Paris, London, or New York has dramatically increased over the past 20 years. But this information does not account for real estate quality improvement. By the same token, Paris' average square foot price does not make any distinction between a location 'opposite the Louvre' and 'opposite the train tracks'.

the second uses plain financial VA and is called “plain unit cost”.

It is worth noting that because the unit cost calculation entails numerous sources, details on series calculation and sources are provided in the appendix to this paper.

## 2 Three European cases : Germany, France, and the UK

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

### 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, with its particularly powerful banks, is often considered the prototype of bank-based financial systems.<sup>9</sup>

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 throughout their lives, thanks to the range of its financial activities. 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 reduces competition and raises the cost of financial services. Nevertheless, two points must be taken into account when considering the “universal” nature of German banks. First, financial markets were weak throughout the second half of the twentieth century (see figure 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 segregated 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

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9. As documented by Vitols (2003), the proportions of banking system assets to total financial assets in 2003 were 74.3% in Germany and 24.6% in the US.

German banking as a whole before the mid-1990s. For a large part, the German bank-based system was mostly characterized, until twenty years ago, by banks whose role was to collect deposits and provide credit.

Whether regulation helped to shape this financial system or was dependent on it is hard to determine, 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.

Although Germany was less tightly regulated than other OECD countries till the 1980s,<sup>10</sup> 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 leading underwriter of DM-denominated issues of foreign entities was a first step towards 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 1994) on developing financial markets had considerable repercussions on the development of market activities. The full effects of the reforms are not clear, however. Although IPOs surged after the creation of the *neuer markt*, 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 maintaining high market shares despite 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—declined significantly with the opening of money market funds in 1994 (Domanski 1997 and Fisher and Pfeil 2004) while the development of financial markets generated new income out of asset management and off-balance sheet activities.

### **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 OECD data rely 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 can simply assume that foreign banks have to create subsidiaries in order to access the German market and vice versa.

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

Figure 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 period covered. Moreover, the figure shows that using banking incomes in the calculation had 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 diverged increasingly. This confirms the increasing size of capital income after financial deregulation.

Figure 2 plots the ratio of financial output to GDP in Germany by asset type. We can see that credit—almost entirely bank loans—was 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 occurred after the mid-1990s was due to market capitalization while the ratio of credit to GDP remain quite stable after 1980. This confirmed the new orientation of the German financial system, although, as argued in the preceding paragraph, it did not mean that non-bank financial intermediaries kept banks out of the financial market business.

### 2.1.3 Unit cost in Germany

Figure 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. Because Germany is a bank-based financial system, I also plot the ratio of banking income to total credit as a robustness check. Indeed, as argued in section 2.1.1, financial liberalization in Germany has not reduced the role of banks in the financial system. Figure 4 shows that this alternative measure of the unit cost does not have any effect on the result. It appears, in both measures, that the unit cost has remained fairly constant from 1970 to today, suggesting that financial reforms, although not as tough as in France and the UK, have not impacted the cost of intermediation.

This puzzle is all the more salient since the “plain unit cost” increased during the 1970s then decreased in the 1990s, returning to its 1960s’ value. This result suggests that similar forces pushed up both “unit cost” and “plain unit cost” in the 20 years after 1970. On the other hand, those forces seemed to vanish in the 1990s, thereby reducing the plain unit cost. High unit cost values during the 1990s should thus be explained by factors asymmetrically affecting the unit cost and the plain unit cost after that date. As shown in section 4 below, increases in nominal rates of interest during macroeconomic turmoil might explain 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 (see section 4.2).

## 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 many changes 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 credit, 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 coordination strategy that the French government pursued to accelerate economic 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 tracked the FED rate to prevent capital movements, while credit controls were used to manage inflation (Monnet 2012b). However, this strategy generated some market distortion. In particular, it discouraged competition, kept inefficient banks alive, 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 obvious that the institutional environment inherited from the Reconstruction and the Bretton Woods era was not adapted to the new circumstances. First, economic openness and the end of Bretton Woods changed the international equilibrium dramatically. National institutions had to adapt to a new set of constraints, which contributed to monetary instability (Loriaux 1991). Second, inflation rose too much 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 crédit”). 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 Treasury control—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 the rise in public debt, the government found it advantageous to open up the 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’ centre-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 “disintermediation” of the financial system was the most visible consequence of this structural change.

### **2.2.2 Financial consumption and financial output**

As in 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. I therefore make the same assumption as for Germany. Based on Fournier and Marionnet’s (2009) analysis, this hypothesis seems unproblematic.

Figure 5 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 increased over the period covered. The figure shows that using banking incomes in the calculation had no impact on the shape of the curve before 1990. After that, the ratio of financial VA to GDP declined while the ratio of corrected financial VA to GDP continued to rise. It is also worth noting that, unlike in Germany, the difference between both series was already large in the 1980s. However, this might be due to the conservative hypothesis I made to extend the banking income data before 1988 (see the on-line appendix for details).

Figure 6 displays 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 increased significantly in the 1980s. Unlike in Germany, market capitalization was not the only variable explaining the post-1990s financial output increase in France. In fact, credit and broad money rose rapidly throughout the last 20 years of the sample. In fact, banks are no longer subject to credit control after the 1980s reforms.<sup>11</sup>

### 2.2.3 Unit cost in France

Figure 7 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 (plain unit cost globally decreasing). Interestingly, we see that the post mid-1980s unit cost decreased, suggesting that, unlike in Germany, financial deregulation might have reduced financial costs in France. In fact, credit control and subsidized loans during the 1970s may have helped French banks to make rents (Monnet 2012a). This is all the truer since firms could not turn their backs on the banks because financial markets were not sufficiently developed to offer alternatives to bank loans. For that reason, because credit control and subsidized loans were mostly used in France from the late 1950s to the early 1980s, the higher unit cost observed in France compared to other countries before the 1990s was not very surprising.<sup>12</sup>

## 2.3 The UK

### 2.3.1 The UK market-based system, some historical facts

The UK's financial system did not follow the same path as the French and German ones. Although financial regulation was stringent till the 1970s, the UK financial system allowed more room for financial market activity. Firms could obtain long-term funds on the market, while banks helped enterprises with their needs 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 the value of sterling while not jeopardizing government borrowing (Monnet 2012b). Like the Bank of

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11. As a comparison the difference between French and German ratio of credit to GDP decreases after the mid-1980s, that is after French financial reforms.

12. Italy, which followed similar policies, displays similar results.

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. 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 change 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 fixed commission and brokers’ single capacity, thereby 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 the universal banking business, wherein economies of scope helped banks to grow rapidly and to concentrate. The “small bank crisis” of 1991/94 marked a sea-change. Many small banks collapsed because of 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—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).<sup>13</sup>

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13. 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

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, thereby drawing in capital from around the world and redistributing it to its best remuneration in the UK and abroad.

### 2.3.2 Financial consumption and financial output

It is difficult to account for financial costs in the UK because of the increasing world 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 the trade balance of financial activity, but this is not sufficient to account for capital gains made by UK banks abroad. I therefore make the assumption 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 the largest banking group<sup>14</sup> activities in the UK and abroad. While the data do not account for foreign banks business in the UK, they do 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 8 plots the GDP share of finance, using financial VA in its plain and corrected forms. It shows that the GDP share of finance increased 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 increasing role played by the financial industry. A comparison of the two series shows that corrected financial VA tends to move away from plain financial VA in the late 1990s, that is, with the boom of credit and securitization.

Figure 9 plots the GDP share of financial output. UK financial output increased at the same pace as GDP till the early 1980s. After that, this ratio surged until 2008. Unlike in Germany and France, the role of market capitalization was very important throughout

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cartel-like practices. (...)”. In other words : “By the beginning of the twenty-first century more than half of the City’s 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”.

14. 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.

the period covered, meaning that credit development—in particular, banking credit—helped 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 increased together after the mid-1990s, thereby feeding each other. This is why the financial output share of GDP reached the astonishing value of 457% in 2006, with credit accounting for 45% of financial output compared with 34% in 1979.

### 2.3.3 Unit cost in the UK

Figure 10 plots the unit cost according to whether banking incomes are included in the calculation or not. It shows that the unit cost increased overall when banking income is used in the calculation. However, the plain unit cost increased during the 1970s then decreased in the 1990s falling back to its 1960s level. It is worth underscoring that the shape of the unit cost tracks specific historical events. First, the increase from the mid-1970s to early 1990s corresponded to the period of deregulation but also to the Bank of England’s monetarist policy. Second, the fall during the 1990s corresponded to banking restructuring and monetary crisis. Third, the rise following 2000 was characterized by the development of originate-to-distribute finance following financial innovation, along with the rebirth of London as a first-rank financial centre.

It is important to note that the plain unit cost fell during the 1990s, diverging from the unit cost. As in the German case, it appears that nominal rates of interest explain the evolution of the unit cost quite well till 1990 (see section 4). Therefore, the unit cost increase observed after 2000 might be related to the rise in bank capital income too (see section 4.2).

It is finally worth noting that the international character of the UK financial industry makes it difficult to calculate unit cost. Unlike France and Germany, whose financial industries are highly domestically focused, the UK financial industry is increasingly dependent on international capital and activities. Due to the difficulty in disentangling national from international businesses in the data, the overall analysis of the unit cost tends to be less precise.

## 2.4 Accounting for banks’ capital income in the US

Because Philippon (2014) does not account for banks’ 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 for the period before 1980, I use the same process as for Germany, France, and the UK, to extrapolate the series from 1950 to 1980.

Figure 11 plots the GDP share of finance using plain VA and corrected VA. The series diverged during the mid-1980s but remained 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 banking, credit intermediation, and related activities fell from 51% in 1978 to 45% in 2007 in the US, the financial VA share of banking declined from 75% to 68% in Germany.

Figure 12 plots the unit cost of financial intermediation in the US using both corrected VA and plain VA. Although the unit cost was 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 holds.

## 2.5 Comparing national series

To give a broader view of the co-evolution of national unit costs, figure 13 plots all national series calculated hitherto. This figure also adds the US unit cost calculated by Philippon (2014). Although national unit cost evolved in a similar way over the period—increasing in the 1970s and stagnating thereafter, with the exception of France, where it decreased after 1990—substantial differences occurred among countries. However, the series tended to converge progressively over the period (figure 14) as national regulations converge. The US unit cost is close to the mean value, suggesting that the US case is “normal”. By contrast, the French unit cost appears far higher throughout the period. The end of credit control and subsidized loans in the 1980s might explain why the French unit cost fell after the 1990s while it stagnated overall in other countries.

Comparing national series can also help us to deal with the assumptions made about financial asset intensity of intermediation. Using simple econometric devices, it is possible to look at the effect of the output share of each kind of financial asset on the unit cost. The mechanism works as follows : if the intensity of intermediation of one kind of asset is underestimated, an increase in its output share should reduce the unit cost. For example, assume that the intensity of intermediation of credit is higher than one—that is, higher than the intensity of intermediation of equities and broad money—, any increase in the output share of credit should impact the unit cost positively due to misspecification. Therefore, if the output share of credit increases in a country A but not in a country B, we should observe an increase in the unit cost in A but not B. This is the effect econometric analysis helps to account for. Let's first compare the case of Germany with the case of the US to understand the logic involved. The output increased after 1990 in Germany due to market

capitalization whereas the output increased in the US due to credit. Insofar as we do not observe any impact of those shifts on the unit cost either in Germany or in the US, we cannot reject the hypothesis stating that the intensity of financial assets was the same for credit as for equities. This is what confirms the OLS-within regression including all four countries of interest plus Italy and Spain for which data are available from 1970 to 2007.<sup>15</sup> Regressions cover the whole period and two sub-periods from 1950 to 1990 and from 1991 to 2007.<sup>16</sup> Table 1 shows that the explanatory variables are not significant whatever the period used for the analysis. This tends to confirm that the assumptions made about the intensity of intermediation of financial assets do not bias the results either before or after 1990.

It is finally worth noting that national unit costs converge around 2% and 2.3% after the liberalization of capital movements in the 1980s. This coincides with the alternative measure of the cost of financial intermediation proposed by Mehra et al. (2011) for the US. In other words, in all four countries for which the unit cost has been calculated, it cost 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, thereby 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 outputs". The second method uses the weighted sum of countries' unit cost based on each country's share in the total GDP. In both cases, the international activities of financial intermediaries are captured in the calculation. Those activities are assumed to be provided for the benefit 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

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15. Two things must be added in this respect. First, I do not provide full analysis of Spain and Italy's unit cost series precisely because of data availability issues before 1970. Pre-1970 data are indeed essential to account for the effect of the 1970s sea-change. Second, some data exist for the Netherlands too. I do not account for this country here as banking income data seem abnormally high after 1990. However, including the Netherlands in the data does not change the results.

16. 1990 is used as the pivotal year of the analysis as countries regulation tends to converge around this year.

point is particularly important in the case of the UK since the calculation now accounts for its positive financial intermediation trade balance.

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 do not capture such activity in countries that export a lot of financial services. It will be overestimated if the data account twice for banks' off-shore activities, in countries exporting and in countries importing financial services. I propose alternative estimations according to countries included in the calculation to assess this potential bias. 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% of Europe's GDP throughout the period under study.<sup>17</sup> Since data are not available before 1970 for Italy and Spain, nor before 1961 for the Netherlands, the unit cost is estimated with the remaining countries (Germany, France, and the UK) before those years.

### 3.1 Method 1 : Summing national series

In the first method 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") includes all the countries in the panel (Germany, France, the UK, Italy, Spain, and the Netherlands) and runs from 1970 to 2007. The second ("Europe 2") removes Italy and Spain from the equation and runs from 1961 to 2007. The third calculation ("Europe 3") omits 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" of banking income (activities of national banks and foreign subsidiaries in the country), Italy, Spain, and the Netherlands use a "country view" (banking activity within the country regardless of the national origin of the banks). If those differences are significant, then the series should diverge significantly.

In order to measure the robustness of the final series, I look at the evolution of the ratios of the corrected financial VA to GDP and financial output to GDP. Figure 15 shows the

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17. Luxembourg and Ireland, countries in which financial activity is particularly thriving, are omitted because of data problems. This tend to undervalue the European unit cost after 1990.

results of the ratio of the corrected financial VA to GDP using all types of calculations. The three calculations yield similar results. Overall, the ratio displays an increasing trend throughout the period as the GDP share of financial income came to 2.2% in 1950 and 8.3% in 2007. Similarly, figure 16 plots the ratio of financial output using all three calculations. The results are also very similar, whichever set of countries is used in the estimation. The ratio rose slowly before the 1990s and exponentially thereafter. In both figures 15 and 16, the series were almost the same whatever the type of calculation 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 the largest share of all six countries' GDP throughout the period. Finally, figure 17 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 does not seem to distort the estimation of the European unit cost.

Figure 17 shows that the unit cost of financial intermediation increased throughout the period in question. A sharp rise occurred in the 1970s and the 1980s—that is, during the period of restructuring of financial systems and macroeconomic troubles. The unit cost then tended to decrease during the second half of the 1990s and increased again after 2000. Overall, the unit cost never returned 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 versus 2.4 cents in 2007. In other words, given that I did not control for the evolution of the intensity of intermediation of financial assets, for the unit cost to be the same in 2007 and 1960, the overall intensity of intermediation needed to be 71% higher in 2007 than in 1960. Based on the results obtained in section 2.5, this turns out to be improbable (see also the discussion in sections 3.4).

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

### **3.2 Method 2 : the country-weighted view**

In the second method, 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 figures for 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 18 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 the

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 19 shows that the distribution of financial assets in Europe is not much different today from what it was in the 1960s. In fact, the relative size of each component did not change dramatically except in the 1970s and 1980s, because of a reduction in market capitalization. This is an important finding, as value differences between 1951 and 2007 unit costs barely 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, we compare the European unit cost with the US unit cost. Figure 20 shows that European and US unit costs follow very similar paths throughout the period. Both increased during the 1970s and levelled out in the 1980s. The European unit cost appeared slightly higher from the early 1970s to the mid-1990s, then caught up that of the US in the late 1990s.

Comparing European and US “plain” unit costs provides interesting facts, too. In particular, figure 21 shows that both series followed the same path until 1990 but diverged 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 to a larger extent in Europe than in the US. This is probably because the financial system depends far more on banks in Europe than in the US. Because financial wealth management depends on mutual funds business, financial wealth management income in the US is largely accounted for by financial VA through fees. This is not the case in most European countries (even in the UK), where financial wealth management income arises out of banks’ capital income. Therefore, national accounts must underestimate financial VA more because banks dominate financial intermediation.

### 3.4 Robustness check

Because the way banking income is 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.<sup>18</sup> Hence, the unit cost was calculated using

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18. 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

UK plain financial VA instead of banking income. This means the calculation cannot take UK banks' capital income into account, thereby understating the unit cost. Figure 22 shows that, despite such underestimation, the European unit cost still rose over the period covered. A small difference emerged for the initial estimation after 1999, probably due to the boom in financial market activities and banks' capital income in the UK after that date.

Since insurance companies also provide non-financial services to their customers, I exclude insurance VA<sup>19</sup> from the calculation. Based on the preponderant role played by banks and insurance companies in European countries' financial systems, withdrawing insurance VA from financial consumption is akin to look at banking income only. This robustness check is not too restrictive in the case of Europe since banks represent by far the largest part of the financial intermediation business. Figure 23 shows that the shape of the unit cost is left unchanged when insurance VA is ignored, thereby confirming that banking incomes increase more rapidly than financial output.

The weight attributed to each series composing the financial output does not affect the result, either. I compare the evolution of corrected value added with the evolution of each single series used in the output calculation. In all cases, the ratio of corrected VA to the volume of selected assets increased over the period. Because the relative size of market capitalization diminished dramatically in the 1970s and 1980s, and because financial market activities were not particularly prominent in Europe during that time, except in the UK, I plot an alternative unit cost, which ignores market capitalization. Because this unit cost displays a similar shape, figure 24 shows that market capitalization does not affect the result.

### 3.5 Discussion

Since the calculation of the output does not account for the varying intensity of intermediation of financial assets, the main conclusions might be driven by output misspecification. Let's discuss this point in detail. First, credit development is largely due to mortgage credit, the collateral size of which tends to discourage monitoring and screening behavior (Manove et al. 2001). At the same time, because rating agencies use hard information such as credit scoring or loan-to-value ratios for notation, banks rely increasingly on hard information (Rajan et al. 2010), which is less intensive to manage. In addition, securitization tends to lead to lax screening (Keys et al. 2012) and thereby diminishes the intensity of intermedia-

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are omitted from the calculation, the estimation is naturally biased downwards.

19. Statistical publication does not make a distinction between insurance and pension funds.

tion.<sup>20</sup> Second, the rise of market capitalization in Europe was largely due to the wave of privatization and speculative bubble from the mid-1980s to the late 1990s, an activity for which intermediation intensity should not have been great. Third, so long as diseconomies of scale do not prevail at the financial industry level, there is no reason for financial wealth management to be more intensive today than it was in the 1960s. In fact, today's comparison between active and passive fund manager profits does not display any superiority of the former over the latter (Fama and French 2010).

Despite those facts, what would be the consequence of a quality adjustment based on Philippon's (2014) methodology—the aim of which is to account for the increasing intensity of intermediation related to poor households' and low-cash firms' access to credit. Given Philippon's (2014) results this should not have a radical effect on the results produced so far. First, poor households' access to credit has increased more in the US than in most European countries. In fact, the ratio of household mortgage lending to the value of housing stock—which accounts for households' debt capacity—have increased more in the US than in Europe over the past 20 years (Jordchularik, and Taylor 2014). Second, the ratio of corporate credit to GDP has only slightly increased in Europe after the 1970s, especially in Germany, France, and Italy (Jordchularik, and Taylor 2014). Lastly, because the US unit cost continued to increase after quality adjustment and because both European and US unit costs followed similar patterns, there is no reason for the European adjusted unit cost not to increase over the past 30 years.

Another potential misspecification could stem from private financial wealth-management oversight (GSV 2014). 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 (2014) for Germany, France, the UK, and the US, figure 25 shows that this is indeed the case.

Lastly, tax havens may have had an impact on the output calculation too. Nonetheless, this should not have artificially increased 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 \$  $\alpha$ . 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 \$  $\alpha$ .

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20. Based on the conventional view of bank as delegated monitoring, lax monitoring reduce financial services production.

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 \$  $\beta$  while an investment of \$ 1 provides the French investor with a VA of \$  $\mu$  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 tax havens. 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,  $\beta$  must be higher than  $\mu$ . 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.

It is finally worth noting that financial intermediaries may have helped produce indirect services like, say, price discovery. However, the aim of the unit cost calculation is to account for the price of financial intermediation as in a partial equilibrium framework. Externalities, which can also be negative—e.g. government deficit boom following the subprime crisis—, must not be included in this calculation. As a comparison, the price of energy does not account for the fact that electricity has improved industrial production worldwide.

## 4 Discussion on unit cost evolution

This section discusses the evolution of unit cost based on recent theories of financial intermediation. As shown throughout this paper, two ruptures occur in the data. The first rupture corresponds to the sharp increase of the GDP share of finance and unit cost during the 1970s. The second rupture corresponds to the boom of financial development and banks' capital income in the 1990s. Based on the theories on the opportunity cost of non interest bearing money and the cost of liquidity management (Lucas, 2000), I look at the correlation between nominal rates of interest and unit cost to account for the first rupture. The correlation between both series is good until the late-1980s, when banks' move away from their usual business to rise market-based income (fees and capital income) at the expense of interest spread. Because banks develop market-based activities out of traditional activities, I rely on theories on the joint development of financial wealth management, the securities in-

dustry, and credit intermediation (Greenwood and Scharfstein (2013), GSV (2013, 2014)) to account for the second rupture and its consequences on unit cost. Therefore, I show that the unit cost remains high when the credit intermediation index (CII henceforth)—that is, the number of steps a monetary unit takes as it passes from investors (households or enterprises) to end-users—increases.

## 4.1 The role of nominal rates

Looking at the shape of unit cost series, either in their plain or corrected forms, it is easy to identify increasing values during the 1970s and 1980s. Those years were a time of macroeconomic turmoil which affected nominal variables. Nominal interest rates are important in the case we are dealing with because financial intermediation seeks 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.

According to Lucas (2000) the effect of the nominal interest rate on the unit cost depends on the banks' function as liquidity provider. Keeping unproductive funds in order to meet depositors' demands for cash is considered an opportunity cost, the value of which increases as nominal interest rates rise. Because demand deposits yield no interest rate, the average yield on deposits is more rigid than nominal rates by definition. This is particularly true in bank-based countries where the ratio of demand deposits to broad money is high. In addition, Smith (2003) and Paal, Smith, and Yang (2013) show that banks must cope with a contradiction between liquidity provision and investment strategy. 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 reserves is a positive function of the nominal interest rate. Even though the impact of an increase in nominal rates of interest on the interest spread is ignored, the unit cost of financial intermediation must increase with nominal rates of interest.

Another effect of the nominal interest rate emerges with the asymmetric evolution of nominal rates and deposit rates. Indeed, so long as deposit rates are sufficiently rigid in relation to nominal rates (Flannery 1982), a rise in the latter increases the spread between lending and deposit rates. Figure 26 demonstrates this positive relationship 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 finance depends mostly on banks.

Because nominal rates of interest are directly related to interest margins, it is worthwhile comparing them with the unit costs. Instead of comparing the two series directly, I use a

lowess-smoothing of short-term rates to deal with the volatility of the series. In addition, smoothed values are necessary so long as past rates continue to affect financial intermediation. Figure 27 shows that short-term interest rates explained the unit cost until 1990 in Germany, France,<sup>21</sup> and the UK,<sup>22</sup> and in Europe as a whole.<sup>23</sup> On the other hand, we can see that the distance between both (scale-adjusted) series increased after that date. This coincides with the development of market-based activities—generating capital income—built on the shoulder of bank-based activities—the income of which comes from interest spread. In other words, because capital income has developed at the expense of interest spread, the effect of nominal rates of interest on banks’ profit and unit cost decreases steadily during the 1990s.

## 4.2 The joint development of credit intermediation and the securities industry

New financial activities have made it easier to source new income out of wealth management businesses. As shown by Greenwood and Scharfstein (2013) for the US, and argued in this paper when measuring financial income, the joint development of wealth management, the securities industry, and credit intermediation has been a primary characteristic of the increasing weight of finance since the 1990s. Because financial intermediaries’ profit has depended on credit expansion through securities management, the increase of the CII should have been an important aspect of financial development throughout the past 20 years (GSV 2014).

The joint development of financial wealth management, the securities industry, and credit intermediation is assumed to have impacted the cost of finance through various channels. First, it increased the number of intermediaries to compensate for their services. Second, due to limited liability and government bail-outs option, intermediaries have been encouraged to take more risks on the market without paying the cost of those risks (Acharya 2009). Third, as shown by GSV (2013) in their model of shadow banking and securitization, when households’ wealth is too high, intermediaries are able to provide so-called riskless claims through the reduction of interest paid to investors—and the underlying increase in their profit. Fourth, as argued by Acharya, Schnabl, and Suarez (2013), the joint development of the securities

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21. 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.

22. Interest rate data are not available in the UK before 1958.

23. 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.

industry and credit intermediation has allowed banks to reduce their mandatory reserves. Securitization here aimed at increasing credit intermediation without transferring the risk.

Those facts yield two main predictions. First, financial intermediaries' risk taking increased with the amount of financial wealth. Recent studies by Basu, Inklaar, and Wang (2011) and Colangelo and Inklaar (2012) for the US and Europe show that banks has tended to bear more risk in their balance sheet. This complements the analysis of Acharya, Schnabl and Suarez (2013). Second, the unit cost of financial intermediation increased with the joint development of wealth management, credit intermediation and the securities industry. So as to account for this prediction, I look at the correlation between the CII<sup>24</sup> and the share of the unit cost unexplained by nominal rates—that is, the residual of a regression explaining the unit cost by nominal rates of interest<sup>25</sup>—for Germany, France, the UK, and Europe. Figure 28 shows how good the fit between both series is. In other words, the joint development of financial wealth management, the securities industry and credit intermediation seems to coincide with high unit cost values over the past 20 years.

This results does not mean that the increase of the CII causes high unit cost. It is indeed hard to know whether the rise of the CII is the cause or the consequence of borrowers' idiosyncratic risk. If the CII has raised to manage the risk (GSV 2013), higher unit cost might be the consequence of higher intensity of intermediation. On the other hand, if the risk has been caused by the joint development of credit intermediation and the securities industry in order to rise intermediaries income (Acharya 2009 and Acharya, Schnabl, and Suarez 2013), higher unit cost might be due to intermediation rents.

## Conclusion

This paper has aimed to measure the cost of financial intermediation in the largest European economies (Germany, France, and the UK) and to estimate it for Europe more broadly. Following Philippon (2014), I have calculated the unit cost of financial intermediation using financial intermediaries' income—thereby accounting for banks' capital income—divided by financial output—measured with the sum of financial assets. In order to obtain a European series, I have compiled national series, taking national financial intermediation trade balances into account.

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

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24. See the data appendix for calculation details.

25. In this respect I assume that the unit cost should have decreased in proportion of nominal rates reduction.

rose (Germany and the UK) or stagnated (France), while the series tended to converge throughout the period. The European unit cost also appears to have increased the same way as the US unit cost calculated by Philippon (2014). In all cases, the unit cost increased during the 1970s, after the end of the Bretton Woods system. In addition, the data show that a second rupture occur in the 1990s as fees and banks' capital income raise along with financial development. I show that the high unit costs of the 1970s and 1980s is statistically explained by the increase in nominal rates of interest following macroeconomic turmoil, which increased the cost of detaining non interest bearing money. Lastly, high unit cost values after the mid-1990s seem to have coincided with the joint development of the securities industry and credit intermediation as argued in Greenwood and Scharfstein (2013) and GSV (2014). This corresponds to the development of fees and capital income—in lieu of interest spread—as the main source of financial intermediaries profitability.

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