

## Macroprudential Policies Beyond Basel III

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The centerpiece of the new capital and liquidity framework for banks known as Basel III is a strengthened common equity buffer of 7% together with newly introduced liquidity requirements and a leverage cap, to be phased in over an extended timetable running to 2019.

The elements that were most promising in living up to the macroprudential aims of regulatory reform – the countercyclical capital buffer and the capital surcharge for the systemically important financial institutions (SIFIs) – proved most controversial and have yet to be finalized.

Under its current agreed form, Basel III is almost exclusively *micro*-prudential in its focus, concerned with the solvency of individual banks, rather than being *macro*-prudential, concerned with the resilience of the financial system as a whole.

The language of Basel III is revealing in this regard, with repeated references to greater “loss absorbency” of bank capital. However, achieving greater loss absorbency by itself is almost certainly inadequate in achieving a stable financial system, for two reasons.

- Loss absorbency does not address directly *excessive asset growth* during booms.
- Preoccupation with loss absorbency diverts attention from the *liabilities side* of banks’ balance sheets and vulnerabilities from the reliance on unstable short-term funding and short-term foreign currency debt.

As argued below, increased systemic risk from interconnectedness of banks is a corollary of excessive asset growth. To be effective, a macroprudential policy framework must address excessive asset growth and fragility of bank liabilities.

We take each issue in turn.

## Excessive Asset Growth in Booms

During a lending boom, high bank profitability and low measured risks tend to bolster bank capital ratios. However, experience has shown repeatedly that rapid loan growth is achieved only at the cost of lowering lending standards. Take the example of Allied Irish Banks (AIB), which is currently very topical given the difficulties in Ireland, but there is no shortage of examples from the recent global financial crisis.

**Figure 1. Loan Growth and Provisions for AIB**

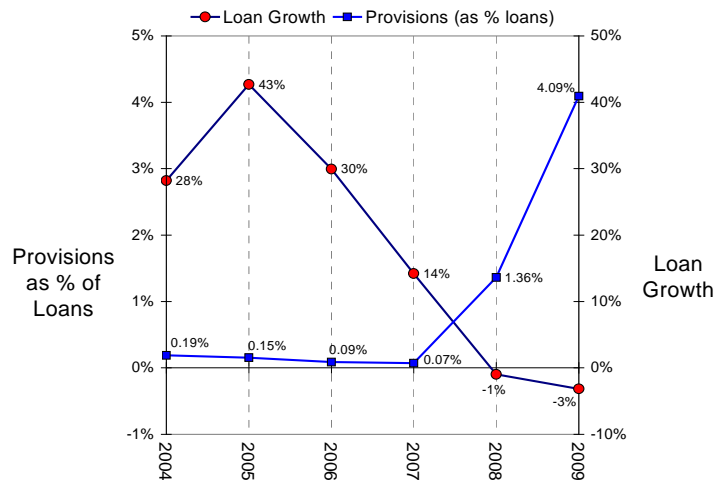


Figure 1 plots AIB's loan growth and loan loss provisions from 2004 to 2009. AIB's loan book increased 43% in 2005 and 30% in 2006, but loan growth came to a sudden halt with the global financial crisis. Provisions were low and falling throughout the lending boom. However, the underlying vulnerability of the loan book was exposed by the recession, and provisions have jumped above 4% of the total loan book.

**Table 1. Capital Ratios for AIB**

	2004	2005	2006	2007	2008	2009
Tier 1 capital ratio (%)	7.9	7.2	8.2	7.5	7.4	7.2
Total capital ratio (%)	10.7	10.7	11.1	10.1	10.5	10.2

AIB's capital ratios were highest at the peak of the boom in 2006 and did not issue timely warnings, as seen in Table 1. The severity of the subsequent bust calls into question the philosophy of relying on capital ratios while neglecting asset growth itself.

Would additional measures, such as forward-looking provisioning have prevented the collapse? Larger capital cushions would undoubtedly have mitigated the shock to the real economy, but the experience of Spain (which had such forward-looking provisioning) suggests that forward-looking provisioning may not be sufficient.

Both Ireland and Spain being members of the Eurozone prevented them from having autonomous monetary policy in reining in domestic liquidity. However, the loss of autonomy over monetary policy is a more general theme that affects many more countries than just the Eurozone. Emerging economies with open capital markets face constraints on monetary policy from carry trade inflows. Faced with low interest rates in advanced economies, raising domestic interest rates may backfire by inducing greater carry trade inflows and looser domestic financial conditions. In Korea, market interest rates actually *fell* when the Bank of Korea started raising the policy rate in the summer of 2010.

When faced with excessive asset growth fueled by loose domestic financial conditions other tools may be necessary to lean against the build up of vulnerabilities. Administrative measures on bank lending such as caps on loan to value (LTV) ratios and debt service to income (DTI) ratios may be important additional ingredients in the macroprudential policy framework. DTI rules serve as an anchor that ties loan growth to the wage level. The experience of Korea and other Asian economies suggest that DTI rules may be a useful complement to more traditional tools of banking supervision.

### Keeping Track of Non-Core Liabilities

Excessive asset growth is mirrored on the liabilities side of the balance sheet by shifts in the composition of bank funding. The core funding available to the banking sector is retail deposits of household savers. However, retail deposits grow in line with the aggregate wealth of the household sector. In a lending boom when credit is growing very rapidly, the pool of retail deposits is not sufficient to fund the increase in bank credit. Other sources of funding are tapped to fund rapidly increasing bank lending. The state of the financial cycle is thus reflected in the composition of bank liabilities.

**Figure 2: Northern Rock's Liabilities (1998 – 2007)**

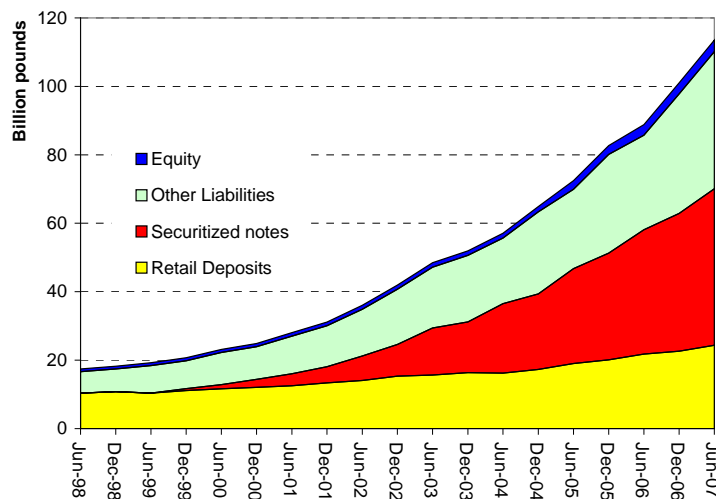
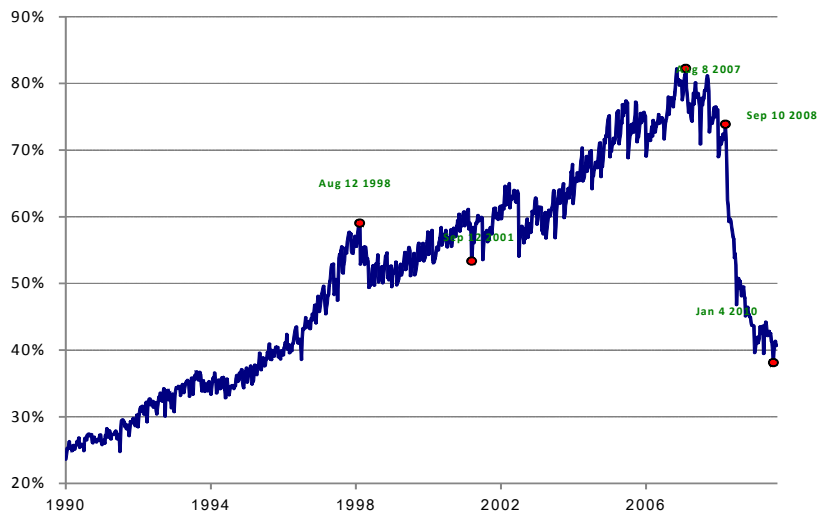


Figure 2 shows the composition of the liabilities of Northern Rock, the UK bank whose failure in 2007 heralded the global financial crisis. In the nine years from 1998 to 2007, Northern Rock’s lending increased 6.5 times. This increase in lending far outstripped the funds raised through retail deposits (in yellow), with the rest of the funding gap being made up with wholesale funding (in red and light blue).

Northern Rock’s case illustrates the general lesson that during a credit boom, the rapid increase in bank lending outstrips the core deposit funding available to a bank. As the boom progresses, the bank resorts to alternative, non-core liabilities to finance its lending. Therefore, the proportion of non-core liabilities of banks serves as a useful indicator of the stage of the financial cycle and the degree of vulnerability of the banking system to a downturn of the financial cycle.

The role of non-core liabilities in signaling the stage of the financial cycle can also be seen at the aggregate level. Figure 3 plots data from the United States and charts the stock of repurchase agreements (repos) of US primary dealers<sup>1</sup> plus the stock of financial commercial paper expressed as a proportion of the M2 money stock.

**Figure 3. Repos and Financial CP as Proportion of M2**  
(Source: US Federal Reserve)<sup>2</sup>



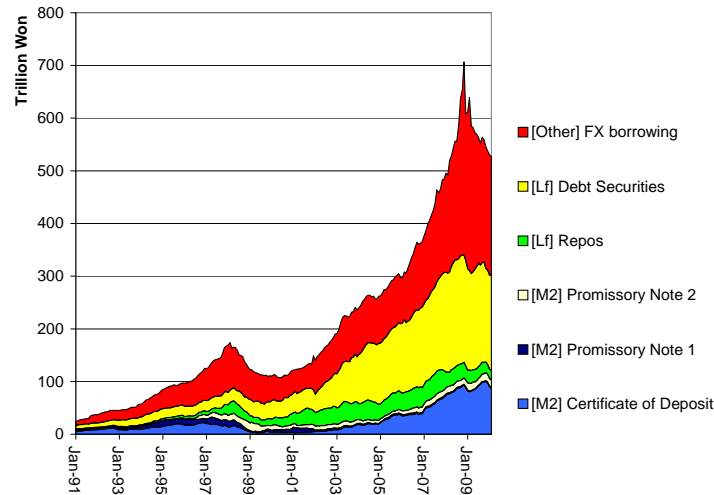
M2 consists of retail deposits and holdings in money market funds, and thus can be regarded as retail depositors’ claim on the broader banking system. As recently as 1990, repos and financial CP were only a quarter of the size of M2. However, the ratio rose rapidly and reached over 80% by August 2007, only to collapse with the onset of the financial crisis.

<sup>1</sup> US primary dealers are US banks and securities firms that have a daily trading relationship with the Federal Reserve, and which are permitted to bid at the auctions of US Treasury securities.

<sup>2</sup> See Adrian and Shin (2010) “The Changing Nature of Financial Intermediation and the Financial Crisis of 2007-09” <http://www.princeton.edu/~hsshin/www/ar2010.pdf>

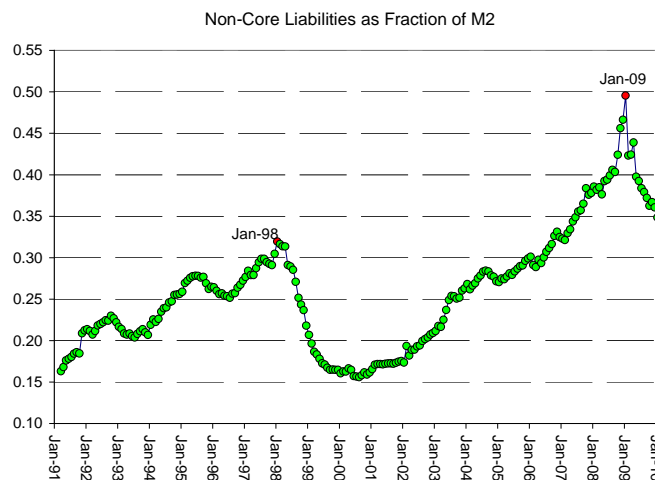
In an open emerging economy, rapid increases in the non-core liabilities of the banking system show up as capital inflows through increased foreign exchange-denominated liabilities of the banking system. Figure 4 charts the non-core liabilities of the Korean banking sector with the FX liabilities shown in red.

**Figure 4. Non-Core Liabilities of Korean Banking Sector<sup>3</sup>**



Note that the first peak in non-core liabilities coincides with the 1997 crisis. After a lull in the early 2000s, non-core liabilities increase rapidly in the run-up to the 2008 crisis. Figure 5 plots the non-core liabilities as a fraction of M2. We see that there has been substantial variation in non-core liabilities, ranging from around 15% of M2 to a peak of 50% in the Lehman crisis.

**Figure 5. Non-core liabilities of Korean banking sector as a proportion of M2**

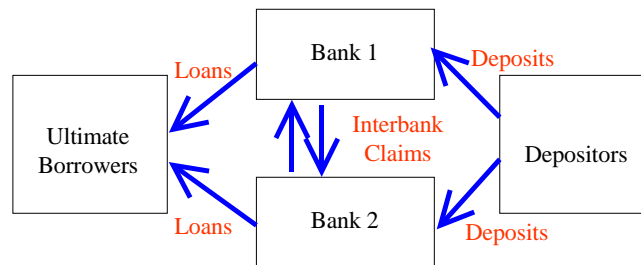


<sup>3</sup> Source: Shin and Shin (2010) “Procyclicality and Monetary Aggregates” paper for Bank of Korea 2010 conference, <http://www.princeton.edu/~hsshin/www/BOK2010.pdf>

## Interconnectedness and Systemic Risk

Excessive asset growth and greater reliance on non-core liabilities are closely related to systemic risk and interconnectedness between banks. In a boom when credit is growing rapidly, the growth of bank balance sheets outstrips available core funding, and asset growth is mirrored in the greater cross-exposure across banks. Consider a stylized banking system in Figure 6 with two banks – Bank 1 and Bank 2. Both banks draw on retail deposits to lend to ultimate borrowers. They also hold claims against each other.

**Figure 6: Stylized Financial System**



Imagine a boom where the assets of both banks double in size, but the pool of retail deposits stays fixed. Then, the proportion of banking sector liabilities in the form of retail deposits must fall, and there must be increased cross-claims across banks. In this sense, the growth in bank assets and increased interconnectedness are two sides of the same coin.

The relationship between banking sector assets and increased cross-exposures across banks holds more generally as an accounting identity. Define the *core liabilities* of a bank as its liabilities to claimholders who are not financial intermediaries themselves. Retail deposits would be the best example of core liabilities. Covered bonds held by a pension fund would also count as a core liability. However, any liability of an intermediary held by another intermediary would be a *non-core liability*. Under this definition, we have the following accounting identity<sup>4</sup> for the total core liabilities of the banking sector:

$$\text{Total Core Liabilities} = \sum_{i=1}^n e_i z_i (\lambda_i - 1)$$

where  $e_i$  is the equity of bank  $i$ ,  $\lambda_i$  is the leverage of bank  $i$ ,  $z_i$  is the ratio of bank  $i$ 's core liabilities to its total liabilities, and  $n$  is the number of banks in the banking system. Since total core liabilities (retail deposits) are slow-moving, a rapid increase in total bank assets (equity times leverage) must result in lower  $z_i$  values, implying a greater reliance on non-core funding.

<sup>4</sup> See Shin (2010) *Risk and Liquidity*, Clarendon Lectures in Finance, Oxford University Press, Chapter 9.

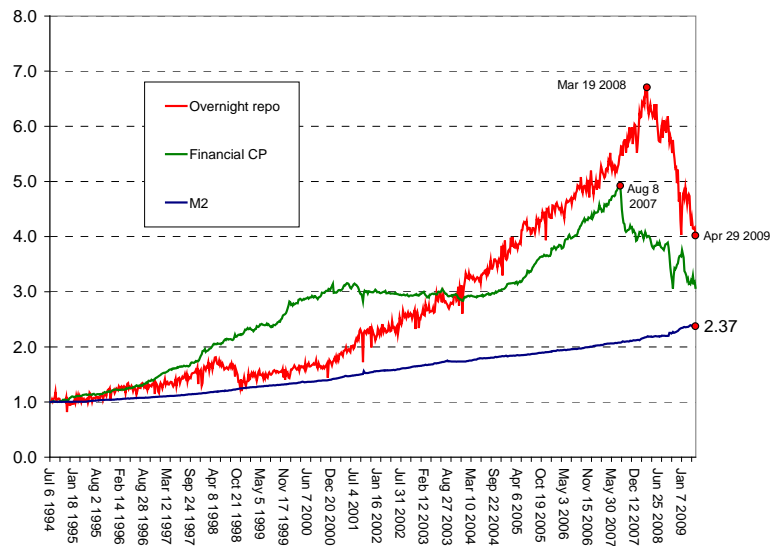
In this way, there are close conceptual links between procyclicality, interconnectedness and the stock of non-core liabilities of the banking system. In a boom, we have the conjunction of three features:

- Total lending increases rapidly
- Non-core (including foreign currency) liabilities increase as a proportion of total liabilities
- Systemic risk increases through greater cross-holdings between intermediaries

In this respect, systemic risk is procyclical and excessive asset growth lies at the heart of the increase in bank interconnectedness. Therefore, addressing excessive asset growth in booms will go a long way toward mitigating systemic risks and the cross-exposure across banks.

The growth in non-core liabilities is accompanied by the shortening of maturity of the liabilities. Figure 7 plots three series for the US: the size of the *overnight* repo stock, the total stock of financial commercial paper and M2, all normalized to equal 1 on July 6th, 1994. In Figure 7 we see that M2 grows by a factor of 2.4, but overnight repos grow seven-fold before collapsing with the onset of the crisis in 2008.

**Figure 7. Overnight Repos and M2 (weekly data)**  
(Normalized to 1 on July 6<sup>th</sup> 1994. Source: Federal Reserve)



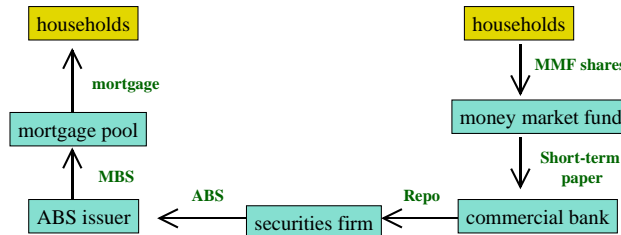
The prevalence of short-maturity liabilities is a consequence of longer intermediation chains and the need to maintain a lending spread for each link in the chain. Figure 8 depicts a traditional deposit-taking bank that collects deposits and holds mortgages. All banking liabilities are core liabilities in such a system.

**Figure 8: Short Intermediation Chain**



However, lengthening intermediation chains increases cross exposures across intermediaries. In Figure 9, mortgage assets are held in a mortgage pool, but mortgage-backed securities are owned by an asset-backed security (ABS) issuer who pools and tranches the MBSs into another layer of claims, such as collateralized debt obligations (CDOs). Then, a securities firm might hold CDOs and finances them by pledging them as collateral to a commercial bank through repurchase agreements (repos). The commercial bank in turn funds its lending to the securities firm by issuing short term liabilities such as financial commercial paper. Money market mutual funds complete the circle, and household savers own shares to these funds.

**Figure 9: Long Intermediation Chain**



The illustration in Figure 9 is a simple example of potentially much more complex and intertwined relationships. At each stage of the intermediation chain, the funding interest rate must be lower than the asset interest rate. As the intermediation chain becomes longer, more short-term funding must be used to support the chain, as short-term funding tends to be the cheapest. In this way, the prevalence of short-term debt is a natural consequence of the increased weight of non-core liabilities in the intermediary sector.

What is noticeable from the institutions involved in Figure 9 is that they were precisely those institutions that were at the sharp end of the recent financial crisis. Subprime mortgages cropped up in this chain, and the failure of Bear Stearns and Lehman Brothers owed to problems in the smooth function of this chain.

Securitization is a way for intermediaries to tap non-deposit funding by creating securities that can be pledged as collateral. The demand for collateral assets is therefore a demand for leverage. In this respect, subprime lending in the US can be seen as a reflection of the wider principle that the growth of non-core funding is a sign of excessive asset growth in a lending boom.

## Macroprudential Policy Frameworks

A macroprudential policy framework should encompass a system of early warning indicators that signal increased vulnerabilities to financial stability and a set of associated policy tools that can address the increased vulnerabilities at an early stage.

**1. Macroprudential Indicators.** Excessive asset growth is at the core of increased financial sector vulnerabilities. The challenge is knowing when asset growth is “excessive”. Simple rules of thumb such as the ratio of total credit to GDP may be useful, but more promising are measures derived from the liabilities side of banking sector balance sheets. The ratio of non-core to core liabilities of the banking sector may be especially useful in gauging the stage of the financial cycle. Monetary aggregates and other liability measures of the banking sector may be usefully developed to track potential vulnerabilities. Whereas the traditional role of monetary aggregates has been through its effect on inflation, the macroprudential role of monetary aggregates has to do with the behavioral and stability properties of such aggregates. The legal form of the claim may not coincide with the behavioral properties of the claim. For instance, household deposits will have empirical traits that differ from interbank deposits, even though the legal form of the claims are identical.

Measures of cross-exposures across intermediaries (such as CoVaR) may be useful complementary indicators, bearing in mind that cross-exposures themselves are procyclical, and track non-core liabilities.

**2. Macroprudential Tools.** Macroprudential policy tools to mitigate vulnerabilities should ideally be designed to fit closely with the early warning indicators and the conceptual underpinnings for the relevant economic externalities. Examples of macroprudential policy tools include:

- **LTV and DTI caps.** When monetary policy is constrained, administrative rules that limit bank lending such as caps on loan to value ratios and debt service to income ratios may be a useful complement to traditional tools in banking supervision.
- **Leverage caps.** Caps on bank leverage may be used as a way to limit asset growth by tying total assets to bank equity.<sup>5</sup> The rationale for a leverage cap rests on the role of bank capital as a constraint on new lending rather than the Basel approach of bank capital as a buffer against loss. Korea’s leverage cap on bank FX derivative positions introduced in June 2010 is aimed at limiting the practice of banks hedging forward dollar positions with carry trade positions in Korean Won funded with short-term US dollar debt. The leverage cap has moderated carry trade capital inflows into Korea, but the primary rationale of the leverage cap is as a macroprudential measure aimed at financial stability rather than as a capital control tool.
- **Levy on Non-Core Liabilities.** The stock of non-core liabilities reflects the stage of the financial cycle and the extent of the under-pricing of risk in the financial system.

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<sup>5</sup> Morris and Shin (2008) “Financial Regulation in a System Context”, *Brookings Papers on Economic Activity*, 2008, <http://www.princeton.edu/~hsshin/www/BPEA2008.pdf>

A levy or tax on the non-core liabilities can serve to mitigate pricing distortions that lead to excessive asset growth. The Financial Stability Contribution (FSC) recommended by the IMF in its report on the bank levy<sup>6</sup> to the G20 leaders is an example of such a corrective tax.

The levy on non-core liabilities has many desirable features. First, the base of the levy itself varies over the financial cycle. The levy bites hardest during the boom when non-core liabilities are large, so that the levy has the properties of an automatic stabilizer even if the tax rate itself remains constant over time. Given the well-known political economy challenges to the exercise of discretion by regulators, the automatic stabilizer feature of the levy has important advantages.

Second, the levy on non-core liabilities addresses the financial vulnerability while leaving unaffected the essential functioning of the financial system in channeling core funding from savers to borrowers. By targeting non-core liabilities only, the levy addresses externalities associated with excessive asset growth and systemic risk arising from interconnectedness of banks.

Third, the targeting of non-core liabilities addresses the vulnerability of open emerging economies to sudden reversals in capital flows due to deleveraging by banks. Indeed, for emerging economies, the levy on non-core liabilities could be aimed more narrowly at the foreign currency denominated liabilities only. A levy on the FX liabilities of the banking sector will have an impact on foreign currency flows, but such a policy is a macroprudential tool aimed at financial stability, rather than a tool for capital controls or a tool to manage exchange rates.

The revenue raised by the levy is a secondary issue. The main purpose of the levy is to align incentives. A good analogy is with the Congestion Charge used to control car traffic into central London. Under this charge, car drivers pay a daily fee of 8 pounds to drive into central London. The main purpose of the charge is to discourage drivers from bringing their cars into central London, thereby alleviating the externalities associated with traffic congestion. In the same way, the non-core liabilities bank levy should be seen primarily as a tool for aligning the incentives of banks closer to the social optimum. The revenue raised by the levy would also be of benefit (perhaps for a market stabilization fund) but the revenue is a secondary issue.

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<sup>6</sup> “A Fair and Substantial Contribution by the Financial Sector” Report by the IMF to the G20, June 2010 <http://www.imf.org/external/np/g20/pdf/062710b.pdf>