NEW BANK TAXES: WHY AND WHAT WILL BE THE EFFECT?

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Abstract. This paper analyses several options for the introduction of new taxes on the financial sector. It sets out possible objectives for such taxes, and in particular analyses the Financial Activities Tax (FAT) and the Financial Services Contribution (FSC). It compares the properties of the various forms of the FAT in terms of the revenue-raising potential while minimising distortions. The FSC may instead be seen as a mechanism to correct negative externalities created by the financial sector. To analyse this, the paper considers the origins of the recent financial crisis, and then considers the likely effects of the introduction of the FSC alongside existing regulations.

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1. INTRODUCTION

Since the beginning of the financial crisis numerous proposals have been made for new or increased taxes on banks and other financial companies. Many individual governments have already taken action, and several official international bodies have also been active in considering reform. For example, the IMF produced a report on options,[1] and the European Commission has produced a Communication on the Taxation of the Financial Sector, on which it is currently consulting.[2] This paper analyses some of the options for the taxation of banks and other financial companies that have been discussed, proposed and in some cases, enacted.

The European Commission's Communication and the accompanying Commission Staff Working Document raised three possible objectives for new taxes on banks.

The first is that "taxes could indirectly and in addition to regulation contribute to the goal of improving the stability of the financial sector by dissuading it from carrying out certain risky activities".[3] Presumably the idea is to reduce the probability of default in individual banks or other financial companies, and in particular in systemically important banks. This has been addressed partly through capital and liquidity requirements as part of the Basel III package (BCBS, 2010), and partly in some countries by restrictions on the trading activities of some financial companies.[4]

A theme of this paper is that to influence the behaviour of banks through taxation is far from straightforward, and that any attempt to influence the behaviour of banks must take account of financial sector regulations. There is a possibility that Pigouvian taxes may be more effective than regulations in correcting banks' behaviour. But it seems implausible in practice that taxes could replace existing and planned new regulations. In this case, the effects of taxes depend on such regulations. An important example, which we discuss in detail, is the effect of a levy on bank liabilities, such as has been introduced in the UK. While appearing to create an incentive to use more equity capital, the tax may also interact with regulations to change a bank's asset structure, with uncertain effects on risk.

Second, the Commission argues that additional tax could be justified by the support given to the financial sector during the crisis, and the consequent negative impact on government debt. This appears to be a backward-looking, raising revenue, approach: the banks caused the crisis, and they should pay for the costs of recovery. As President Obama said, on proposing a new Financial Responsibility Fee in the USA: "My commitment is to recover every single dime the American people are owed".[5] The IMF was asked by the September 2009 G20 meeting "to prepare a report on how the financial sector could make a 'fair and substantial contribution" to meeting the costs associated with government interventions to repair it" (IMF, 2010). This appears

[1] IMF (2010).
[2] European Commission (2010a); the accompanying staff working document is European Commission (2010b).
[3] European Commission (2010a), p.3.
[4] For example, through the Dodd-Frank Act in the USA.
[5] White House press release, January 14, 2010.

to express a similar sentiment. But it could also perhaps be interpreted in a wider sense, which links with the Commission's third objective.

That relates to more specifically to ensuring that the financial sector makes a "fair and substantial contribution" to public finances. Distinguishing this from the second objective, the idea here appears to be to question whether in normal times, the financial sector pays its fair share of tax. What would be a fair share is of course, difficult to judge. But more specifically, the Commission argues that, since the financial sector is largely exempt from VAT, there may be a sense in which it is under-taxed relative to other sectors. As the Commission points out, the reason why the sector does not pay VAT is that it is very hard to levy VAT on margin-based services. But there is a more fundamental issue here. It is not clear that the intermediate goods and services produced by the financial sector should be subject to additional tax. The basic principles of optimal tax theory suggest that intermediate goods should not be taxed. To examine this issue, we draw on a recent paper by Lockwood (2010). Beyond that, we provide some analysis of the form of tax that the IMF (2010) and Commission have in mind: a Financial Activities Tax (FAT).

A distinct fourth objective could also be considered. That also concerns revenue-raising, but more specifically in the context of raising funds to provide for a resolution mechanism in the event that a bank requires support in the future. The European Commission has been active in developing a new resolution mechanism within the EU, which has the aim of facilitating "the resolution of failing banks in ways which avoid contagion, allow the bank to be wound down in an orderly manner and in a timeframe which avoids the "fire sale" of assets".[6] This paper does not discuss the scope of such a resolution mechanism, but it does consider the issues that affect the design of a tax for such a purpose.

These objectives would give rise to rather different allocations of tax across different financial companies. The first objective seeks to impose higher tax on specific forms of activity within banks, related to improving the stability of the financial system. In principle, the appropriate tax could be based on leverage or the risk of a bank's assets. It might also be related to the extent of systemic interaction between each bank and the rest of the financial sector. A similar form of tax could be appropriate under the fourth objective; if the aim is to create funds for future resolutions, then one approach could be to charge a form of insurance premium. In this case, more fragile banks would pay a higher premium, and the base could be similar to that required under the first objective.

By contrast, the second objective would require a tax related to the costs imposed by an individual bank on the rest of society during the most recent financial crisis. For the third objective it would not necessarily be intended that the tax would be intended to influence behaviour, or to reflect an insurance premium. Instead, this objective is essentially to raise additional tax revenue in an undistorting way.

If these are the objectives, then there are also no shortage of taxes that have been proposed or enacted. Box 1 briefly summarises some of the options.

[6] See European Commission (2010c, d).

Box 1 Alternative forms of taxation

We describe four alternative forms of taxation on banks. This discussion draws on IMF (2010), and also identifies cases where such taxes have been proposed or enacted.

Financial Securities Contribution (FSC)

Various forms of a tax, or levy, on the liabilities of financial companies have been proposed. The version considered by the IMF (2010) would be paid by all financial institutions, and would initially be levied at a flat rate on a broad measure of the institution's liabilities or assets, excluding capital (Tier 1 for banks), and with a credit in respect of insured liabilities, such as deposits.

This is similar to the Financial Responsibility Fee (FRE) proposed by the United States. This was originally envisaged as a charge of 15 basis points on the liabilities, less Tier 1 capital and insured deposits, of large financial institutions. However, more recent proposals have envisaged it being based on risk-weighted assets. Sweden has introduced a similar stability fee on liabilities of banks at a rate that will rise to 3.6 basis points. The United Kingdom has introduced a levy, based explicitly on the IMF proposals from 2011, and set a target of raising £ 2.5 billion in revenue, and plans to adjust the rate to meet this target. France and Germany have also announced their intention to introduce a similar levy.

The motivation for the levy differs. The IMF proposed that it be linked to a resolution mechanism, and that the levy would be intended to pay for any future government support for the sector. In Sweden, the fee is intended to accumulate around 2.5 per cent of GDP in a resolution fund. The original US proposal was intended to recover costs already incurred in the crisis. Originally, the UK proposal was "designed to encourage less risky funding and complements the wider agenda to improve regulatory standards and enhance financial stability" (Hoban 2010), but the UK government has more recently emphasised its role as raising revenue. Germany intends to set the rate to reflect systemic risk, and earmark the proceeds for a resolution fund.

Financial Activities Tax (FAT)

The IMF also considered various forms of a Financial Activities Tax. One possibility is to base the tax on profits and all remuneration of financial institutions. If all remuneration is included in the tax base, then the base would effectively be value added, and so could be seen as a substitute for VAT, which is not generally applied to financial activities. However, if the profit element is appropriately designed, and if the remuneration element is restricted to higher levels of remuneration, it could approximate a tax on economic rents earned in the financial sector, given that part of the rent is captured by high-earning executives.

Tax on bonuses

The United Kingdom introduced a temporary tax on bonuses in the financial sector from December 2009 to April 2010 at 50 per cent of bonuses above £ 25,000. France introduced a temporary bonus tax for the accounting year 2009 at 50 per cent of bonuses over € 27,500. A tax on bonuses is more difficult to implement on a permanent basis since it would be necessary to identify the proportion of total remuneration which is deemed to be a bonus. Nevertheless, Italy introduced a permanent tax of 10 per cent on bonuses and stock options exceeding three times manager's fixed remunerations, from 1 January 2010.

Financial Transactions Tax (FTT)

Popular debate has favoured a financial transactions tax (which has also become known as the "Robin Hood" tax). Many countries already have some form of financial transactions tax. Advocates argue that such a tax could raise substantial revenues from taxing speculative flows that have little social value, and may serve to reduce the incentive to create a cascade of structured securities that were at the heart of the financial crisis. However, the tax would be a relatively blunt instrument for correcting socially costly financial behaviour as it would not be able to distinguish between desirable and undesirable trading. It would not target the key sources of systemic risk, such as the size and interconnectedness of banks. And its burden is likely to fall on the consumers of financial products in the form of lower returns to savings and higher borrowing costs. A comprehensive survey of the case for and against an FTT is provided by Matheson (2010).

This paper proceeds by analysing each of the objectives in turn, rather than by analysing each proposed tax in turn. Also, the paper focuses exclusively on the first two types of tax set out in Box 1: the FAT and the FSC.

We begin in Section 2 by first setting out a summary of the causes of the financial crisis. This is a necessary first step to analysing and understanding the role of alternative policies designed to affect behaviour in the financial sector: under the first, and possibly the fourth, objectives policy should be targeted towards the underlying causes of the crisis.

We then turn to a more detailed discussion of how taxes could be designed to meet the various objectives. We begin in Section 3 with the revenue-raising objectives – the second, third and fourth objectives above. In Section 4, we then raise the issue of whether a new tax could be introduced that could meet the first objective of enhancing the stability and efficiency of the financial system. This may also be relevant for the fourth objective. In this Section, we first consider the merits of inducing different behaviour by banks through the tax system as opposed to regulation. We then consider a specific form of tax, as levied in the UK and Sweden, and considered in France and Germany, on the liabilities of banks. We investigate specifically what the effects of such a tax are likely to be in the context of the Basel system of capital requirements. Section 5 briefly concludes.

2. UNDERLYING CAUSES OF THE CRISIS

There were clearly many elements which contributed to the onset and scale of the financial crisis. In order to identify policies which may help to reduce the probability of future crises, it is useful first to identify some of the more important factors that created the recent crisis. We will do this relatively briefly, since other contributions have already provided a comprehensive analysis of the causes of the crisis (see, for example, EEAG, 2009 and Sinn, 2010).

Two key factors are liquidity and solvency. Banks use short-term debt to provide long term loans. There are clear benefits from this to society: funds can be pooled to allow investment in long-term illiquid assets, while meeting the expected demands for individuals' short term liquidity needs. However, as Diamond and Dybvig (1983) demonstrated, in such a situation any cost to the liquidation of long-term assets is likely to result in banks being inherently fragile, and susceptible to demands from short-term debtholders. The existence of deposit insurance reduces such fragility, as deposit holders are protected and hence less likely to create a bank run. By acting as lender of last resort, central banks can have a similar impact, as demonstrated by Rochet and Vives (2004).

However, as King (2010) argues, although in 2007 "everyone thought that the crisis was one of liquidity .. it quickly became clear that it was in fact a crisis of solvency" (p.8). The problem of insolvency was created by excessive leverage and risk. According to Sinn (2010), in 2006 the largest 5 American investment banks had equity to asset ratios of between 3.2% and 4.6% (based on European accounting rules, these ratios would have been even lower).

The implication of such low equity ratios is clear. Suppose that the ratio is 4%. Then if the value of the assets held by the bank falls by more than 4%, then bank would be technically bankrupt: equity holders should be wiped out, and creditors should share what is left. It is clear, then, that both the risk of the bank's assets and the proportion of its assets that are financed by debt are crucial for solvency. This is why regulatory requirements for the capital ratio depend on risk-weighted assets: we discuss below whether existing and proposed regulations and taxes are sufficiently strict.

Several factors may have been involved in creating the situation in which banks held excessively risky assets, given their equity capital. One, highlighted by Sinn (2010), is limited liability. We discuss this in the next subsection, before considering other factors, including preferential taxation.

a. *Limited liability*

In the presence of risky investment, limited liability implies that the shareholders of a company gain from risk on the upside, but that their losses on the downside are limited. In some circumstances, limited liability can create the incentive both for high leverage and high risk: both of these improve the gamble available to shareholders.

But this true for the shareholders of any limited liability company. Other factors therefore need to be considered to see why banks succumbed to this risky behaviour while companies in other sectors generally did not.

The key factor in whether limited liability induces greater leverage and risk is the response of the debtholders to greater risk on the asset side. Suppose creditors are able to observe the strategy of the company, and to hold the company to a strategy after the lending has taken place. In general in this case, creditors will demand a rate of interest that compensates them for greater risk. In particular, as the risk of the banks assets increases, so does the downside risk to creditors, and so the interest rate charged will increase. Since shareholders have to pay the higher interest rate in the good state, it is straightforward to show that in this case there is no incentive for shareholders to take on extra risk.[7]

A similar argument holds with respect to increasing leverage. As leverage increases, so does the risk to the creditors, and hence the rate of interest charged by the creditors will also increase. In principle, there is then no incentive for shareholders to increase leverage. This is simply the famous 1958 Modigliani-Miller theorem, which states that, given certain conditions, the risk and value of a company does not depend on the way in which it is financed: it depends only on the activities that the firm undertakes. Given the company's activities, a rise in the use of debt and a commensurate decline in the use of equity will increase the risk and required rate of return of both the debt and the remaining equity. But the overall cost of capital of the company will be unaffected.

So the existence of limited liability in itself does not necessarily induce more risky behaviour, nor does it necessarily induce more leverage. But the conditions for this to hold are stringent. One is that there must not be a tax advantage to debt: a factor we discuss below. A second is that the risk position of the bank must be observable to creditors, who must be able to adjust the interest rate that they charge in the light of the risk that they face.[8]

A third condition is that governments must not implicitly nor explicitly insure creditors. However, it is commonly suggested that that there was - and remains – implicit or explicit state support for the creditors of banks. Explicit insurance is commonly provided for deposit holders. But beyond this it is clear that governments could not allow the banking system to collapse because of its interconnectedness. Allowing one large bank to default would have serious repercussions for other banks, in the tightly woven web of cross-bank lending and other holdings. This is commonly regarded as the "too big to fail" phenomenon. An implication of this is that creditors

[7] This is demonstrated, for example, in a differentiated duopoly banking model by Matutes and Vives (2000). In this model, banks compete for deposits, have limited liability, and choose the risk of their portfolio, which is observable by investors. If a bank fails there is a social cost of failure. In these circumstances, for risk averse investors there is a disincentive to take on extra risk.

[8] In the Matutes and Vives (2000) model, when there is full deposit insurance, financed with flat premiums from the banks, the banks will take maximal asset risk irrespective of whether asset risk is observable or not. When the asset risk position of the bank is not observable, and the bank chooses its portfolio risk once the investors have deposited in the bank, then limited liability implies that the bank will again take maximum asset risk. In principle, in this case, the effect will be anticipated and depositors will require a higher return; however, we discuss below whether this may not have occurred in practice.

of “too big to fail” banks evaluated their risk at a lower level than would otherwise be the case given the strategy pursued by banks of very low equity ratios and high investment in risky assets. Ueda and Weder di Mauro (2010) have used two approaches to estimate the impact of the “too big to fail” subsidy for banks. Their estimates of the benefits to banks are measured in terms of a funding cost advantage, and range from 20 basis points to 65 basis points.

b. *Other factors*

So one possible explanation for the excessive leverage and risk of banks prior to the crisis is limited liability, combined with implicit or explicit insurance of creditors by governments on the grounds that the banks were “too big to fail”.

Hubris

But there are also alternative explanations, which have implications for devising strategies to create the conditions under which banks are less risky in the future. One possibility suggested by, among others, Mervyn King (2010) is that

> “the real failure was a lapse into hubris – we came to believe that the crises created by massive maturity transformation were problems that no longer applied to modern banking... There was an inability to see through the veil of modern finance to the fact that the balance sheets of too many banks were an accident waiting to happen, with levels of leverage on a scale that could not resist even the slightest tremor to confidence about the uncertain value of bank assets.” (p.10).

In this view, the proliferation of financial instruments, together with special investment vehicles, and other factors documented at length elsewhere, simply got out of hand, with buyers of financial instruments having little idea of their underlying risk. Ratings agencies – either through deliberate policy determined by their own incentive mechanisms, or simply because of miscalculation – were unable to offer appropriate advice.

In this case, the excessive leverage and risk taken by banks was, at least in part, simply a mistake. This would explain the relatively low rates of interest charged by creditors, referred to above. If creditors simply underestimated the risks that they were facing and hence charged rates of interest that were too low, this would create an incentive for banks to undertake excessive leverage and risky lending.

Agency problems

A second alternative stems from the role of bankers, rather than banks. Bank executives are in a similar position to shareholders, in that they effectively have limited liability. Their downside risk is small, relative to the huge rewards that are available through very large bonuses. In a world of implicit government guarantees to creditors, the incentives of shareholders may very well be to take excessive risk. This has led Sinn (2010) to point out that we do not need an agency theory of the behaviour of bank executives to explain the crisis. Large bonuses are then simply an indication of the interests of shareholders and executives being closely aligned. While this is

likely to be an important part of the truth, it does not, however, mean that we can rule out the possibility that executives were acting in their own interests, rather than in the interests of the shareholders. This distinction could be important in devising strategies to reduce risk in the future.

There is evidence on both sides here. Sinn points out the senior bank executives spend considerable time and effort meeting analysts and other investors to explain the strategies that the bank is employing. They are therefore not unaccountable to investors. Further, to the extent that shareholders aim for high leverage and risk, they should in principle create incentive schemes for their executives which reward them for doing so.

On the other hand, executives earn truly gigantic bonuses. The annual payment of bonuses in the City of London stretches into billions of pounds. As an example, the UK government introduced a one-off tax of 50% on bonuses paid by banks in 2009. This raised around £3.5 billion in tax revenue, implying that executives received a further £3.5 billion, the total cost to banks stretching to £7 billion.

These are enormous rewards to employees: is it really credible that these rewards represent optimal remuneration packages, in the interests of shareholders? The generosity of the remuneration packages should depend on the degree of scarcity of managerial talent. If there is really a very steep supply schedule of managerial talent – so that there are very few people who could successfully run a bank in the interests of the shareholders, then it may be the case that shareholders should agree to a substantial fraction of their profit being distributed in managerial incentive payments. But the degree of scarcity of managerial talent motivating observed remuneration schemes seems too large to be empirically plausible.

The alternative is that there is a corporate governance and agency problem. Due to lack of information, or other agency problems, executives are able to capture a significant share of the profits earned. However, this is an explanation for a high generosity of remuneration, not for extremely high power incentives to take risks.

Costs of equity finance

Banks typically argue that equity finance is more expensive than debt finance. The implication is that forcing banks to hold more equity would raise their costs. In turn this would raise the costs of their lending, probably forcing them to cut back on lending to other sectors and hampering economic growth.

There is a substantial economic literature in corporate finance which investigates this issue in a general context, rather than specifically banks. In considering equity finance, it is necessary to distinguish two sources: retained earnings and new equity issues. It is generally accepted that by far the largest source of finance to the corporate sector in developed economies is internal finance in the shape of retained earnings. Of external finance, debt is used more heavily than new equity.[9]

[9] See Mayer (1988), Tirole (2006).

There are many issues of agency and asymmetric information involved in external finance. Kashyap et al (2010) usefully distinguish stock and flow concepts of the costs of equity finance. Flow costs relate to issuing new equity. Myers and Majluf (1984) suggested that asymmetry of information between management and external investors would lead to an issue of new equity being interpreted as a negative signal by outsiders, since if managers act in the interests of existing shareholders, then they will sell shares when they believe it to be overvalued. There is evidence that share issues tend to be associated with negative share price effects, compatible with this.[10] As a result, managers will be reluctant to use new equity finance in the first place.

As a consequence, it is argued that a requirement to raise the capital ratio is more likely to be met in the short term by shrinking assets than by issuing new equity, even when the assets represent profitable investments. This is perhaps a caution against demanding too rapid a change in capital ratios. On the other hand, a regulation requiring additional equity presents a reason for issuing new equity which is clearly different from the Myers-Majluf argument. Adhering to new regulation by issuing new equity should reasonably not be viewed by the market as a negative signal.

In any case, the long run costs of using equity finance are much less clear, precisely since companies and banks can build up the stock of equity finance by retained earnings.

Admati et al (2010) and Hellwig (2010) consider various arguments that have been made to justify high leverage in banks. These arguments include: increased equity will increase funding costs since equity is more risky; increased equity requirements will lower the rate of return earned by banks; increased equity would be costly since debt is necessary for providing market discipline to managers; and increased equity would force banks to cut back on lending. They show that there is little evidence to support any of these propositions. Haldane (2010) demonstrates how leverage has significantly increased over the last few years: current levels are by no means the historic norm.

c. *Tax distortions*

A further incentive for excessive use of debt finance is the tax advantage of doing so. In addition, there is arguably an advantage to the financial sector from being exempt from VAT.

Deductibility of interest for corporation tax

It is generally the case that corporation taxes are based on profits including interest receipts but net of interest payments. For most companies, this deductibility of interest payments creates an incentive to finance its activities through debt rather than equity – which typically does not receive any equivalent relief. The same is true for banks. While interest received by the bank is generally taxed, interest payments made by banks are generally deductible. For a given set of loans, there is therefore an incentive for banks to finance their activities by debt rather than equity.

[10] For survey evidence see, for example, Graham and Harvey (2001).

Such forms of corporation tax are not new: they have been in place for decades. If anything, there has been a move towards its restriction, in the context of combating tax avoidance schemes. Partly because these forms of taxation have been in place for some time, this factor is not generally considered to have been a decisive factor in the lead up to the crisis.[11] Another reason for this judgement is that the definition of what is "debt" and "interest" tends to be different for tax purposes and regulation.[12] Some financial instruments may be treated as part of equity capital for the purposes of regulation, but as debt for the purposes of tax. Hence what is considered to be equity capital for regulatory purposes may receive favourable tax treatment. This implies that the favourable tax treatment of interest may not induce banks to reduce regulatory capital further.

Exemption from VAT

The financial sector is generally exempt from VAT. This means that VAT is not charged on outputs, and VAT paid on inputs cannot be reclaimed. Relative to normal VAT treatment, this implies a higher tax on business-to-business transactions (where VAT at earlier levels of production can normally be offset against later levels), but a lower tax on business-to-consumer transactions. Broadly, evidence suggests that revenue is lower than would be the case under full VAT treatment.[13] According to the IMF (2010), this could have contributed to the financial sector becoming larger than would otherwise have been the case.

Exemption is generally used because of the difficulties in identifying value added on margin-based instruments (e.g. borrowing and lending with a spread, but no explicit charge). However, it is questionable whether financial intermediation should be subject to taxation. The broad thrust of the optimal tax literature suggests that intermediate goods should not be subject to taxation. This principle underlies the structure of VAT, since the tax paid on intermediate goods by business (input VAT) can be set against the tax due on final goods. But where consumers purchase the intermediate good directly, as for example, when they borrow to purchase consumer goods, it is less clear whether such lending and borrowing should be subject to tax, and if so, at what rate. Most recently, Lockwood (2010) suggests that in a general framework, the tax on savings intermediation should optimally be zero.[14] In this case, there could be too much VAT charged on financial intermediation, since input VAT paid by banks cannot be claimed back by consumers, nor by business customers.

d. *Why did regulation fail?*

Banks and other financial companies have not been free to choose their own leverage and risk positions for many years, but have been subject to regulations especially in the Basel I and II agreements. It is clear that these regulations failed to prevent the

[11] See, for example, Hemmelgarn and Nicodeme (2010), IMF (2010), Shackelford, Shaviro and Slemrod (2010).
[12] See Devereux and Gerritsen (2010).
[13] De la Feria and Lockwood (2010).
[14] Savings intermediation is here distinct from payment services provided by a bank, such as a cheque book, credit card, or other such facilities.

crisis. Detailed accounts of why these regulations were insufficient are provided elsewhere (see, for example, Sinn, 2010, Vives 2010a). We will not repeat these at length. However, in assessing the reform of these regulations, and the possible role of taxation as a replacement or complement to revised regulations, it is useful to identify briefly why they may have failed.

Over 100 countries signed up to the Basel I agreement, originally set up in 1988. This provided for a minimum capital ratio. Tier 1 capital consists broadly of paid-in capital, accumulated earnings and preferred stock. Tier 2 includes a broader definition of capital, including subordinated debt. Each of these measures is divided by a measure of risk-weighted assets to create the minimum Tier 1 and Tier 2 capital requirements: 4% and 8%, respectively.

Under Basel I, assets are assigned to broad risk classes, and given weights for use in these ratios. For example, loans to firms were typically given a weight of 0.5, loans to normal banks a weight of 0.2, and sovereign loans a weight of zero. The Basel II accord, implemented in the EU, Switzerland and some other countries from 2008, introduced a much more flexible system of assigning weights to specific assets. Broadly, following lobbying from the industry, banks were permitted to use their own models to differentiate – in principle, more precisely – the risks associated with different types of lending. Among other things, this permitted banks to hedge their lending with credit default swaps, and replace the risk weight of the debtor with that of the insurer. Overall, as Sinn (2010) demonstrates, the result was that a Tier 1 ratio could easily be four times larger than a simple equity asset ratio, defined as Tier 1 capital to total assets. For many banks, the simple equity asset ratio was less than 2%, while the reported Tier 1 ratio was in the range of 8 to 10 percent.

The problems of the system were exacerbated further by the accounting treatment of mark-to-market, which created procyclical effects. In an upswing, asset prices rise, high profits are recorded which increase Tier 1 capital, and vice versa. Consequently, there is an incentive to reduce Tier 1 capital in an upswing, making it more difficult to replace that capital in a downswing. This effect is multiplied at lower equity asset ratios.

A further problem of the system was that significant parts of the financial system were not subject to the Basel regulations, in particular, hedge funds and special purpose vehicles. That latter were vehicles typically set up in tax havens, and whose assets did not appear on the balance sheet of the parent bank, even though in practice the parent was obliged to assume the risks of the special purpose vehicle.

This very brief review serves to highlight two factors: the level and the definition of the required capital ratio. Both factors require attention.

3. TAXATION TO RAISE REVENUE

In the Introduction we noted three variants of a rationale for raising additional tax revenue from banks and other financial companies:

- The financial sector was responsible for the recent financial and economic crisis and should be expected to make a significant contribution to meeting the costs of the crisis.
- The financial sector is exempt from paying VAT. This gives it a competitive advantage over other sectors which could be avoided or reduced by introducing an alternative tax.
- It is necessary to build a fund for a resolution mechanism to be used in the future. The financial sector should pay a tax earmarked for such a fund.

We discuss each of these in turn.

Backward-looking tax

As noted in the Introduction, the original US proposals for a "Financial Crisis Responsibility Fee" were explicitly related to paying for the bailout costs of the crisis through the TARP. Laeven and Valencia (2010) provide some evidence on the costs of bailouts to date. As might be expected, these vary considerably between crises and between countries. They also vary depending on what is included in the costs. For example, with respect to the financial crises in 2007-9, Laeven and Valencia estimate that the direct fiscal costs were an average around 5% of GDP. In advanced economies, by the end of 2009, IMF (2010) suggests that the cost of direct support had amounted to only 2.8 % of GDP. But Laeven and Valencia point out that the crises led to output losses of 25% of GDP, and a consequent increase in public debt of around 24% of GDP. The scale of the tax need to cover costs therefore depends critically on exactly what costs are to be covered.

In any case, the aim of reimbursing past costs deserves some comment. First, the effective incidence of taxes levied on banks now may not match the effective incidence of prior bailout payments. The implication of President Obama's remarks, cited above, is that individuals that benefited from the US bailouts should be those who repay that money in the form of higher taxes. But it is not enough to say, for example, that bank A received bailout funds, and therefore that bank A should face a tax payment now. First, this is because the benefits of the bailout were shared widely across the economy. Indeed, the point of the bailout was not to protect individual banks, but to protect the entire financial system, and beyond that, the entire economy. To that extent, virtually everyone in the economy must have benefited from bailouts.

Second, even from a narrower perspective, it cannot be the bank that ultimately bears the tax burden, but individuals associated with the bank – its shareholders, employees, suppliers and customers. Which of these individuals ultimately bears the tax burden depends on the type of tax levied, and the conditions in the various markets in which the bank operates. What is far from clear, however, is whether any tax levied post-crisis will be borne by the individuals who profited from the bailouts, or from the behaviour of the bank before the bailout.

Even putting aside these considerations, what would be the appropriate form of a tax to reflect this backward-looking rationale? The principle would presumably be that cost should be borne by those who were most responsible for the crisis. This could perhaps be measured by use of bailout funds, though that would not reflect the systemic effect of the actions of any particular bank on the overall crisis. In any case, it is not clear that any of the tax bases summarised in the Introduction would constitute an appropriate base in this case.

A VAT replacement

The second rationale is related to the instructions from the G20 to the IMF for considering taxes on banks: the IMF was charged to consider how the financial sector could make a "fair and substantial contribution" to public finances. The Commission's argument that the financial sector does not already do so is based primarily on the fact that it is exempt from VAT. We have already addressed whether this is a reasonable inference, based on the considerations from optimal tax theory. But leaving those considerations to one side, what would be an appropriate tax base to meet the objective of simply raising additional tax revenue from the financial sector?

One option would be to find ways of applying VAT to financial services.[15] But as an alternative to VAT, the IMF has proposed a Financial Activities Tax (FAT), based on the sum of profit and remuneration for each bank. Since profit plus remuneration is equivalent to value added, this would be a natural candidate for an alternative form of tax, even though it would be administered in a very different way.

There are important technical details about how such an addition-based tax could be implemented than remain as yet unresolved, many of which are discussed, though not resolved, by Keen et al (2010). One key issue is one of cascading: in the VAT system, VAT paid on inputs can be offset against VAT charged on outputs, which has the net effect that VAT ends up as a tax on sales to the final consumer. But there is no mechanism as yet for introducing something similar for the FAT, which would imply that there would be several levels of tax.[16] Keen et al argue that this would be a reason for levying the FAT at a rate significantly below the VAT rate. In the design of a new tax, this does not appear very satisfactory. It would surely be better to attempt to design a tax with no underlying serious flaws than to introduce a new tax so likely to create such distortions that the rate needs to be kept low.

A second issue is international adjustment. VAT is levied on a destination-basis: exports are tax-free while imports are subject to tax. Broadly, this implies that goods are taxed in the country in which they are consumed. This is a significant advantage for conventional VAT. The location of production is not distorted by tax, and if consumers are relatively immobile, then the location of consumption is also not be significantly affected.[17]

[15] One well-known approach was proposed by Poddar and English (1997), but has not so far been implemented.
[16] Kerrigan (2010) proposes an allocation mechanism that could in principle address this problem.
[17] There is a significant literature on the conditions under which destination- and origin-based VATs have equivalent effects: see Lockwood (2005) and Auerbach and Devereux (2011).

In principle, the FAT should follow this approach. Yet this would be more difficult to implement, since it implies, for example, that the sum of profit and remuneration must be reduced to the extent that sales take place abroad rather than at home. Yet even if this is done on an ad hoc basis, then there also needs to be a mechanism by which the value added relieved in the source country is taxed in the destination country. It is hard to see how this could be accomplished under an addition-method FAT. As a result it seems plausible only to levy the FAT as an origin-based tax. As such it will distort the location of production, in a similar way as conventional corporation taxes.

A third issue is which companies would be liable to the tax, and whether it is applied to all value added from financial transactions. A reasonable approach would need to ensure that income is not taxed both under a VAT and under a FAT. This could imply a complex allocation of income and expenditure to each category.

Although this version of the FAT is closest to a VAT, the IMF also considers other versions. Another possibility is that only remuneration to very high earners would be added to economic profit in the tax base. The definition of economic profit here is different from that normally used in corporation tax. In fact it is instead a tax on economic rent.

This could be implemented in several ways, but perhaps the most straightforward would be something comparable to existing corporation taxes, but which also gives relief for the opportunity cost of equity finance, known as an "allowance for corporate equity", or ACE (IFS, 1991). This has been proposed in the literature as a replacement for existing tax systems, on the grounds that it is neutral with respect to the financing decision (since debt and equity receive equivalent treatment) and the scale of investment (the effective marginal tax rate is zero, since it is a tax only on economic rent).

Such a tax could be implemented in addition to conventional, existing corporation taxes. The effect would be that the total marginal tax rate on economic rent would be equal to the sum of the rates of the two taxes, while a lower rate (from existing taxes) would be applied to other capital income. This would not remove the tax advantage to debt finance, but the new tax would not exacerbate that problem. An alternative would be to use such a tax to replace existing corporation taxes in the financial sector. However, in this case to raise revenue in excess of what is already raised would require a very high rate, since it would be applied to a narrower tax base.

The narrow version of the FAT would be approximately the same as a corporation tax with an ACE allowance, plus a tax on workers with a very high remuneration. This high remuneration might also be considered a form of economic rent, to the extent that part of the economic rent of the company is captured by the management in the form of high remuneration.

The narrow version of the FAT in principle suffers to some extent from the same problems as the broader version. However, these problems are likely to be significantly smaller in the case of the narrower base. Very broadly, the narrower base would be a tax on economic rent, while the broader base would be a tax on economic rent plus all remuneration (ie. value added). The crucial issue in determining the cascading effect here is whether the tax is passed onto the consumer through a higher

price. We assume that this happens in the case of VAT, and that the additional cost is offset against the VAT charged on the output. We can also assume that this happens in the case of the broad version of the FAT. But it is less clear that it would happen in the case of the narrower version, since a tax on economic rent is usually borne by the owner of the investment, rather than passed on in higher prices. If this is the case, then there would be no cascading effect.

Contrary to the view expressed by Keen et al (2010), the international problem exists for an origin-based narrow FAT to the extent to which companies make discrete location choices, since even a tax on economic rent can affect discrete choices.[18] That is, if companies make location choices based on where they can earn the highest post-tax economic rent, then differences in the tax rate even on economic rent can affect those choices.

Of course, to raise the same revenue as the broader for of FAT, the rate charged would have to be higher. For relatively small tax revenues, the narrower tax base is attractive. However, if larger revenues are needed, then the implied tax rate required could be very high, and the broader tax base would be needed, even if it creates more distortions.

A still narrower version of the FAT is also considered by Keen et al (2010). This would be a tax on very high returns, will above the normal return on equity. The idea here is that imposing such a tax on good outcomes would offset to some extent the relief that the government implicitly or explicitly offers in bad outcomes by bailing out creditors in the event of default. It would therefore induce banks to undertake less risky behaviour. However, it is by no means clear that such a tax would have this effect. This depends on the extent to which a company or bank that in one period was liable to this tax was able to reduce its taxable income by undertaking more investment. Any allowance that the bank received for such additional investment would receive relief at the higher rate, and so an incentive for such additional investment could be created.

Financing a resolution fund

The third approach above was to consider a tax as raising revenue to fund future resolutions: a forward-looking use of the revenue. The IMF rightly argues that the financial sector should pay for fiscal support that it may receive in the future. In designing a tax to raise revenue for this purpose, there are two possible routes to consider, even leaving aside any deliberate attempt to modify behaviour to reduce externalities.

The first route would be to attempt to design a tax that is as non-distorting as possible. This approach returns us to the discussion of the FAT above. The revenues from a FAT could be earmarked for a resolution fund, as well as making a general contribution to government finances. The use of the funds does not affect the issues discussed above.

[18] See, for example, Devereux and Griffith (1998, 2003).

The second route would be to attempt to design a tax or levy which is like an insurance premium. In this case, the tax should fall more heavily on banks and financial companies that are more likely to require help from a resolution fund, and from those that are likely to require more substantial funds if that event occurs. That is, the tax should fall more heavily on companies that are larger, more fragile, and more systemically connected to the rest of the financial sector.

A tax designed on this basis would go well beyond the simple objective of raising revenue. By targeting companies that are more likely to require financial support, the tax would in turn be likely to have significant behavioural consequences. For example, Matutes and Vives (2000) show how fair, risk-based, deposit insurance induces banks to behave less aggressively when the regulator observes the risk position of the bank. This may have beneficial consequences, but raises the issue of the relationship of the relationship with existing regulations.

The behavioural consequences of the tax bring us to the first objective raised by the European Commission: to improve the stability of the financial sector. This is addressed in the next Section, where we focus (in the second part) particularly on the Financial Securities Contribution (FSC). In particular we analyse its likely effects, given existing Basel regulations.

4. CRISIS PREVENTION

In the previous section we have discussed the appropriate structure of taxes on the financial sector when the aim is to raise revenue in a relatively non-distorting way. We now turn to discuss the possibility that taxes may be used as a way of deliberately influencing the behaviour of banks and other financial institutions, in particular to reduce the risk of a future financial crisis. A key issue in considering any form of tax designed for this purpose is its interaction with regulatory requirements.

Starting with a blank sheet of paper, it might be possible to design a tax that would make regulation unnecessary; and we discuss this possibility first. More realistically though, any new tax would sit alongside existing and new regulations. It is therefore important to consider the impact of such a tax conditional on such regulations being in place.

a. Tax *versus* regulation

Historically, policies to deal with negative externalities arising in the financial system have taken the form of regulation, rather than taxes. However, since the crisis there has been a growing interest in the possibility of introducing new taxes on banks.[19] In this section we address the basic principles involved in choosing between tax and regulation as a means of reducing externalities.

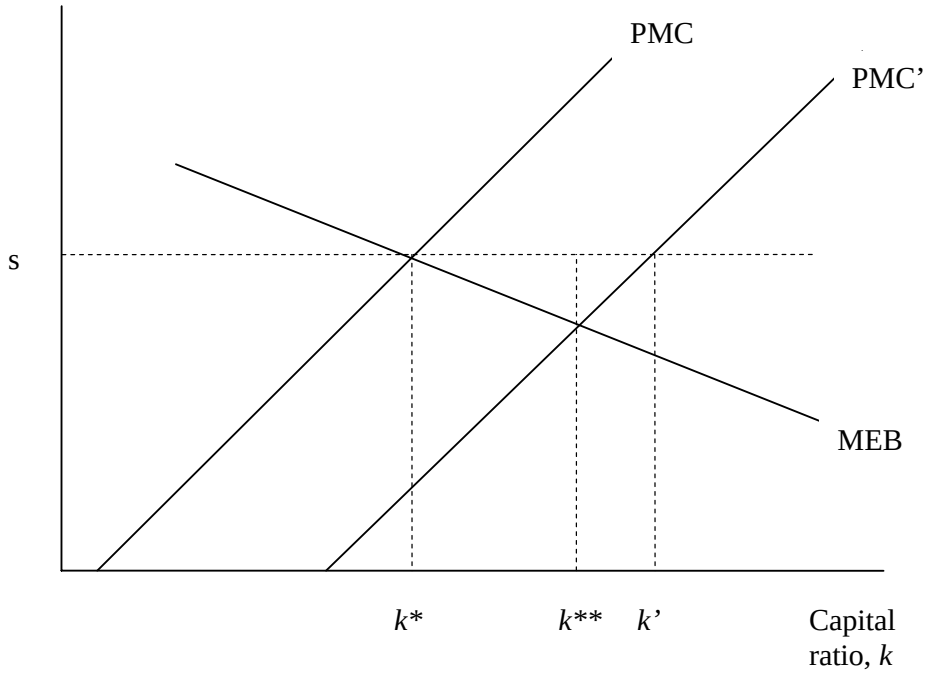
[19] Recent theoretical contributions include Bianchi and Mendoza (2010), Jeanne and Korinek (2010) and Perotti and Suarez (2010).

There is clearly a case for policy makers to intervene in a market which, left to itself, would generate harmful externalities on the rest of society. The classic example of such a market is one which creates pollution. But the need for regulation of banking shows that this is generally also thought to be true in this case as well. In considering intervention in such markets, policymakers have two possible tools, essentially affecting prices or quantities. We can translate this into taxes – affecting prices – or regulation – affecting quantities. Existing regulation of banks through capital requirements is a form of quantity control: banks are given a minimum capital requirement. A tax would follow a different route: by taxing or subsidizing alternative forms of finance, policy makers may induce banks to hold more capital.

The current mainstream view amongst economists about the relative merits of these two approaches stems from a contribution by Weitzman (1974). For example, Stern (2007) and Keen (2010) both apply Weitzman's model – to externalities from carbon emissions and from systemic risk in banking, respectively. It is therefore worth briefly presenting this approach, before questioning its application in the case of banking.

The approach is illustrated in Figure 1, taken from Keen (2010) though also used elsewhere. The upward-sloping lines show the marginal private costs (PMC) facing banks as the proportion of their funding in the form of equity capital, *k*, rises. The downward-sloping lines represent the marginal net external benefits (MEB) of increasing *k*. The initial social optimum is at *k**, where the initial PMC lines intersects with the MEB line.

Figure 1. Illustration of subsidy v regulation



Keen (2010) discusses the slopes of these lines in terms of a *failure externality* and a *bailout externality*. The failure externality reflects the probability of a bank falling into distress or failure, and the wider social costs if it does so. The greater is the sensitivity of this failure externality to the capital ratio, the steeper is the MEB line. The bailout externality reflects the benefits to banks due to a lower interest rate charged by creditors as a result of creditors expecting to be bailed out in the event of default. A larger bailout externality tends to flatten the MPC line, since it blunts the sensitivity of the cost of raising finance to the capital ratio.

With perfect information, a policy maker could ensure k^* in two ways. He could subsidise the bank by paying a marginal subsidy of s to offset the banks private marginal costs (or impose a lump-sum tax which is reduced at the margin by s). Or it could impose k^* as a minimum capital requirement.

However, now suppose that there is a change in the private marginal cost line to PMC'. Or PMC' might also be interpreted also as the "true" private marginal cost, known to the bank but not known to the policy maker (who believes that this cost is represented by the original line, PMC).

Under a minimum capital requirement of k^*, there is no change in the capital used by the bank. Even at PMC', the bank would prefer a capital ratio of less than k^*, since at this point private marginal costs are still positive. With a subsidy of s, however, the bank would instead choose capital ratio of k', where the combination of marginal cost and subsidy remains zero.

Neither of these outcomes is optimal, since the optimal position is at k^{**}. Conventional analysis compares the total welfare cost under each option. This depends on the relative slopes of the PMC and MEB lines. The position shown in the Figure is that the distortion is lower with the subsidy, reflecting the fact that the PMC line is steeper than the MEB line. But this need not generally be true.

However, this analysis makes several implicit assumptions. Notably, as pointed out by Kaplow and Shavell (2002), the analysis assumes a linear subsidy schedule: that is, the marginal rate of subsidy is fixed.[20] Suppose instead that a non-linear schedule were possible. We can expect the bank to take into account its private costs, but not the net social benefits, of a higher capital ratio. Then the optimal position could be achieved if the policy maker could set a marginal subsidy schedule (again possibly combined with a lump sum tax) equal to the MEB schedule. In effect, this would simply mean that the bank would fully incorporate the MEB schedule into its decision making.

In this case, the policy maker would not need to know anything about private costs or benefits, but only to estimate the MEB schedule, reflecting the net marginal costs to society. Of course, to the extent to which the MEB schedule is measured with error, then the marginal subsidy would also contain error, and the outcome would not be efficient. But this would be the case with any intervention.

[20] Weisbach (2010) also points out that this analysis assumes that policy makers are not able to change the rate of subsidy, or required level of k, in response to new information.

Note, though, that a lump-sum tax and marginal subsidy would not necessarily yield revenue equal to social costs. The subsidy would in principle be set to match the *marginal* social benefits and costs. The lump-sum element of the tax would then have to be determined so that the tax payment was equal to *average* social costs. To set the lump-sum tax correctly it would be necessary to know the schedules of both marginal costs and benefits.

Of course, both regulation and taxes face a problem in translating such macroeconomic analysis into a policy fit for individual banks. This is partly simply a scale problem. For example, if all banks faced the same non-linear schedule, it would be necessary to divide the aggregate marginal external benefit between banks to derive the appropriate schedule for each bank. A similar problem exists for regulation. A more difficult problem is heterogeneity between banks: a bank which creates more systemic risk at the margin should in principle be taxed at a higher rate. But it is very difficult to implement a tax in which each bank faces a different tax rate. Dealing with differences between banks is perhaps less difficult for regulation: although even with regulation typically the same regulations apply to all banks within a jurisdiction.[21]

Finally, this theoretical analysis leaves to one side the fact that there is already a system of quantity regulation in place, supported by over 100 countries who have adopted the Basel system. By contrast, proposals for addressing banking externalities through taxes have barely been examined. Taking it as given that some form of regulation will continue along the lines of Basel III, as discussed below, a relevant question is whether there is a role of taxation as a correction mechanism *as well as* regulation. We discuss this further below, in the context of specific proposals.

b. Taxes in the presence of regulation

As described above, there have been considerable recent developments in regulations for capital adequacy through the Basel III proposals. At the same time, some of the taxes proposed in response to the financial crisis have also been designed to target the amount of capital held by banks. In this section we consider the likely effects of a tax on financial liabilities, along the lines of the Financial Services Contribution proposed by the IMF, on the financing and lending activities of banks.

If taxation is to be used as an element of crisis prevention, then its precise design is important. To illustrate this, consider the Financial Securities Contribution, as proposed by the IMF, a form of which has been enacted in Sweden and the UK. The IMF proposes a levy based on "a broad balance sheet base on the liabilities side, excluding capital .. and possibly including off-balance sheet items, and with a credit for payments in respect of insured liabilities" (IMF, 2010, p 13).

[21] The Financial Securities Contribution (FSC) proposed by the IMF is a tax on liabilities. Imposed at a single rate on the value of liabilities, this would be a linear tax, and subject to the Weitzman analysis above. The IMF does consider the possibility that the rate could reflect the systemic risk of each bank, but does not appear to consider a non-linear schedule.

The IMF proposes this base after considering a levy based on risk-weighted assets. It rejects the former on the grounds that such a levy could duplicate the effects of Basel regulations also targeted at risk of the asset side. This illustrates the problem of attempting to use two instruments. If the tax and the regulation are perfectly in alignment, then it seems likely that the tax would have no effect on behaviour beyond what is required by regulation. But if they are not in perfect alignment, then the form of their interaction could be important.

To prepare for this discussion let us first study the interaction between a regulation based on the Tier 1 capital ratio and one which is in addition based on the capital asset ratio as in the Basel III system. Consider Figure 2. The vertical axis shows a bank's sum of risk-weighted assets relative to total assets, *R*, and the horizontal axis the capital ratio, i.e. the ratio of Tier 1 capital to total assets (the inverse leverage ratio), *k*. The upward sloping line marked Basel II reflects the trade-off permitted in the Basel II regulations between capital and risk-weighted assets. The inverse of the slope of this line is the Tier 1 ratio, i.e. the ratio of capital and risk-weighted assets. That is, a bank that increased the risk of its assets as measured in the Basel system would be required also to hold more capital. The line therefore represents a locus of points that are just acceptable to the regulator. We assume, based on experience and the theoretical explanations for the incentive to gamble under limited liability, that banks would prefer a combination of lower capital and more risk: that is, they would prefer to be located towards the top left part of the diagram. However, given regulation, the bank is forced to choose a desired position either on the Basel II locus, or to the right of the locus.

Let us assume that the bank chooses the point (R_1, k_1). In practice, banks may choose to hold a buffer of additional capital to ensure that they do not easily cross the threshold due to small movements in asset values; however, we neglect that possibility here.

The increase of the minimum Tier 1 ratio according to Basel III pivots the locus to the right in a clockwise fashion, keeping the origin fixed, because more Tier 1 capital is needed relative to total assets for any given share of risk-weighted assets in total assets. In the absence of further effects, let us suppose that given the new regulations, the bank moves to the point (R_2, k_2).

However, as noted above, the Basel III regulations also introduce a minimum constraint to the capital asset ratio. In the Figure, let us assume that this constraint is binding, at k_3 with $k_3 > k_2$. In effect, at the minimum capital asset ratio the maximum share of risk-weighted assets is R_3; above this level, the Tier 1 ratio, as given by the Basel III line, becomes binding. As shown in the figure, as long as the bank continues to prefer to hold less capital and engage in more risky lending, then the effect of the leverage ratio will be likely to shift the bank from (R_2, k_2) not to (R_2, k_3) but to (R_3, k_3). This is still on the locus of acceptable points under the Basel III line. But it does not represent a safer combination of capital and risk as measured by the Tier 1 ratio: rather, since it lies on the Basel III line, these two points represent an equally acceptable trade-off between risk-weighted assets and capital.

This may seem to imply that the minimum capital ratio does not serve any useful purpose. However, one rationale for the minimum capital asset ratio in Basel III is

that there are important deficiencies in the Basel system of risk measurement. As noted above, loans to companies normally have a weight of 0.5, loans to banks have a weight of 0.2, and loans to governments are not counted at all. Given the crisis over sovereign debt, this set of weights is clearly unreasonable.

The leverage constraint in terms of the minimum capital asset ratio, k_3 in Figure 2, has the effect of constraining the assets not included in the concept of risk-weighted assets. If the availability of equity capital is fixed, then a bank has to scale down its balance sheet to meet the higher required capital asset ratio. Doing so by reducing assets not included in the sum of risk-weighted assets, such as sovereign debt, would also raise the average risk of the remaining assets, and help the bank move towards (R_3, k_3). But it would reduce the overall risk, as the volume of assets such as government bonds, which are risky but not included in the sum of risk-weighted assets, is smaller at k_3 than at k_2. Thus, even though the minimum capital requirement does not change the measured risk relative to capital, it does reduce the non-measured risk relative to capital, which could mean lower externalities being imposed on the bank's creditors and on taxpayers.

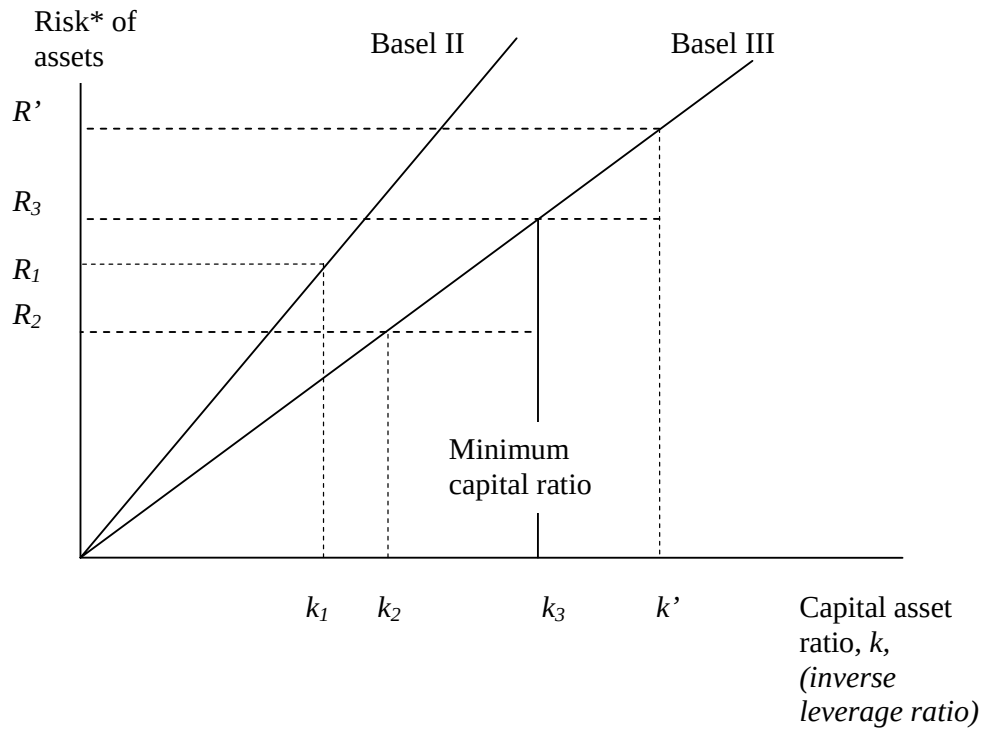
This is demonstrated more formally in the Appendix. There we first consider the case in which the bank holds only two types of assets – say loans to government, which have a risk-weight of zero, and loans to firms that have a positive risk weight. We measure the "default risk" of the bank as the probability that the value of its assets becomes lower than the value of its outstanding debt, in which case the bank would be technically bankrupt. This depends on the variance of the value of total assets, which in turn depends on the variance of the value of each asset and the covariance between them.

Suppose now that a minimum capital requirement is introduced, and that the bank aims to meet this requirement while maintaining its Tier 1 ratio. It could do this by reducing its overall assets by selling sovereign debt, and using the proceeds to reduce debt, holding equity capital constant. As long as sovereign debt had a lower variance than lending to firms, then the average measured risk of the assets would increase, or equivalently, risk-weighted assets would increase relative to total assets. This would be consistent with a move from (R_2, k_2) to (R_3, k_3). The Appendix demonstrates that the probability of bankruptcy would fall in this case, as long as there was a positive covariance between the returns of the two assets.

However, if we consider a more complex asset structure then this result may not hold. In particular, the Appendix also considers the case where there are three types of assets. The required move from (R_2, k_2) to (R_3, k_3) could again be achieved by selling assets and using the proceeds to reduce outstanding debt. But now there are additional options in choosing which asset to sell. As the Appendix demonstrates, the probability of bankruptcy may rise or fall, depending on how the bank chooses to restructure its asset holdings.

Consider now the role of the FSC suggested by the IMF, i.e. basically a tax on a bank's balance sheet, net of its capital and augmented by off-shore operations. Suppose we begin at point (R_3, k_3) and introduce the FSC. One possibility is that the new levy would have no effect: the bank would simply accept the additional cost, but that cost would not be sufficient to induce it to increase k.

Figure 2. The effects of the FSC, given regulation



* Share of risk-weighted assets in total assets

The other possibility is that the levy is sufficiently high that the bank chooses to hold more capital than is required by the Basel regulations. As shown in the Figure, this could move the bank to (R_3, k'). However, once again, if the bank prefers more risk in the sense of risk-weighted assets, then it can move back onto the Tier 1 Basel III locus by investing in riskier assets, to reach (R', k').

This change therefore has exactly the same effects as that induced by the introduction of the minimum capital ratio. The share of risk-weighted assets in the bank's balance sheet will increase at the expense of other assets, though there is no change in the measured risk relative to capital. It is likely that the probability of default will be reduced, but this is not guaranteed.

The effects of the minimum capital requirement and the FSC have to be considered alongside existing regulations. It is possible to consider each of these as a reasonable attempt to overcome the deficiencies of the Basel risk-weighting system. But of course a more direct way to deal with this is to address these deficiencies directly.

5. CONCLUSIONS

This paper analyses the case for introducing new taxes in the financial sector. It discusses two broad objectives from introducing such a tax. The first is straightforward: to raise revenue, but could have three elements. It could be backward-looking – to reimburse governments and society for the cost of the last financial crisis; it could address a longer term problem that the financial sector may be undertaxed; it could be forward-looking – to build a resolution fund ready for the next crisis. A second objective of a new tax in the financial sector could be to help make a future crisis less likely, by inducing banks and other financial companies to reduce leverage or to invest in less risky assets.

This paper analyses where these objectives lead in terms of introducing new taxes, or modifying existing taxes. It focuses in particular on two possible forms of taxation: the Financial Activities Tax (FAT) and the Financial Services Contribution (FSC). The main focus of a tax which aims to raise revenue would normally be to do so in as neutral way as possible, without distorting choices of economic agents. The FAT comes closest to this objective. But the aim of inducing a more stable financial system necessarily must focus on changing the behaviour of banks and other financial companies. The FSC is more attuned to this objective, but its effects are dependent on the form of financial regulation.

The Financial Activities Tax (FAT), as recently proposed by the IMF, has two possible forms. In principle, the paper favours a narrow base, including economic rents and remuneration of very highly paid employees (which are also akin to economic rents). This would in principle be non-distorting, except with respect to discrete investment decisions, but may require a relatively high rate depending on the revenue requirements. This tax could be introduced alongside a conventional corporation tax on profits net of interest payments. If so, it would not correct the existing distortion in favour of debt finance, but it would also not worsen it.

At the other extreme, another version of the FAT would include all remuneration in the tax base. This would be similar to a tax on value added, and could be seen as a substitute for the lack of VAT in the financial sector. It too could be introduced alongside existing taxes. In this case there are a number of technical details about how the tax could be implemented that remain to be resolved. In the absence of their resolution, the tax could prove to have significant distorting effects.

One option for the second objective is the FSC, again proposed by the IMF. Basically this is a tax on the bank's balance sheet that exempts the equity capital and insured assets but includes off-balance sheet operations. Several countries have either introduced, or announced that they plan to introduce, a tax. While this tax is partly designed to raise revenue, it is also clearly intended to reduce leverage.

In principle, such a tax could be a meaningful addition to a Tier 1 capital regulation. It could induce a higher ratio of capital relative to all assets including government bonds, which are currently not included in the sum of risk-weighted assets in the Basel system. However, the FSC, like a minimum capital requirement such as

included in Basel III, is independent of the risk of the bank's assets. It is likely that a bank would respond to a higher capital ratio – induced either by the FSC or by the minimum capital ratio – by increasing the risk of its assets, commensurate with Tier 1 capital regulation. The benefit of higher capital would therefore be undermined, at least to some extent, by greater asset risk. After reacting to the tax, the measured risk relative to the capital may be as large as before. Nevertheless, an advantage will remain to the extent that the non-measured risk, including the risk associated with government bonds, is reduced.

In sum, additional tax revenue would be useful for many governments at present, and also in establishing a crisis resolution fund. Options for taxation include taxes, such as the FAT, that are intended to raise revenue in a relatively non-distorting way. They also include taxes, such as the FSC, which are intended to supplement regulation. The main case in favour of the latter stems from an attempt to overcome the deficiencies of existing regulation: its value may therefore depend on whether it is instead possible to reform the regulation directly.

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APPENDIX. The effects of a minimum capital ratio

1. 2 Asset Case

Assets

Bank holds 2 assets: G of government bonds and F of loans to firms

Total assets in balance sheet = $T = G+F$

Weights for calculation of risk-weighted assets: $w_G = 0$ and w_F
Sum of risk-weighted assets $R = w_F F$

Risk

Variance of one unit of government bonds = σ_G^2
Variance of one unit of loans to firms = σ_F^2
Covariance of one unit of each = σ_{GF}

Variance of balance sheet = $G^2\sigma_G^2 + F^2\sigma_F^2 + 2GF\sigma_{GF}$

Liabilities

Equity = E
Debt = D
and $T=E+D$

Ratios

Capital ratio $k = \frac{E}{T}$

Tier 1 ratio $l = \frac{E}{R}$

Now consider a requirement to increase capital ratio to minimum level of k^*, leaving Tier 1 ratio, l, unchanged

Assume that E does not change, but T falls

Holding E and l constant implies no change in $R = w_F F$

Hence bank must sell government bonds and use proceeds to repay debt, with $\Delta G = \Delta D$, to reach new lower levels, G^* and D^*

We have

Capital ratio $k^* = \frac{E}{G^* + F} > k$

Variance of balance sheet = $G^{*2}\sigma_G^2 + F^2\sigma_F^2 + 2G^*F\sigma_{GF}$

For positive covariance between government bonds and loans to firms, variance must fall. Equity stays same. So probability of default falls.

2. 3 Asset Case

Assets

Bank holds 3 assets: *G* of government bonds, *F* of loans to firms, and *B* loans to other banks

Total assets in balance sheet = $T = G+F+B$

Weights for calculation of risk-weighted assets: $w_G = 0$, w_F and w_B
Sum of risk-weighted assets $R = w_F F + w_B B$

Risk

Variance of one unit of loans to banks = σ_B^2
New covariances defined as σ_{GB} and σ_{FB}

Variance of balance sheet =
$G^2\sigma_G^2 + F^2\sigma_F^2 + B^2\sigma_B^2 + 2GF\sigma_{GF} + 2GB\sigma_{GB} + 2FB\sigma_{FB}$

Liabilities and ratios the same as defined as in 2 asset case

Now consider again a requirement to increase capital ratio to minimum level of k^*, leaving Tier 1 ratio, l, unchanged

Assume again that *E* does not change, but *T* falls

Holding *E* and *l* constant implies no change in $R = w_F F + w_B B$

The bank now has more options to reach k^*, while leaving *l* unchanged.

One option: reduce *B* and raise *F*; no change in *G*

R must be unchanged: so $w_F\,dF + w_B\,dB = 0$

Given weights of $w_F = 0.5,\ w_B = 0.2,\ dB = -\frac{5}{2}dF$

Change in total assets: $\Delta T = dB + dF = -\frac{5}{2}dF + dF = -\frac{3}{2}dF < 0$: so *k* rises, as required

Change in variance of balance sheet:

$$= \left\{2F\sigma_F^2 + 2G\sigma_{GF} + 2B\sigma_{FB}\right\}dF + \left\{2B\sigma_B^2 + 2G\sigma_{GB} + 2F\sigma_{FB}\right\}dB$$
$$= \left\{2\left[F\sigma_F^2 + G\sigma_{GF} + B\sigma_{FB}\right] - 5\left[B\sigma_B^2 + G\sigma_{GB} + F\sigma_{FB}\right]\right\}dF$$

So variance could rise or fall. Since *E* is unchanged, the probability of default could rise or fall.