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Estimating the Costs of Financial Regulation

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EXECUTIVE SUMMARY

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I. INTRODUCTION

Reforming the regulation of financial institutions and markets is critically important and should provide large benefits to society. The recent financial crisis, from which the world is still recovering, underlined the huge economic cost that comes with recessions associated with severe financial crises. For this reason, policymakers around the world, including the leaders of the Group of 20, placed a high priority over the last few years on reforming the financial system.

However, adding safety margins in the financial system comes at a price. There are some areas of financial reform, such as some of the measures to increase transparency, where the system's running costs may actually decrease as measures to increase safety also improve efficiency. Much more frequently, though, greater security has a cost during the non-crisis years when the wider safety margins have little short-term benefit. Most notably, the substantially stronger capital and liquidity requirements created under the new Basel III accord have economic costs during the good years that are analogous to insurance payments. In this case, the insurance is intended to substantially reduce the probability of future financial crises, their severity, and the damage resulting from them.

There is serious disagreement about how much the additional safety margins will cost. The Institute of International Finance (IIF, 2011) has projected that the proposed reforms will wipe away approximately 3 percent of the economic output of the advanced economies during 2011-2015. Official estimates, particularly those from the Bank for International Settlements (BIS) Macroeconomic Assessment Group (MAG), suggest a reduction in Gross Domestic Product (GDP) in those countries that rounds down to zero. Analysts who do not work for either the industry or the official sector tend to produce results in between these extremes, although generally significantly closer to the official estimates than to those of the IIF.

Finding an intellectually sound consensus on the costs of reform is critical. If the true price is too high, then reforms need to be restructured as necessary to improve the cost-benefit ratio. On the other hand, if the reforms are economically sound, then they should be pushed forward to increase safety and reduce the uncertainty about future rules that creates inefficiencies and makes long-term planning difficult.

This study aims at assessing the overall impact of the financial regulatory initiatives on financial institutions in the United States, Europe, and Japan. It examines the existing analyses on the impact of the regulatory initiatives by the financial industry (financial analysts, industry associations, and consulting companies) and the official sector and supplements them with Basel III disclosures by financial institutions to estimate the overall impact of the regulatory reforms and reach some overall conclusions. To minimize the uncertainty around the cost estimates, the results are benchmarked against the ones by the financial industry or the official sector.

[To be filled in, summary of the key findings]

The study focuses on the long-term equilibriums, rather than transitional costs, and does not attempt to measure the economic benefits of these reforms. Good policymaking requires true cost-benefit analyses and it would certainly be a mistake to ignore transitional costs. However, resource constraints require a narrower focus on the central question of long-term costs.

Separate estimates are provided for the United States, Europe, and Japan. The economic and financial systems of these regions differ significantly, substantially altering the economic impact of the reforms. For example, the banking system in the United States is considerably smaller in relation to the size of its economy than is true in the other two regions. In addition, the specific reforms vary somewhat between regions and countries, even though there is a great deal of commonality in the overall direction of the changes and sometimes in the details. Despite divergences that are worthy of analysis, Europe is not broken down in order to analyze the United Kingdom and Switzerland differently.

Some analysis is also provided of the differential effects on different classes of borrowers and lenders and on different types of loans. The effects of reform on financial institutions vary widely depending on the type of institution, with banks generally being most heavily affected. Similarly, different types of borrowers and loans are impacted differently. For example, mortgages are less directly affected by changes to capital requirements than other loans due to a lower than average risk weighting. One of the concerns expressed by some analysts is that small and medium-size enterprises (SMEs) may be harmed disproportionately by the aggregate regulatory changes.

The study goes into substantially more detail on the effects of regulatory changes on banking than on the rest of the financial system. This is partly because the actual changes are heavily focused on banks, as the cornerstone of the financial system, and partly because it is much harder to estimate the effects on, for example, capital markets with any degree of precision. The choice was also made to focus on regulatory changes that were specifically spurred by the financial crisis. This means excluding, for instance, Solvency II, the new European rules on capital and certain other safety margins for insurers, since it was in the works well before the financial crisis struck.

Measuring the cost of financial reform requires careful consideration of the baseline for comparisons. At first glance this might seem simple, since one can compare the new regulatory requirements with the old. However, this misses the crucial point that regulatory requirements are not necessarily the binding constraint. In particular, financial institutions often carry significantly stronger safety margins than the minimums required by the rules, as a result of their own desire to operate safely and because of pressure from the markets and rating agencies. Nor can it be assumed that the additional buffers on top of the regulatory requirements will remain the same as in precrisis times. The crisis sharply altered perceptions of risk by managers, bank customers, counterparties, and investors. As a result, the appropriate buffers above regulatory minima have surely changed.

There are many areas of research to expand on the topics covered here. In addition to refining key findings presented here, other topics include analysis of transitional effects; potential impact of regulatory arbitrage; changes in the role of less-regulated credit providers; the effects of insurance regulations; the impact on other regions of the world; a further breakdown of the effects on different types of borrowers, lenders, and types of transaction; and the inclusion of more categories of reform than those studied in detail here.

The review of the existing empirical and theoretical literature provides relevant cost estimates and benchmarks for the major categories of financial reform. The review includes methodologies and specific estimates provided by financial analysts and private sector consultants, in addition to reviews of more traditional academic research and economic analyses. The literature review is then combined with the authors' previous analyses and experience to assess qualitatively the relative importance of the cost impacts of the different categories of financial reform, such as changes to capital requirements.

Five categories of reform are selected for detailed quantitative analysis, based on the qualitative assessment. They are the most important and amenable to quantitative estimates. For each of the five categories, a range of cost estimates are either presented based on external analyses or supplemented by author's calculations. The cost estimates are then translated into a common framework of changes in the average cost of credit for borrowers resulting from the reforms, since this is of most concern to the rest of the economy.

Finally, an overall, integrated cost estimate for the five categories taken together is considered. This involves examining the interactions between these categories and including the effects of mitigating actions likely to be taken by the financial institutions as a result of the reforms in totality. For example, the room for expense cuts to counteract the need for price increases, to the extent that such cuts were not already included in stand-alone impact estimates.

II. LITERATURE REVIEW

There are many academic analyses of the effects of capital requirements on lending behavior. The most theoretical models are useful for drawing some broader lessons about the optimum design of capital regulation but make many simplifying assumptions to be helpful here. The empirical studies of the effects of historical changes in capital requirements, however, might not fully control for other factors occurring at the same time for these to be more than broadly indicative of what to expect. There are many fewer academic analyses of the likely impact of liquidity requirements and virtually no studies on the cost effects of the other major regulatory changes, with the exception of changes in taxation or fees.

There is a strong incentive for equity, credit analysts, and international management consulting firms with expertise in the financial sector to evaluate the likely cost impact of reforms. These can substantially change the appropriate prices of the stocks and bonds of firms in the sector. As a result, there are a host of analyses, of varying qualities, addressing

questions directly relevant to this study.¹ They are helpful, in part because they incorporate guidance from the financial institutions as to how they plan to adjust to various reforms. In addition, major international management consulting firms have also provided detailed analyses of what they think financial institution managements need to do in order to respond to the regulatory reforms. They are also useful in pointing out the likely responses by managements and the considerable range of reactions beyond simply increasing prices to customers.

A number of official bodies have published cost-benefit analyses of some of the important regulatory changes, particularly the capital and liquidity reforms proposed in Basel III. These analyses have reported low effects of the capital and liquidity reforms on the economy, with the benefits from higher financial stability outweighing the cost incurred in terms output loss.

Findings of Comprehensive Studies

The only study that provides a detailed estimate of the overall cost impact of comprehensive financial reforms is IIF (2011). However, the IIF study shows a far larger cost to financial reform measures than is plausible. For instance, their model predicts that the price of credit in the United States will average almost five percentage points higher on average over the period 2011-2015 as a result solely of the regulatory changes. This includes all forms of loans, including mortgages and shorter-term credit. Overall, they estimated that the major economies would be about 3 percent smaller in 2015 than they would have been without the effects of comprehensive financial reforms.

This study differs substantially from IIF (2011). One major difference, which comes through in multiple ways, is the focus on the long-term effects while the IIF looks primarily at the transition effects in the short- to medium-term. Beyond that, there are a number of other different technical choices. There are four areas in particular where divergent views appear to have the greatest impact:

- **First, the IIF baseline appears to correspond more with the levels of safety margins held pre-crisis than it does with the levels banks would choose to hold in light of the lessons learned from the financial crisis.** This can make a large difference since the levels of capital and liquidity were clearly far too low pre-crisis, which would have been corrected to a very considerable extent by market forces with or without new regulation. This means that the IIF study ascribes a considerable amount of the cost of shifting to a saner financial system to regulatory change rather than to necessary market adjustments.

¹ One has to be aware of potential biases in reports about the financial system written by employees of major financial institutions, but this is offset, and perhaps more than offset, by the pressures for financial analysts to be positive about the prospects of the industry they follow. If cost estimates by analysts are too negative, it makes it difficult for them to recommend buying shares in these firms, which puts them at odds with the managements they follow, and who they rely on for information. Many investment funds in this sector are specialists and would also not welcome excessively negative views that would hurt the stocks that they own.

- **Second, the IIF assumes that the long-term expected return demanded by investors in bank securities is heavily influenced by the volume of securities being issued, at least in its main scenario.** It takes some increase in expected returns to lure investors to absorb a large amount of issuance, but the assumed magnitude of that effect seems too large. This matters as it appears to be an important driver of their results.
- **Third, there is greater scope for cost-cutting by banks than the IIF assumes.** This is of somewhat lesser importance numerically, but is still enough of a difference to matter.
- **Finally, the IIF modeling appears to produce too strong an impact on GDP and jobs.** That concern is bolstered by the independent analysis described next.

Slovik and Cournède (2011) at the Organization for Economic Cooperation and Development (OECD) took the interim version of the IIF report and expanded on it. They started with the IIF assumptions about underlying responses by the financial industry and then applied their own macroeconomic model to assess the effect on the overall economy. Their conclusion was that the major economies would be about 0.75 percent smaller after five years, rather than 3 percent smaller.

Finally, the BIS MAG estimated that the effect of the capital and liquidity changes proposed in Basel III, would slow growth by 0.04 percent. This study did not examine the other regulatory changes, but it is likely that the capital and liquidity changes taken together account for a significant majority of the costs. The BIS MAG study is effectively the average of the results of [fill in the number] separate studies by national central banks and regulatory bodies using a wide range of separate methodologies. As such it is hard to compare directly to our work here or to the IIF's study, except at the level of the overall results themselves.

Thus, as shown in Table 1, the few relatively comprehensive studies available differ wildly in their cost estimates. For this reason, it has been necessary to pull together the many studies that estimate the cost impacts of the different regulatory initiatives and to put them all together, supplemented by the analysis below.

Table 1. Basel III Impact on Credit and GDP Growth

Basel III impact	Impact on credit (bps)			Impact on GDP (annual) (%)			Credit (bps)	GDP (%)
	USA	EUR	JAP	USA	EUR	JAP	Global impact	
IIF 2012-2019	243	328	181	-0.10	-0.40	-0.30	280	-0.20
IIF 2011-2015	468	291	202	-0.60	-0.60	-0.80	362	-0.60
OECD 5 years transition	64	54	35	-0.12	-0.23	-0.09	51	-0.15
BIS 2019							52	-0.04

Note : For the BIS, it is assumed that the TCE to RWA ratio would increase by 4 percent.

III. QUALITATIVE ASSESSMENTS OF THE COST IMPACT OF REGULATORY CHANGES

Ranking the categories of financial reforms by their likely impacts allows one to select a subset on which to focus. Reforms are in process across a very wide range of financial activities, in response to the many flaws and risks that were exposed by the severe financial crisis. Table 2 lists the major categories and sub-categories of legislation and regulation of the financial sector undertaken in response to the crisis.

It is necessary to focus the quantitative analysis on the key areas of reform. The breadth of the changes, across multiple geographies, can render it impossible to cover all the reforms in a reasonable timeframe. In order to focus the quantitative analysis on the key areas, the reforms are grouped into larger categories and then assessed by their relative importance on a qualitative basis. This assessment is made separately for each geographical region and also broken down by the major classes of financial institutions and by the types of borrowers and credit categories.

Table 3 shows the qualitative assessment for the United States of the impact on the major categories of financial institutions. Table 3 condenses the qualitative assessment into a simple scale running from +10 to -10, where +10 represents a category of reform that is likely to create a major increase in costs for the relevant type of financial institution. Negative numbers indicate that those institutions would likely benefit from a decrease in costs, or from an increase in revenues that more than covers the additional costs. For example, changes to capital requirements, which are heavily concentrated on the highly regulated financial institutions, particularly banks, should drive significant business to insurers, other non-bank financial institutions, and to the capital markets. This would be offset only slightly by the effects of capital changes on these other types of financial institutions, leading to a substantial benefit for them.

Table 2. Major Regulatory Responses to the Financial Crisis

Higher capital requirements	Higher overall capital Higher quality capital SIFI buffer Capital conservation buffer Counter-cyclical capital requirements Penalty for combining banking and assurance Many changes to the specific requirements
Higher liquidity requirements	LCR NSFR Liquid asset definition Stress test Off-balance sheet commitments Money market fund regulation Local restrictions
Expansion of the regulatory perimeter	Applying bank-like rules to some non-banks HF- Alternative Fund Managers
Enhanced consumer protection regulation	Consumer loans in USA
Tightening of derivatives regulation	Standardized trades Central counterparties for clearing of standardized trades Higher capital and collateral requirements Increased transparency Post-trade disclosures
Accounting changes	Tightening of standards for what can be off the balance sheet Conforming IASB and GAAP Fair value measurement Hedge accounting
Changes to securitization regulation	Skin-in-the game requirements Change to initial and ongoing disclosure requirements Underwriting standards
Tougher regulation of credit rating agencies	EU oversight Increased legal risk for the agencies in the US Greater SEC oversight in the US Restricted use in regulation
Structural changes to banks and limitations on bank activities	Resolution and recovery plans Volcker rule in the US Limitation in the US on derivatives dealing by banks Vicker commission structural changes in UK banking
Changes in regulation of compensation and corporate governance	EU limitations on and regulation of compensation US rules for changes in incentive compensation
Higher taxes or fees facing financial institutions	UK bank tax
Changes in crisis resolution regimes	Dodd-Frank in the US International coordination in crisis prevention and coordination
Compensation	Guidelines on risk alignment and governance Deferrals and claw-backs Link to capital conservation Limits for state-assisted firms Shareholder say on pay

The categories of reform in Table 3 are listed in rough order of importance, based on our qualitative assessments. However, there is no formula to go from the figures in the table to the position in the listings. The ordering of the list is purely a convenience for the reader given the subjectivity involved in establishing it. In general, the ordering should be clear by a simple inspection. The rationales for the qualitative assessments in Table 3 are as following:

Table 3. Impact of Major Regulatory Initiatives on Financial Institutions in the U.S.

	Commercial Banking		Investment Banking	Universal Banking	Life Insurers	Non-bank Financials	Capital Markets
	Large	Small					
Higher capital requirements	10	10	10	10	-7	-8	-10
Higher liquidity requirements	7	4	10	8	-5	-8	-10
Tightening of derivatives regulation	8	3	10	8	-2	-3	-5
Accounting changes	3	3	3	3	1	6	3
Changes to securitization regulation	2	3	2	2	1	4	3
Enhanced consumer protection regulation	5	5	2	3	1	7	2
Expansion of the regulatory perimeter	-3	-3	-1	-2	0	7	2
Higher taxes or fees facing financial institutions	3	2	3	3	1	3	-1
Changes in crisis management and resolution regimes	4	0	3	3	-1	-1	-2
Tougher regulation of credit rating agencies	1	1	1	1	1	2	2
Structural changes to banks and activity limits	2	-1	3	2	0	-1	-2
Changes in regulation of compensation and governance	0	0	0	0	0	0	0

- *Higher capital requirements.* Capital is a key input, and an expensive one, for most banking activities, as confirmed by our later quantitative assessments. The required equity capital for banking activities will increase several-fold in the United States, compared to prior regulation, once Basel III is implemented. The result is to increase costs substantially for U.S. banks across the board. On the other hand, non-banks, with rare exceptions, are not facing appreciably higher capital requirements. This will improve their competitive position considerably for those activities in which they compete with banks. In particular, some credit activity will doubtless move to the capital markets, which are facing essentially no increases in capital requirements.
- *Higher liquidity requirements.* Basel III rules, as currently proposed, would also force U.S. banks to shift their asset-liability management to favor shortening asset maturities and lengthening liability maturities, both of which are expensive.² Like the capital changes, this heavily affects the core of banking activities and, therefore, has a high impact. This impact is likely to be somewhat less, however, for the commercial banking portion of the business, which can access a substantial amount of stable deposits, which are favored by the liquidity rules. Therefore, commercial banking,

² As discussed below, it is highly likely that there will be significant changes in the Basel III liquidity requirements before they are fully implemented.

- particularly at smaller banks, should be considerably less affected than investment banking. Universal banks would fall in between, given their split of business between commercial and investment banking. As with capital, non-bank financial institutions are largely unaffected by Basel III or similar changes and therefore should benefit from a movement of business in their direction.
- *Tightening of derivatives regulations.* The Dodd-Frank Act requires regulators to take a series of actions to push business away from customized derivatives towards exchange-traded derivatives and away from bilateral counterparty arrangements and into central clearinghouses. In general, it will be mandatory for standardized types of derivatives to be exchange-traded and centrally cleared, while customized derivatives will carry higher capital charges for banks and bank affiliates and collateral will often be required from counterparties where it was not needed before. Derivatives are a major category of financial activity in the United States, and many other banking activities rely on derivatives for hedging; therefore, changes of this magnitude will have major impacts on banks. For the most part, bank costs will increase and some of their higher-margin revenue sources will move to low-margin standardized forms. Some of this business will shift to the various non-bank financial institutions, with capital markets gaining the most, once again. Insurers and non-bank financials will suffer some of the same losses as the banks, to an extent sufficient to reduce their net benefit, but not to eliminate it completely.
 - *Accounting changes.* Changes in the Generally Accepted Accounting Principles (GAAP) used for U.S. accounting will almost invariably make U.S. financial institutions look less attractive and require more capital. The latter effect is because much of U.S. regulatory accounting automatically follows GAAP and other parts are heavily influenced by changes to GAAP. The most painful changes are probably those that make it considerably harder to move transactions off-balance sheet, inspired in part by the problems created by Structured Investment Vehicles (SIVs) that, in retrospect, should have been treated as on-balance sheet. The accounting changes should hit most financial institutions, with somewhat less effect on insurers and somewhat more on other non-bank financials, which generally relied much more on wholesale funding from vehicles like SIVs. Although this category of reform ranks relatively high on the list, it is not nearly as significant in its cost implications as changes to capital and liquidity requirements that affect the core of what financial institutions do or the major changes to derivatives markets.
 - *Changes to securitization regulations.* Securitization reforms are aimed at increasing transparency and trying to incentivize the firms that put together the securitizations to care about the quality of their securitizations. This meshes with reforms in other areas such as regulation of the rating agencies and increases in capital standards for securitizations under Basel III. It is difficult to be sure of the magnitude of the impacts, since much will depend on the details in this area. However, it already seems clear that a large portion of the market will be exempted in the United States from some requirements, on the basis of guarantees from Fannie Mae and Freddie Mac. In general, it appears that banks will be modestly affected and the presumption is that securitizations will be harder and more costly to do, which would increase their costs.

However, it is possible that restoration of faith in the securitization market could ultimately reduce costs for banks by allowing them to resume more active use of those markets. Non-bank financial institutions are shown as more affected, since some of them have made very heavy use of securitizations in the past.

- *Enhanced consumer protection regulations.* Commercial banks in the United States are likely to be considerably affected over time by the establishment of a new Consumer Financial Protection Bureau (CFPB). The presumption is that it will be an active agency that will generally be focused on consumer interests, even when that raises the costs for banks. Also, some actions that it takes would probably reduce revenue potential by making potentially profitable products unworkable for the banks. The industry clearly views the CFPB as a major threat to profitability of some lines of business and they may be right. However, it is a new agency and does not have a Senate-confirmed Director yet. Its exact direction will depend heavily on who that Director is, as well as whether there will be additional changes to its mandate or governance. Investment banks should be less affected since they sell fewer retail products, most of which would remain under the Securities and Exchange Commission (SEC) supervision anyway. Many non-bank financial institutions will find themselves with substantial federal regulation for the first time, which is why they have the largest impact.
- *Expansion of the regulatory perimeter.* There is always a question of which firms should be heavily regulated and which can be left outside that regulatory perimeter and subjected to a lesser degree of control. It has been agreed for many years that banks and insurers need to be within the perimeter. Investment banks were not but largely now are as a result of the crisis. The Dodd-Frank Act did not do much directly about bringing “shadow banking” within the perimeter, but the Financial Stability Oversight Council has considerable power in this area and the CFPB does as well in areas which touch on consumer protection. Any expansion of the perimeter will bring greater costs and limitations to those firms that find themselves newly inside it, which would provide a relative benefit to banks as a result of creating a more level playing field.
- *Higher taxes or fees facing financial institutions.* Deposit insurance fees in the United States have increased considerably in response to losses at the Federal Deposit Insurance Corporation as a result of the financial crisis. The formula for calculating fees has also been altered so that most of the increase comes at the expense of the larger banks. There are also various proposed fee increases at the SEC and other regulatory bodies, which should raise costs in the industry. Finally, the U.S. Administration has proposed a Financial Crisis Responsibility Fee that was originally pegged at about US\$10 billion a year and was subsequently reduced to about US\$3 billion a year after estimated taxpayer losses from the financial rescues fell sharply. However, there appears to be little chance that this will pass through Congress.
- *Changes in crisis management and resolution regimes.* The Dodd-Frank Act, complemented by international efforts coordinated through the Financial Stability Board (FSB) in Basel, is clearly intended to make it considerably easier to deal with

large, troubled financial institutions and to reduce the chance that government support would be provided to aid bondholders and counterparties. This should add administrative expenses and operational limitations for the large U.S. banks and may raise the interest rates they have to pay on their liabilities as a result of a lessened potential for government aid. These cost burdens would produce at least a modest competitive advantage for other credit providers.

- *Tougher regulation of credit rating agencies.* The Dodd-Frank Act encourages greater SEC oversight of the rating agencies, requires more transparency, and raises their legal liabilities. All of this is intended to ensure that they do a better job in the future of providing unbiased and accurate ratings. This is not likely to have a strong effect on the financial industry's costs or revenues, although it may very modestly raise the cost of ratings and the work required to procure them and may slightly reduce revenues by making rating agencies less flexible about meeting requests from the banks.
- *Structural changes to banks and activity limits.* Relatively little structural change is being required by Dodd-Frank, with the exception of the so-called Volcker Rule to eliminate proprietary trading and related activities and through some changes in where derivatives business can be housed within a banking group. These changes are not inconsequential, but they act on the periphery of the banking business. They will also produce some relative winners, probably modestly increasing the competitiveness of smaller banks that had never had the ability to subsidize some of their core activities with profits from proprietary trading. Capital markets should benefit as some business is forced out of the banking groups.
- *Changes in regulation of compensation and governance.* Compensation and governance changes required by legislation and regulation are relatively minor in the United States. Where they are likely to have the most effect, such as in forcing better management of compensation arrangements, they generally work in favor of the banks by encouraging an ongoing shift towards approaches that discourage unreasonable risk-taking and by helping hold down overall employee compensation. At the same time, the new regulations do not appear draconian and are unlikely to lead to an exodus of talent from the heavily regulated financial institutions towards hedge funds and other competitors.

Overall, the reforms fall into three broad groupings. Capital and liquidity requirements and changes to derivatives regulation should have a major impact on costs and profitability for banks and thereby to confer some significant competitive advantages on non-banks of various kinds. At the other end of the spectrum, a number of categories of reforms should have relatively little effect on costs, and, in the middle, there are some that will be significant, but do not rise to the level of effect of the first grouping. These conclusions are broadly true for all three regions studied, although the details certainly vary among the regions. This makes sense as capital and liquidity management and derivatives activities are central to modern banking.

It is critical, however, to understand that these qualitative assessments are rough, subjective, and intended for a limited purpose. They are only used to focus the remainder of the work and not in an attempt to rank their overall regulatory importance or their overall virtues. The exact rankings, especially in any one column, are of no significance to the remainder of the conclusions.

IV. QUANTITATIVE ANALYSIS OF STAND-ALONE REFORMS

Five categories of reform are selected for further analysis based on the qualitative assessments below. They are the capital and liquidity requirements, derivatives and securitization regulations, and taxes and fees. These five categories capture most of the total cost impact of regulatory reforms. In addition, the other three categories are difficult to quantify and their impacts will be sufficiently small in relation to the aggregate effects of the five chosen categories that the conclusions here will remain largely valid. The excluded categories are accounting changes, consumer protection regulation, and expansion of the regulatory perimeter. The latter is likely to work in the opposite direction of all the others, generally aiding banks and hurting non-banks, so its exclusion should partially offset the failure to include the other two areas.

The changes in capital requirements virtually all stem from Basel III. Most of the world's significant financial centers were represented in the deliberations of the Basel Committee on Banking Supervision (Basel Committee) on Basel III. As a result, the leaders of the G-20 have endorsed the changes and all significant financial centers have agreed to implement Basel III. The Basel III capital rules are very comprehensive, so that countries have generally seen little need to go beyond that framework, except that a few, such as Switzerland, have chosen to create still higher capital requirements using the same overall approach.

The creation of new liquidity requirements, or changes to the existing ones, also reflect strongly those in Basel III. It should be noted that few nations had formal liquidity requirements, although it was always part of the task of supervisors to make at least a subjective judgment about liquidity levels. As a result, the Basel III liquidity standards will generally determine liquidity requirements going forward. It should be noted that previous versions of the Basel accord did not contain liquidity requirements, so this is a very new area for the committee.

There is no global agreement on changes to derivatives regulation, but the United States and Europe are broadly on the same track in their proposed reforms. Asian countries expected to follow once the dominant derivatives centers settle on their regulations. On both sides of the Atlantic, the intent is to push derivatives away from customized trades and into standardized formats wherever possible and to have those transactions executed on exchanges and cleared through central clearinghouses. For those transactions where customization remains sensible, counterparty risks are to be reduced by requiring higher capital from financial institutions and by raising or instituting collateral requirements.

Similarly, there is no global agreement on securitization regulation, but the United States and Europe are in broad agreement. It is unclear at this point what Asian regulators might do, but the securitization markets in most of Asia are relatively small in comparison. Securitization reforms are intended to ensure that new securitizations are more transparent and that those entities that put together the securitizations have “skin in the game” so that they are not indifferent to the ultimate success or failure of the securitization. The level of that skin in the game appears likely to be 5 percent on both sides of the Atlantic, although much of the market in the United States will be exempted because of guarantees by Fannie Mae and Freddie Mac or because the underlying mortgages meet certain stricter standards. Reforms in other areas are also intended to make securitizations safer, such as through regulation of the rating agencies and increases in capital standards for securitizations under Basel III.

Changes in taxation and fees for financial entities may vary greatly across the world. There is considerable disagreement across the globe, particularly in the vexed area of potential taxes on financial transactions. The latter is being considered quite seriously in Europe, but has been rejected by the United States and a number of other countries. Changes in taxes and fees to date have been quite specific to individual countries, such as the increases in deposit insurance fees promulgated in the United States.

A. Choice of Baseline Scenario

A key consideration in any quantitative study of the effect of regulatory changes is the baseline against which to compare. This would be relatively simple if financial institutions always ran exactly at the minimum levels required by regulation or even if they always maintained the same buffer above those minimums, regardless of economic and financial market conditions. Unfortunately, this is clearly not true.

Financial institutions decide their target capital and liquidity levels based on a number of factors, not just regulatory requirements. Managements will choose their levels of safety margins so as to meet the maximum of: (i) the regulatory requirements plus whatever chosen buffer the institution prefers to hold to lower the risk of regulatory intervention if things go wrong; (ii) the economic capital that their own risk models tell them they need in order to minimize risks of bankruptcy or other bad outcomes; (iii) the level the rating agencies demand for the institution to maintain its targeted credit rating; and (iv) the level that counterparties and financial markets demand.

The financial crisis substantially increased the safety margins demanded under all four methods, not just the requirements of regulators. Banks’ own economic risk models have been adjusted to reflect substantially higher risk perceptions, in addition to automatic increases as the data from the financial crisis became part of the historical database. Rating agencies clearly became more conservative, even aside from their perceptions about how regulators might change requirements. Finally, counterparties, financial markets, and customers have shed the considerable complacency that they exhibited prior to the financial crisis.

The fair test, therefore, would be to compare expected post-reform levels of safety margins with what those levels would be in the absence of regulatory changes, but taking account of changes in the behavior of other parties as a result of the financial crisis. Unfortunately, the latter levels cannot be observed and some subjective judgment is necessary to determine the appropriate baseline. However, it is imperative to reflect changes in safety margins demanded by non-regulatory constituencies, including banks' internal risk managers, even though it requires judgment to estimate the figures. Otherwise, the calculations would unfairly penalize regulatory changes for costs that would have been incurred anyway as a result of the demands of other constituencies.

Our baseline assumptions are shown in the individual sub-sections dealing with the different regulatory changes. In general, we use the actual end-2010 figures on capital and liquidity in the United States, Japan, and Europe as a reasonable approximation of what market forces would have demanded there even without regulatory changes. This has the potential of understating the effects of regulation, since some in the industry argue that a substantial portion of the reaction to Basel III was already included in the capital and liquidity levels by then. The end-2010 figures for the European banks also probably overstates the regulatory impact since markets are clearly demanding more capital and liquidity than those banks had at end-2010, in aggregate anyway. For Japan, the end-2010 figures seem reasonable and consistent with the other continents.

B. Translating Cost Changes to Credit Impacts

Higher costs for banks and other credit providers clearly will affect credit pricing and availability, but not through a direct 100-percent pass-through. Like other businesses, credit providers will respond in a variety of ways, with the exact mix of actions dependent on specifics of the cost increases and of the competitive situation of the credit providers. There are eight broad categories of bank responses to cost increases in this paper:

- *Absorbing the costs by lowering returns to shareholders.* In the long run, credit providers can only absorb any additional costs if the expected returns to shareholders remain at or above the target returns required by them, otherwise the sector will shrink over time as capital is withdrawn. In a reasonably efficient market, this is only likely to be the case if the increase in cost is associated with some other factor that makes investors willing to accept a lower return over time. A number of the regulatory reforms should have exactly this effect. For example, higher capital requirements should reduce the probability of failure and also damp down the volatility of profits. This increased safety should induce investors to lower their return requirements.
- *Reducing funding costs.* All else equal, banks could respond by paying less for their deposits and borrowed funds. Fund providers that do not benefit from guarantees ought to reduce their required interest rates at least marginally to reflect the greater safety provided by higher bank capital, better liquidity, and the benefits of other

reforms. There may also be room for banks to decrease the rates paid on retail deposits, even when they are guaranteed. Money market funds and other available products are not perfect substitutes for retail deposits, which means that cost pressures on the banking industry could result in some rate decreases.³ In practice, the new minimum liquidity requirements are likely to raise average funding costs by more than these factors reduce them, but the net increase should still be smaller than in the absence of the safety benefits and the ability of banks to squeeze deposit rates.

- *Reducing expenses.* Industries that come under external pressure almost invariably reduce their costs as one response to the threat. A substantial portion of the cost of credit provision comes from administrative and marketing expenses, where there is considerable room to cut expenses if necessary. In addition to reductions in expense ratios at individual banks, there are likely to be market share gains by the more efficient banks, lowering the average expense ratio for the industry as a whole.
- *Decreasing the expected credit losses.* Credit providers can alter the terms and conditions under which they lend, in order to reduce the probability of a credit loss and the size of any resulting loss. This can occur without necessarily cutting back on marginal loans per se. For example, loans to businesses often contain covenants by the borrower which must be met in order to keep the loan in place, such as maintaining a certain minimum level of net worth or annual income. Technically the lender could call the loan if such covenants are breached, perhaps reducing their loss by exiting before more damage occurs. More commonly, the negotiating leverage provided by this right is used to renegotiate the loan to improve pricing for the lender or to force the borrower to agree to actions to remedy the problems they face. Including tougher covenants up-front is one way to reduce the expected losses on such a loan.
- *Limiting the regulatory impacts through technical means.* In some cases, there is scope for a credit provider to reduce the effect of a regulatory change by taking specific actions designed to meet the particular challenge. For example, improving data collection and modeling efforts may allow a firm to justify a lower risk weighting under the internal modeling approach. Less technically, it may be possible to meet a client's credit needs through a somewhat different transaction, such as by decreasing the maturity of a loan modestly to make it a short-term asset or by making a commitment to lend rather than disbursing funds up-front. For that matter, there may be new circumstances where securitizations or outright loan sales may make sense. This broad category would also be where much of the activity would occur that policymakers may consider "gaming" the system. Credit providers will be looking for the optimal structure through which to offer a given product under the rules that are

³ See Elliott (2009 and 2010a) for a discussion of the competitive situation of the retail deposit market in the United States. It is notable that movements in retail deposit rates are not as highly correlated with money market fund rates as one might expect, indicating that they are somewhat distinct markets.

then applicable. Sometimes this will have consequences different from those desired by policymakers.

- *Rationing credit.* Credit providers could also choose to make fewer loans by rejecting those loan applications that fail to meet newly heightened credit standards. This could be done at the individual loan level or by making a decision to withdraw from lines of business that do not meet minimum profitability criteria.
- *Raising prices for credit.* Finally, of course, credit providers can simply charge more for their loans. This option will be limited by competitive market conditions within the banking industry and in regard to other types of credit providers.
- *Restructuring their businesses.* Many credit providers are in the process of rethinking what business lines they wish to be in and how they manage those businesses. In the end, a combination of the above actions may be necessary in order to construct a portfolio of business lines that fit together to optimize the overall profitability of the organization. Such restructuring will also include strategic decisions to sell or buy businesses or to merge with other financial firms or to sell the entire organization.

The likely reactions of credit providers to the regulatory changes are discussed below under each of the categories of reform and also under the final section on quantification, which looks at some overall responses to the combined effects of regulation.

C. Capital Requirements

Minimum capital requirements for banking groups are sharply increased under Basel III. One of the lessons drawn by virtually all observers of the recent financial crisis is that banks need to hold significantly higher levels of capital. Therefore, the Basel Committee members, with the ultimate endorsement of the G-20 leaders, doubled the minimum target ratio for Tier 1 capital, raising it from 4 percent of risk-weighted assets to 8 percent, which includes a 2.5 percentage point “conservation buffer.” Banks with capital below the basic 5.5-percent Tier 1 ratio can be taken over by regulators. Banks above this level but below the 8 percent target will have serious operating limitations, including limits on compensation and on payments to shareholders.

The minimum quality of capital is also raised by Basel III. Another lesson of the crisis was that some financial instruments, and some types of assets, were not actually available to protect banks. For example, subordinated debt had been viewed as an effective form of capital, albeit one that provided weaker protection than common equity. The theory was that subordinated debt holders could be hit with losses without doing harm to constituencies that were of concern to regulators, such as depositors, senior debtholders, etc. In practice, very few regulators felt that they could allow such losses in the widespread and severe. The signaling effects about the health of the troubled bank, and the potential to trigger a drying up of funding for other banks that might become troubled, were viewed as too severe to be worth the benefits of having subordinated debtholders shoulder some losses. Similarly, some

types of assets, such as tax loss carry-forwards or minority stakes in non-bank financial institutions, were difficult to monetize, in part due to the severity of the crisis. As a result, Basel III drops subordinated debt from the definition of capital and limits the ability of certain assets to be counted when calculating core common equity.

Basel III capital requirements remain based primarily on risk-weighted assets (RWA).

The key tests look at the ratio of capital to an adjusted size of total assets that reflects the presumed risk levels of the various assets. Many government obligations are treated as riskless by being given a zero-percent risk-weighting and therefore do not require any capital. Standard loans have a 100-percent risk-weighting, so that a bank with only such loans as assets would have risk-weighted assets equal to its total assets. Most mortgages are weighted at 50%. There are specific weights for many other asset categories as well.

Many risk weights are increased quite substantially under Basel III compared to Basel II, especially for trading account assets. The crisis also demonstrated that risk-weightings were often considerably too low compared to the actual risk of the assets. Some risk weights are directly increased under Basel III, while others rise because of changes to the formulas for how to calculate risk weights, especially for trading assets. The modifications for trading assets are generally in place already as part of a package of intermediate changes, known as Basel 2.5, which were agreed upon while the Basel III Accord was still in development.

Systemically Important Financial Institutions (SIFIs) will have an incremental capital requirement. On top of the otherwise required minimum, the largest and most important banking groups will have required minimum capital to RWA ratios of 0.5 to 2.5 percentage points above those applied to other banks. This can even rise to a full three percentage points if a SIFI is perceived to be growing its risks excessively despite already being subject to the 2.5 percentage point incremental requirement.

A new leverage ratio is unlikely to be the binding constrain on capital, but provides a safety net to ensure RWA calculations do not produce excessively large balance sheets. Basel III, for the first time, will introduce a straight leverage ratio as an additional minimum requirement. This leverage ratio is essentially just the level of capital divided by the total asset size, although there are adjustments to reflect off-balance sheet items and certain commitments. Most observers believe that this ratio will seldom be the binding one, since it is set low enough that the tests using RWA's should normally produce higher capital requirements. However, it would help to guard against a situation where banks held overly large quantities of seemingly low-risk assets which then proved to carry higher risk than was understood. A topical example of this might be the large holdings of sovereign debt of Eurozone countries, which had a risk-weighting of zero when acquired. The leverage ratio will undergo an observation period of [2 years?] during which it is not mandatory to remain above the minimum ratio, before it becomes a hard requirement in [2015?].

In theory, under idealized conditions, adding equity capital does not increase bank costs. Modigliani and Miller proved that, under specific conditions, including perfect markets and

no distortions induced by government policy, the proportion of a firm's funding coming from equity was immaterial to its weighted average cost of funds.⁴ This is because investors in equity and debt do not charge as much for supplying funds to a safe company as they do to a less safe one. Modigliani and Miller showed that increasing a firm's safety by switching from debt towards equity results in a reduction of the cost of each unit of equity and each unit of debt that exactly counteracts the cost increase from having more units of equity, which will always be more expensive than debt because of its inferior position in liquidations.

In practice, though, higher equity levels *do* increase a bank's costs. There are two significant distortions created by public policy that interfere with the offsetting mechanism described by Modigliani and Miller. First, virtually all jurisdictions provide a tax advantage to debt issuance by allowing corporate deductions for interest payments, but not for dividends.⁵ Therefore, the after-tax weighted cost of funding does go up as the portion of equity capital rises. In the first instance, this is purely a private cost, not a societal one, since it represents an increase in taxes paid to the government. From the point of view of the bank, however, it does create a cost increase which should prompt it to take offsetting actions of some kind, whether charging more for services, cutting expenses, or whatever. This creates effects on the larger economy.

A second policy distortion is that there are a host of explicit and implicit guarantees of bank liabilities. For instance, when deposits are guaranteed by the government, then deposit rates will be very insensitive to the relative safety of the bank. An increase in equity will not create a significant offsetting decrease in the rate demanded by depositors.⁶ This insensitivity of deposit rates could be offset by risk-based pricing of deposit insurance premiums, however those systems that do incorporate this mechanism tend to do so very crudely and seldom fully reflect the change in risk. Beyond deposits, debt investors appear to believe, with some reason, that certain banks are "too big to fail" and may therefore receive government aid in a crisis that eliminates or reduces the potential for debtholder losses. Such implicit guarantees have a similar effect of lowering the benefits of increased safety that come from higher equity levels.

There may also be agency costs and market imperfections that increase equity costs. Some researchers believe that the cost of raising equity is significantly higher than pure theory would dictate. For example, there can be negative signaling effects when a firm chooses to issue equity since it may indicate that management believes the market price is higher than warranted by the firm's prospects. This would be less of an issue if many banks are raising equity and are doing so as a result of regulatory changes, but it is not entirely

⁴ [Put in the proper citation]

⁵ Belgium is an exception. It provides banks with a tax break on equities in order to offset the tax advantage they forego by not issuing debt.

⁶ There may be a small decrease in required deposit pricing, as depositors may still mildly prefer to be with a safer bank, for a variety of reasons, including being part of a wider relationship with the bank that may be sensitive to its creditworthiness.

eliminated, since banks have other ways to respond, such as by cutting back on their size. A bank with over-priced equity would presumably be more likely to choose equity issuance rather than shrinkage.

Different analysts make different assumptions about how much the increase in safety reduces the costs of switching to equity from debt. The more careful analysts generally assume there is some offset, with the most common assumption being that the return on equity and debt demanded by investors adjusts to be about halfway between the complete offset assumed by Modigliani and Miller and a complete absence of any offset, which would mean no change in demanded returns. One of this report's authors earlier estimated a 50% offset based on a rough-and-ready numerical analysis of tax effects and the likely reactions of investors.⁷ Miles (2010) came to a similar conclusion based on a more extensive analysis.

The degree of offset matters significantly to estimates of the effects of capital increases on credit costs and economic growth. As discussed below, a significant difference between the IIF's findings and those of others is that they assume a smaller offset. And, of course, a complete offset would render the question of the pass-through of higher equity costs essentially moot, since total costs would remain constant. However, it is a very small minority of analysts, if any, who believe there would be a complete offset.

There are multiple ways banks can meet Basel III's much tougher capital standards. Equity could be raised through retaining earnings or by new issuance, assets could be shrunk to reduce the denominator of the capital ratios, or assets with higher risk-weightings could be replaced with assets with lower risk-weightings. Credit pricing is likely to rise and availability to fall, as banks need more incentives to hold assets on their balance sheets due to the rise in their total funding costs. The real question is the magnitude of the impacts. The main debates in this regard are about how much it would cost to raise large sums of capital, and therefore the effects on the cost of providing credit, and about how any increased costs would be divided between expense cuts, reductions in credit availability, and increases in credit pricing.

Table 4 shows how changes in the qualification standards for capital and in the risk weights cause Basel III capital ratios to be several points lower than if calculated under existing rules. The figures summarize disclosures by 22 U.S. banks, 38 European banks, and 7 Japanese banks of their pro forma Basel III capital ratios supplemented with estimates from Credit Suisse (2011) that presumably reflect in considerable part the guidance being provided by bank managements when bank disclosures were not available.⁸ The table shows how the increase in market and counterparty RWAs from capital calculations combines with the creation of some deductions against capital, such as limitations on deferred tax assets, to

⁷ See Elliott (2009).

⁸ In practice, sell-side equity and debt analysts will rarely go too far out on a limb in making their own calculations of something this complex and managements are equally eager to keep invalid calculations from gaining currency. Thus, there tends over time to be considerable guidance provided by managements to the analytical community on technical calculations such as these.

reduce the capital ratios, especially in European banks where the effect is larger than in U.S. banks. It continues by illustrating the impact of the increases in risk weightings under the Basel Accords. The effect of the increase in RWAs is larger in U.S. banks than in European banks. Finally, the table also shows the resulting effects of actions projected to mitigate changes in capital definitions and increases in risk weightings. European banks appear to rely more on mitigation plans to comply with the Basel III minimum required ratios than U.S. banks; however, this seems to be the result of fewer planned mitigating actions by U.S. banks than by European banks.

Table 4. Basel III Pro Forma Core Tier 1 Capital Ratios, 2010
(In percent)

	US	Europe	Japan
Core Tier 1 capital ratio	9.7	9.7	9.2
RWA increase	-2.4	-1.6	-1.1
Core Tier 1 capital ratio after RWA increase	7.3	8.1	8.1
Mitigation	0.3	0.9	0.0
Core Tier 1 capital ratio after RWA increase and mitigation	7.6	9.0	8.1
Deductions	-0.6	-1.1	-1.5
Core Tier 1 capital ratio after RWA increase, mitigation, and capital deductions	7.0	8.0	6.6
Core Tier 1 capital ratio after RWA increase and capital deductions (without mitigation)	6.7	7.2	6.6
TCH (2011a), CS (2011), and Citi (2011) fully loaded Basel III core Tier 1 capital ratio	...	7.0	6.2
		US\$ billion	
Capital needed without mitigation for a 7% capital ratio	59	86	14
Capital needed with mitigation for a 7% capital ratio	37	44	14
Capital needed with mitigation and retained earnings for a 7% capital ratio	8	6	6
Capital needed without mitigation for a 9% capital ratio	219	284	66
Capital needed with mitigation for a 9% capital ratio	187	166	66
Capital needed with mitigation and retained earnings for a 9% capital ratio	124	45	35
TCH (2011a), CS (2011), and Citi (2011) capital needed for a 9% capital ratio	500	441	99
Memorandum items			
Number of banks	22	38	7
Total assets (in US\$ billion)	11,522	34,245	6,363
TCH (2011a), CS (2011), and Citi (2011) number of banks	54	33	15
TCH (2011a), CS (2011), and Citi (2011) total assets (in US\$ billion)	8,300	31,378	7,916

Source: Staff calculations, Citi (2011), CS (2011), KBW (2010), TCH (2011a) and bank disclosures.

Capital mitigation does not include major capital raising, but rather the replacement of one type of financial instrument that no longer qualifies as capital with another that does. Table [\[to be included\]](#) lists 4 categories of capital mitigation that include asset run-offs, disposal, impairment, and other actions such as RWA optimization. RWA mitigation

represents the run-off, disposal, and impairment of assets where risk weighting increases make them no longer viable for banks to hold and also certain technical measures that can be taken to reduce the RWA's by using better data and calculation methodologies.

Table 4 also provides estimates of the total extent of additional capital raising that would be necessary to bring capital levels up from the baseline figures to Basel III standards as they would exist with full implementation. It also includes a modest 2-percent buffer above the required minimums to provide banks with protection against adverse developments that might cause their capital to fall below the minimums. Managements virtually always choose to operate with some buffer of this nature and will do so even though the “conservation buffer” will exist to make any such drops somewhat less painful. On a pro forma basis, European banks would need US\$86 billion to comply with the 7-percent total common equity Tier 1 capital requirement without any mitigating actions or retained earnings while U.S. banks would require US\$60 billion. Given a large transition period in which banks would retain earnings and take management actions to mitigate increases in RWAs, U.S. and European banks would be able to reduce their capital gap to less than US\$15 billion. With a required minimum common equity Tier 1 capital ratio of 9 percent—which includes the 2-percent capital buffer—the capital gap would more than tripled for both U.S. and European banks. Their retained earnings and mitigating actions would not be enough to reduce their capital gap to less than US\$50 billion. The few Japanese banks in the sample would face a low capital gap of US\$ 14 billion without any mitigating actions or retained earnings under the 7-percent minimum requirement and a US\$66 billion capital gap under the 9-percent minimum requirement.

[To be filled in based on 2 other tables on the effects of Basel III capital requirements on different business (IBs, UBs, and CBs) models.]

D. Liquidity Requirements

Prior to the recent financial crisis, regulators around the world generally placed a much lower emphasis on liquidity requirements than they did on capital requirements. As a result, few countries had a rigorous, formalized set of liquidity requirements, although supervisors paid attention to potential liquidity problems at individual institutions for which they were responsible.

The crisis underlined how critical liquidity problems can be in determining the fate of individual institutions and in transmitting problems across banking systems and overall financial markets. As a result, the Basel III accord includes two new liquidity requirements, the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR).

Liquidity Coverage Ratio

The LCR is basically a stylized stress test of an institution's ability to withstand a severe liquidity freeze that lasts 30 days. When liabilities mature, they are assumed to be very difficult to roll over, with the degree of difficulty depending on the category of the liability.

Undated liabilities, such as demand deposits, are assumed to be withdrawn to various degrees depending on the type and source of the deposit. Retail deposits are assumed to be somewhat “sticky,” meaning that a considerable portion of these deposits remain. Deposits from corporations, on the other hand, are assumed to be withdrawn to a much greater extent. Thus, each category of liability is assigned a percentage roll-over figure representing the portion of that liability that either remains a source of funding during the 30 days or is replaced by funds in the same category.

Similarly, each asset category is assigned a percentage haircut.⁹ This represents the loss that would be incurred if that asset were to be liquidated in the middle of a severe financial crisis. Safe, short-term assets have no haircut or a relatively small one while riskier or longer-term assets have higher haircuts or even a full haircut if there is essentially no way to monetize an asset in the 30-day crisis period.

The LCR is the ratio of total assets, after the liquidity haircuts, to the total cash outflows under the stress assumptions. Upon full implementation, the ratio will be required to exceed 100 percent, meaning that the assets, after haircuts, can provide more than enough funds to cover the cash outflows. The LCR must be calculated for each bank starting in [2013?] but the 100-percent ratio will not be mandatory during an “observation period.” It becomes binding in [20xx?] according to the Basel III accord. However, there has been a great deal of objection by many in the financial industry and other observers and the Basel Committee has indicated the likelihood of further refinements in the formulas prior to the start of the observation period.

Net Stable Funding Ratio

The NSFR is intended to cover risks that stem from excessive maturity mismatches between assets and liabilities. This ratio relates the total amount of assets to the total amount of liabilities maturing in less than one year. The one-year cut-off is somewhat arbitrary, but corresponds to a common market and regulatory convention of treating short-term instruments as those of less than a year. The NSFR ratio requires that illiquid assets and a small portion of off-balance sheet commitments and contingencies be matched with stable funding sources. Asset and liabilities are then weighed according to their liquidity and stability characteristics, respectively.

Similar to the LCR, Basel III creates an observation period from [2013 – 20xx] with a binding requirement for a 100 percent NSFR after that. The NSFR has received even more strenuous objections than the LCR and there is a strong possibility that the NSFR will be modified prior to its implementation.

⁹ “Haircut” is a term frequently used in the financial markets to represent the extent to which an asset is treated as if it were worth less than its full value. For example, collateralized borrowing usually is for less than the current value of the underlying asset, with a haircut applied to protect the lender from market movements that might occur before they could liquidate their collateral, in the event the borrower does not repay.

Meeting the Liquidity Requirements

Banks that would not meet the 100-percent ratio requirements for the two tests could take any of several types of actions or combinations of these actions:

- *Increase the length of liabilities.* Liabilities with maturities of over 30 days for the LCR or one year for the NSFR are not included in the denominator and, therefore, do not need to be matched by appropriate assets.
- *Raise capital.* Common equity and other instruments that count as capital, are either perpetual or have very long maturities. Replacing shorter-term liabilities with capital would also reduce the denominator of the LCR ratio and increase the numerator of the NSFR ratio.
- *Shorten the maturity of assets.* In general, shorter maturity assets have lower haircuts, with lower weights in the denominator of the NSFR ratio and higher weights in numerator of the LCR ratio.
- *Switch to higher quality assets.* In general, assets of higher quality have lower haircuts, with lower weights in the denominator the NSFR ratio and higher weights in the numerator of the LCR ratio.
- *Shrink, in combination with other actions.* Shrinking does not automatically change the liquidity ratios, if everything else stays in the same proportions. However, reducing assets and their corresponding liabilities will sometimes be the most cost-effective way to rebalance.

Implications of Adjustment Actions

Under normal circumstances, each of the potential adjustment actions by banks would reduce profits. When there is a normal upward-sloping yield curve, longer-term liabilities will cost more than shorter-term ones and shorter-term assets will earn less than those of longer term. Capital, as described earlier, is more expensive than other funding sources. Higher-quality assets virtually always yield less than lower-quality ones, since risk aversion by investors means that higher-risk assets must generally pay higher returns. Shrinking a bank's book usually means reducing otherwise profitable business. The costs of the actions are discussed in great detail below.

There are also questions about the larger effects on markets and the economy. Maturity transformation is not just an activity from which banks derive profits; it also plays an important economic role. Many savers place a high value on having near-instant access to a portion of their funds, yet the vast bulk of useful economic projects have lives that are too long to be safely funded on this basis. Banks bridge this gap by taking advantage of the fact that savings deposits are "sticky," meaning that they tend to stay in place for long periods, on average, even though they could theoretically be withdrawn on any given day. Liquidity arrangements with central banks and deposit insurance to avoid panic by savers have been constructed to avoid the biggest risks to having banks rely on this stickiness of deposits.

The Basel III liquidity requirements would almost certainly reduce maturity transformation to some extent. Indeed, they are intended for that exact purpose, at least as regards banks. Further, it seems likely that regulators would extend similar types of requirements to other institutions if the maturity transformation activity were to migrate to a great extent away from banks. Therefore, it would be important to have at least a rough estimate of the economic benefits of maturity transformation and of the likely change in those benefits as a result of the liquidity requirements. As a related point, there is a concern that European financial markets are not set up to easily accommodate the shifts necessitated by the liquidity requirements. This is described further below, in the discussion of the costs of liquidity requirements.

Table 5. Pro Forma Basel III Liquidity Ratios, 2010

	US	Europe	Japan
Net Stable Funding Ratio			
IMF GFSR (2011) methodology	94.9	74.6	65.4
Funding needed for a 100% NSFR (in US\$ billion)	695.3	5,560.3	1,465.4
Modified IMF GFSR (2011) methodology	101.6	69.3	78.9
Funding needed for a 100% NSFR (in US\$ billion)	419.5	7,025.7	737.9
CS (2011) and Citi (2011)	...	89.2	86.7
Funding needed for a 100% NSFR (in US\$ billion)	...	1,703.1	554.3
Liquidity Coverage Ratio			
The Clearing House (2011b), CS (2011), and Citi (2011)	60.0	84.3	121.3
Liquid assets needed for a 100% LCR (in US\$ billion)	1,400.0	953.8	53.3
JPMorgan (2011)	...	88.5	...
Liquid assets needed for a 100% LCR (in US\$ billion)	...	493.4	...
Memorandum items			
Number of banks	22	38	7
Total assets	11,522	34,245	6,363
TCH (2011b), CS (2011), and Citi (2011) number of banks	14	33	3
TCH (2011b), CS (2011), and Citi (2011) total assets (in US\$ billion)	9,400	31,378	6,084
JPMorgan (2011) number of banks	...	28	...
JPMorgan (2011) total assets (in US\$ billion)

Source: Staff calculations, Citi (2011), CS (2011), and TCH (2011b).

[IMF staff estimates seem not good enough for European and Japanese banks. Need to fill in the rest of this section with some ratio estimates and the magnitude of changes required to comply with 100% liquidity ratios.]

E. Derivatives Requirements

The Dodd-Frank Act and similar pending legislation in Europe, mandate a number of actions to make derivatives safer and more transparent.¹⁰ Standardized derivatives will be pushed towards trading on exchanges (and similar mechanisms that are technically not exchanges) and clearing through central clearinghouses. Customized derivatives trades will carry higher safety margins of capital and collateral. Other technical reforms also increase transparency and safety.

Exchange trading is much more transparent than the current dominant mechanism of bilateral transactions where a client contacts at most a few dealers and compares their prices before transacting with one dealer. Clients will have a clearer idea about market conditions before they commit to a trade and there will be much more information available afterwards to market participants about what trades have taken place.

Central clearing houses are intended to reduce, and better manage, counterparty risk. The clearing house stands between the two counterparties to a derivatives transaction, so that each external party's exposure is to the clearing house and not to each other. This matters because derivatives, unlike many other financial instruments, commit the two sides of a trade to perform in the future, creating credit risk that the other side will fail to do so. Central clearing houses are intended to be very strong entities that will be safe counterparties, in addition to having the advantage of being able to net across a very wide range of offsetting positions created by the counterparties with which they transact. Clearing houses attempt to ensure their own safety by requiring cash collateral, known as "margin," from counterparties, with the level of the margin fluctuating with the profit or loss in the contracts implied by current market pricing, as well as the degree of volatility in contracts of that type. As a second line of defense, clearing houses also require both up-front and contingent capital from the dealers who are members of the clearing house.

Those derivatives that remain too customized for clearing houses will trigger stronger safety margins. Dealers will have to hold significant amounts of capital against their customized derivatives risks, more than for exchange-traded positions. They will also face a new mandate to require collateral from most counterparties with whom they transact, in order to reduce their risk of losses if the counterparty fails to perform as promised.

Effects on Bank Profits

¹⁰ Asia appears likely to follow along, once standards are set on the two sides of the Atlantic.

The derivatives market has been dominated by very large banks. These firms have been perceived as highly creditworthy, which was important in light of the credit risk created when entering into a derivatives contract, given the reliance on promises of future performance. These leaders have also generally had the necessary sophistication to create and manage derivatives transactions and positions, as well as the extensive customer relationships that can help to generate such transactions.

Large banks will likely be relative losers as a result of derivatives reforms. Customized derivatives, which have been a product with high profit margins, will be replaced to a large extent by standardized derivatives, which will tend to have lower profit margins as a result of the greater competition and transparency. It is true that capital requirements will go down as trades shift to exchanges and clearing houses, but the benefits will be partially offset since the customized derivatives that remain will carry considerably higher capital requirements.

There is a debate about the extent to which banks will try to recoup lower derivatives profits by raising prices of other products. To some extent, the answer depends on the extent to which derivatives have been treated as separate profit centers rather than as one part of the total profitability of dealing with a particular client or counterparty. If derivatives were a completely separate profit center, and priced accordingly, then there would be no cross-subsidies with other products. On the other hand, it is clear that, in many instances, derivatives profits were one piece of a larger customer relationship. Sophisticated clients, who tend to be the largest users of derivatives, have been aware of the relative level of profitability of the derivatives business they provide and have looked for better pricing on loans or other products to offset high profit margins on derivatives. To the extent that there are cross-subsidies like these, a reduction in derivatives profitability for a bank could lead to increases in the price of other products.

Small and medium-sized banks are likely to benefit from derivatives reforms. First, they will have some new profit opportunities in aiding their clients to access markets that are now more open and less dominated by a smaller group of large sophisticated dealers. Second, they may well find better pricing for the derivatives that they purchase for their own needs, for the same reasons that non-financial firms are likely to benefit, explained below.

Non-financial firms, often called “end users” in this context, should benefit on the whole. Standardization of derivatives should drive transaction costs downwards, as it has for other financial products. This would be offset by three factors. One, they may have to begin putting up collateral on customized derivatives positions and will have to meet margin requirements on centrally cleared positions. Two, access to customized derivatives for specialized needs may be reduced or the price may go up significantly. Three, the elimination of cross-subsidies from derivatives profits may raise the price they pay for credit or other financial products.

The new rules will also increase the economy’s total needs for liquid assets. This will be occurring at the same time as banks themselves are being pushed towards buying more liquid assets. The combined effect will presumably be to push down the returns on liquid assets, since buyers will have a number of reasons to own them almost without regard to their yields.

Estimates of the costs of derivatives reforms on U.S. and European banks contain a high degree of uncertainty. Even though the large brokers will be the most affected, the large range of estimates in Table 6 is an indication that, without further clarity from the final rules, the effects of the derivatives reforms on banks cannot be pinned down easily. However, given the magnitudes in Table 6, it appears that the costs of derivatives reforms will not be substantial.

Table 6. Effects of Derivatives Reforms on Banks

	(In US\$ million)	
	US	Europe
JPM Jul 29 2010		
No. of banks	4	14
Derivative Reform Gross Loss	3,766	4,738
Derivative Reform Net Loss after Cost Reduction	2,260	2,843
Barclays Jun 28 2010		
No. of banks	25	...
Derivative Reform Gross Loss	2,651	...
Derivative Reform Net Loss after Cost Reduction
Citi Jun 16 2010		
No. of banks	4	...
Derivative Reform Gross Loss	6,911	...
Derivative Reform Net Loss after Cost Reduction	1,235	...
BoA May 24 2010		
No. of banks	4	...
Derivative Reform Gross Loss	3,428	...
Derivative Reform Net Loss after Cost Reduction

F. Securitization Requirements

The Dodd-Frank Act and pending European legislation will have significant effects on how securitizations are created and sold. Broadly similar steps are being taken on the two sides of the Atlantic.¹¹ Securitizers will be required, in many cases, to keep a piece of the risk, in order to better align their interests with those of the purchasers. Disclosure requirements and underwriting standards are heightened, to increase the quality of offerings and of the

¹¹ It is unclear what will eventually happen in Asia, where securitizations have been less common.

information needed to buy them sensibly. There are also a number of indirect effects resulting from other reforms, such as the pressures on rating agencies to do a more careful job of rating securitizations, due to heightened oversight in Europe and higher legal standards of liability in the United States.

“Skin in the game” requirements will raise cost for banks of participating in securitizations. Arrangers of securitizations, which are often banks or their affiliates, will be required to hold a piece of many securitizations that they sell. The United States and Europe seem to have both settled on 5 percent as the size of that piece, although that could change in Europe before the legislation is finalized. In the United States, there are exceptions for securitizations of Qualified Residential Mortgages (QRMs) that are mortgages meeting fairly strict underwriting guidelines and for mortgages securitized by Fannie Mae and Freddie Mac, at least as long as they are effectively owned by the federal government. Europe appears likely to have fewer exceptions, although this will not be clear for some time.

The “skin in the game” requirement will add costs. Banks are generally not the most cost-effective holders of mortgages, which is why they securitize so many of their own mortgages in the first place. The additional capital and liquidity requirements created by holding 5 percent of the relevant securitized mortgages will create expenses for them. Risks will also be higher as they move from a fee-oriented business model to one in which they retain more of the risk themselves.

Other reforms may add administrative costs, but could save banks money over time. It is in the interest of the banks for there to be a well-functioning securitization market. In fact, it is likely that a number of the reforms would have evolved as market responses even without regulation, such as some of the measures that increase transparency. Other reforms would perhaps not have evolved without regulation, but may limit future losses by banks related to securitizations that go wrong. It is difficult to quantify many of these impacts, since we do not know how legal risks may play out in the judicial process and it is unclear how market volumes might respond to various reforms.

G. Taxes and Fees

The financial sector will also face higher taxes and fees, as a further response to the financial crisis. There are four principal categories of revenue raising specifically targeted at the financial sector:

- *Increases in deposit insurance and similar premiums.* Many countries require banks, and sometimes other financial institutions, to pay insurance premiums to support a fund to protect depositors or other customers of financial institutions. The large losses in the financial crisis have generally caused these premium levels to increase and, in some cases, for new funds to be established. The aggregate premium levels are generally set with the intention of bringing in sufficient revenue to be self-supporting over time. The specifics of the premium structure are often designed to provide

incentives to operate on a safer basis, such as by charging a higher premium for riskier institutions.

- *Taxes related to bonus payments above certain levels.* A number of countries have considered taxing bonuses to financial sector executives that exceed certain levels. The UK is the only country to follow through, with a one-off bonus tax in [2009?] that was charged to the financial institutions paying the bonuses. There are currently no bonus taxes in operation or near implementation.
- *Taxes tied directly to the financial crisis.* The Obama Administration in the United States proposed a Financial Crisis Recovery Fee (FCRF), essentially a tax designed to recover the taxpayer losses from the Troubled Asset Relief Program (TARP). This does not appear likely to pass through Congress, especially since the expected TARP losses have shrunk to relatively modest levels from much higher original estimates.
- *Financial transactions tax.* There is a lively debate going on now as to whether there should be a new, broad-based tax on a wide range of financial transactions. There appear to be two principal arguments for such a tax. First, it is potentially a way of garnering a large amount of revenue from the financial sector without placing a very high tax on any particular transaction, given the massive volume of financial transactions around the world. Second, some favor the tax because it could make the financial sector smaller, simpler, and less active. There is a significant subset of financial instruments which rely on the existence of extremely efficient market operations, which would be made less efficient by such a transactions tax. Others oppose such a tax for a wide variety of reasons, including concerns about loss of market efficiency and distortions to capital allocation, skepticism that a sensible system can be designed given the broad range of financial transactions that exist or can be created, and a belief that regulatory arbitrage would be inevitable and harmful. Europe is seriously considering instituting such taxes, despite opposition from the United Kingdom. However, the United States and a number of other non-European countries are strongly opposed.¹²

Effects of new taxes on credit pricing

Increases in taxes and fees affect financial activity in the same ways as other cost increases. Banks may choose to shrink by refusing business that was marginal and no longer meets their profit criteria as a result of higher costs. Other business would be retained, but some or all of the costs would be passed on to customers, employees, or other parties. Responses may be across the board or may differentially affect certain lines of business or balance sheet categories, especially if the taxes or fees are targeted.

¹² See Claessens, Keen, and Pazarbasioglu (2010).

Table 7 includes anticipated cost increases of the following amounts, based on national fiscal estimates. Their effects on credit are discussed in detail in the next section since bank responses should be the same as to any other increase in costs.

Table 7. Fees and Taxes on U.S. and European Banks during 2010-2013

	US (US\$ billion)	Europe (EUR billion)
Financial tax	...	19.3
Deposit insurance fee changes	8.2	3.8
Orderly liquidation fund	2.4	...
Other fees	3.0	...
Durbin amendment	22.2	...
Regulation E	28.1	...

Source: Schorer, Michael et al (2011) and Elmendorf (2011)

H. Integrated Effects on Credit Provision

The aggregate effects of these five areas of financial reform will be different from the sum of the five stand-alone impacts. There are numerous ways in which responses to one area of regulation will either reinforce or offset changes in other areas. Banks, and their investors, will also respond in additional ways to the overall effect of the combined regulatory changes beyond those effects that are captured in a stand-alone analysis.

Interactions between Different Regulatory Categories

Higher capital requirements generally lower the liquidity requirements. None of the financial instruments that count as capital for purposes of Basel III carry with them any liquidity requirements, since they are all of sufficiently long maturity to fall outside the tests. Therefore, forcing banks to hold more capital reduces liquidity requirements, all else equal.

Actions to improve liquidity will frequently reduce capital requirements. One of the methods to improve the LCR and NSFR of a bank is to switch into assets that are safer and consequently more liquid, therefore bearing a lesser haircut for purposes of the liquidity ratios. In general, these safer assets will also carry lower risk-weightings for capital purposes.

Derivatives rules change capital requirements. Customized derivatives will carry higher capital requirements than they did before, increasing the need for capital. In addition, and probably of more importance over time, there will be a major movement from customized to standardized derivatives, changing capital requirements further. It is not clear at this point what the net effect will be.

Some taxes, and proposed taxes, exclude equity and long-term debt. Such taxes create an interaction between a bank's responses to taxes and its responses to liquidity requirements,

going in both directions. The tougher liquidity requirements may lead to changes that also reduce the tax base. On the other hand, actions to reduce these taxes might include further shifts towards safer liquidity management.

It does not appear that the interactions between the different categories change the overall impact substantially as compared to simply adding the individual pieces.

Further, the interactions tend to ameliorate the costs of each individual item. That is, the regulatory reforms provide a number of incentives to move towards safer operations, so that creating higher safety margins in one area will often automatically move a bank partway towards greater safety by other measures, reducing the cost of adjustment in that other area of regulation. Thus, the cumulative cost of the suite of regulatory reforms is probably modestly less than we arrive at with our sum of the parts approach.

For these reasons, we have simply added the individual effects of the five categories as the first step in estimating the aggregate costs. We then move on to explicitly project the potential impact of certain additional mitigating factors, described next.

Mitigating Factors

Banks can respond in a number of ways to the greater regulatory burden besides raising prices or reducing credit availability, as was briefly described earlier:

- *Absorbing the costs by lowering returns to shareholders.* As discussed in the section on capital requirements, a key parameter of any regulatory cost model is an assumption about how much the increased safety will be reflected in lower return requirements from current and potential equity holders. This lies virtually entirely outside of the control of the banks and is therefore not really a bank response, but rather an automatic mitigating factor. The base case in this study assumes approximately a 50-percent pass-through, in the sense that the new required return lies halfway between the required return prior to regulatory changes and the return implied by the Modigliani-Miller formula. This is broadly consistent with the Modigliani-Miller approach adjusted for tax distortions and explicit and implicit guarantees for various funding sources, as described earlier.
- *Reducing funding costs.* Average funding costs are likely to rise, as the new minimum liquidity requirements push banks to shift their mix of funding towards longer-term and more reliable sources, which are consequently more expensive. Greater competition for these sources is also likely to increase their costs. These effects are explicitly modeled. Working in the opposite direction, there are two factors that should lower funding costs compared to where they would otherwise be. Greater bank safety should be rewarded with somewhat lower required rates from wholesale

funding markets and there may be some room, particularly in the United States, to modestly squeeze deposit rates.^{13,14}

- *Reducing expenses.* Industries that come under external pressure almost invariably reduce their costs as one response to the threat. A substantial portion of the cost of credit provision comes from administrative and marketing expenses, where there is considerable room to cut expenses if necessary. For American banks, roughly half the expenses represent compensation. Some of this comes down fairly automatically when pre-compensation profits fall, since the size of bonus pools tends to remain within a certain percentage range of those profits. In addition, there is almost certainly some room to cut compensation further as a percentage of profits, given the high levels of pay compared to the overall job market. It is true that some bank employees can move to other parts of the financial sector, but there is usually enough specialized human capital tied up in banking that it would take a quite substantial pay cut to trigger this for most employees. For banks in Europe and Japan, there appear to be very considerable savings that could be achieved through restructurings or mergers, in addition to whatever room is available to cut compensation per person. Nor is compensation the only expense that could be cut in any of these regions, since no one would argue that banks are operating at their theoretical maximum efficiency in terms of real estate and other non-compensation expenses.
- *Decreasing the expected credit losses.* As explained above, there are ways that banks could reduce expected credit losses without turning away significant business by tightening the technical terms of loans.
- *Limiting the regulatory impacts through technical means.* The capital and liquidity analyses explicitly include some of the impact of technical responses to tightened regulatory requirements, such as improving the modeling of the behavior of certain assets in order to reflect a lower level of risk in the internal risk models that determine capital requirements.
- *Rationing credit.* Credit providers could also choose to make fewer loans by rejecting those loan applications that fail to meet newly heightened credit standards. This could be done at the individual loan level or by making a decision to withdraw from lines of business that do not meet minimum profitability criteria.

¹³ Investors in the wholesale market for bank funding should be willing to accept slightly lower returns as a result of the greater safety of the banks. However, these reactions may be muted by a continued belief that government aid may be available in the event a large bank becomes troubled, reducing the probability of default. To the extent that reforms have reduced this belief, the increase in perceived default risk from the reduced government backstop may more than offset the improvement in stand-alone creditworthiness.

¹⁴ The United States has large deposit volumes in relation to the size of the banking system and money market funds there are becoming at least marginally less competitive as a result of regulatory changes. It is unclear whether there is room to cut deposit rates in Europe or Japan.

- *Raising prices for credit.* Finally, of course, credit providers can simply charge more for their loans. This option will be limited by competitive market conditions within the banking industry and in regard to other types of credit providers.
- *Restructuring their businesses.* Many credit providers are in the process of rethinking what business lines they wish to be in and how they should manage those businesses. In the end, a combination of the above actions may be necessary in order to construct a portfolio of business lines that fit together to optimize the overall profitability of the organization. Such restructuring will also include strategic decisions to sell or buy businesses or to merge with other financial firms or to sell the entire organization.

The box on the following page lays out the likely areas for business restructuring and some of their implications for the financial sector and the economy as a whole. The main effect on the broader economy of the business shifts at the banks would be higher economic costs for raising debt or hedging against financial risks, to the extent that banks do not absorb these costs by finding other efficiencies or accepting a lower return. These cost increases would have similar effects to a direct hike in the price of lending by banks. The good news, though, is that this should occur only for certain types of business within capital markets activities, so the economy would be faced with a price increase on a fraction of one part of the banks' business.

In certain cases, there may also be a loss of some alternatives for risk hedging by non-financial entities. For example, some types of customized derivatives could absorb too much additional regulatory burden to be worthwhile offering on a large enough scale to support the necessary infrastructure. It is difficult to quantify the economic loss for the wider economy, since there will always be alternatives, such as less perfect hedges or simply retaining the risk at the non-financial entity.

The main effect on the larger economy from operational transformations is to hold down the cost of credit below what it would otherwise have to be. Indirectly, though, efficiencies mean that someone gets paid less, whether employees, through lower compensation or unemployment, or suppliers. These effects would play through in a more complete economic model.

McKinsey (2011) and Morgan Stanley and Oliver Wyman (2011) examined the probable effects of the new regulations on capital markets activities of the banks. They found that regulatory reforms would have a major impact on profitability, primarily due to higher capital and liquidity requirements and from the business model changes being mandated for the derivatives business. However, different parts of the capital markets activities would be affected to quite different degrees. Most of the equities business remains a low user of capital and liquidity and is relatively unaffected by the derivatives changes. Both consulting firms expect this business to continue to produce very high ROE. On the other hand, much of the plain vanilla fixed income business will see significantly higher burdens from capital and liquidity requirements and was not hugely profitable in the first place. This business is likely to migrate away from firms of average or lower effectiveness and towards a relatively small number of firms that have the scale and expertise to squeeze

out costs and grab market opportunities. Lessened competition and the direct pressures from the regulatory burden are likely to lead to price increases of one kind or another, whether through wider bid/ask spreads, higher commissions and fee, or in more subtle ways.

Box 1. Restructuring Strategies by Banks and Implications for the Economy

Financial institutions can restructure themselves in a number of ways in response to regulatory and market changes. Each of these actions is likely to have a somewhat different effect on the wider economy.

Shifts in business mix. The large scale regulatory changes taking place will significantly shift the relative profitability among lines of business, and among products and customer types within various lines. Some activities will be forbidden, such as by the Volcker Rule in the United States, while others will now have regulatory burdens too high for some banks to do continue to do them profitably. This could either be because the burden has increased sharply, such as would result from much higher capital requirements for certain trading activities, or because the business was only marginally profitable in the first place, so that a relatively small increase in costs may make them unattractive. The higher regulatory burden could be either a direct result of regulation, such as with capital requirements, or could be an indirect result of regulation affecting the kind of business customers demand.

Operational transformations. Higher costs should spur greater efforts to improve the efficiency of operations. Logically, there were already incentives for such improvements, since they would increase income, but there tends to be sloppiness in organizations that are making excellent profits without exerting themselves to the utmost. When external cost pressures directly threaten managers' jobs and compensation, they and their employees tend to become more inventive and more flexible. The two consulting firms write considerably about ways to use electronic information and processes to compete better. There is clearly room for improved efficiencies, even if it turns out to be less than estimated by consultants who have a stake in moving firms in that direction.

Cultural transformations. A subset of operational transformations will take place in a more subtle way, as financial firms refocus on core skills such as risk management, expense control, and meeting genuine customer needs. It is difficult to quantify these effects in any way, but they are quite likely to be beneficial for both the banks and the wider economy.

Mergers and acquisitions. Despite valid concerns about institutions that are "too big to fail," the financial industry in most countries still has many competitors of sub-optimal scale. Cost pressures will almost certainly push another wave of consolidation. In Europe, this could be enhanced still further if the twin financial and sovereign debt crises help to pull down protectionist regulatory barriers between countries in the European Union. Industry consolidation would have effects very similar to those described under "operational transformations," although likely on a larger scale for those enterprises undergoing such a change.

V. UNCERTAINTIES AND AREAS FOR FURTHER RESEARCH

There are a number of important topics that extend beyond the scope of this paper, but would be well worth exploring with further research.

Transitional Effects of Regulatory Changes

Even though the focus of this paper is on the cost impacts in equilibrium, transitional costs are an important component of the adjustment process to a new regulatory regime. For instance, raising large amounts of common equity in a short period can be significantly more expensive than doing so in a long period. Similarly, it is likely that the fairly large shifts necessitated by the change in liquidity requirements could be substantially more costly if compressed into too short a period. In fact, the potential for these kinds of transitional problems lay behind the decision of the Basel Committee to establish a quite lengthy phase-in period for both capital and liquidity reforms. There will also be one-off administrative costs of various kinds to make the transition from one regulatory regime to another. It would be worthwhile to extend the quantitative analysis from this paper to take into account transitional as well as long-term effects.

Impact of Regulatory Arbitrage

There is clearly the potential for more lightly-regulated jurisdictions and market sectors to take business away from banks and more highly-regulated institutions. This is a real possibility and this study has also included brief description of how the industry and markets would respond. However, there is considerably more that could usefully be done to examine the potential for regulatory arbitrage in a more focused manner.

Impact of Less-Regulated Credit Providers

It would be particularly worthwhile to look in detail at how “shadow banks” might target parts of the traditional banking business. For instance, there is a strong economic demand for maturity transformation services that will become substantially more expensive for traditional banks to fulfill as the new liquidity rules push them to increase the maturity of their liabilities and reduce the term of their assets. Money market funds in the United States have demonstrated that an entity need not necessarily have deposit insurance protection in order to appear safe enough to persuade bank depositors to shift funds from banks to these new quasi-deposit arrangements. Structured Investment Vehicles did a version of the same thing, albeit taking in their money on a wholesale basis and operating with a business model that is unlikely to be revived anytime soon. Nonetheless, they flourished for quite a number of years, as did a number of other types of shadow banking activity.

Effects on Additional Regions of the World

This study focused only on the United States, Europe as a whole, and Japan due to data limitations and resource constraints. It would be useful to break Europe down into at least Continental Europe, the United Kingdom, and Switzerland, given the quite different paths being taken in the United Kingdom and Switzerland on some important regulatory issues. Major emerging market financial powers are also worthwhile to examine in detail given how different their situations are from the more developed countries in this report and the high probability that their market shares of global financial activity will rise over time.

Quantitative Estimates for Additional Categories of Reform

This study only examined five of the most significant areas of financial regulatory reform. The others shown in the qualitative analysis would also be worth further consideration, although they would be more difficult to analyze quantitatively.

CONCLUSION

[To be finalized]

Our work suggests several preliminary conclusions:

Financial reform comes at a price, in terms of a drag on the economy during “normal” years.

These costs appear reasonable for the expected benefits, based on other analyses of the potential benefits. We did not, however, attempt to quantify the benefits on our own.

Banks around the world appear to have a considerable ability to adapt to the regulatory changes without radical actions.

Banks in the United States seem to be in a better position to adjust than those in Europe and Japan. This is partly because of better starting capital levels and partly because their business models were less tailored to Basel II rules, since these were not applied in the United States.

However, there is a great deal of additional work that would be necessary to be certain of these conclusions. Financial systems are complex and so are the reform measures.

APPENDICES

[To be filled in]

BIBLIOGRAPHY

[To be filled in]