Chapter 2

Competition in derivative markets and financial stability

Today, the large banks that encompass the global derivatives business combine retail and commercial banking with investment bank activities. Product innovation utilising derivatives and gambling in high-risk trades has become a key driver of profitability within banks but this leaves them exposed to huge risks which in turn pose a threat to global financial stability. Policy makers urgently need to address this issue.

2.1. Overview

In very broad terms, there are two quite different types of financial products:

1. Those primary instruments associated with consumption, savings and fixed capital formation that create wealth (usually associated with loans for trade credit and working capital, and securities – equity and debt); and
2. Those associated with wealth transfer between economic agents in the attempt: to hedge risks; to arbitrage prices, to gamble; and to reduce tax, regulatory and agency costs (management fees, custody, brokerage, etc).

The markets associated with the first set of activities – bank credit, debt securities and equities – finance productivity-enhancing innovation and investment. The second set of activities are concerned with the vast derivatives markets – futures, forwards, options, and swaps, which usually are set with respect to the prices of reference assets typically associated with primary securities, credit, commodities and currencies. The size of derivative markets dwarfs those for primary instruments. Derivatives are used by virtually all participants in global financial markets: banks, insurers, pension funds, asset managers, governments, companies and even the retail sector.

Derivatives have all of the bankruptcy characteristics of debt without creating any new underlying net investment for the economy. Derivatives simply shift risk; they do not eliminate aggregate risk. When one party to a derivatives transaction makes a huge gain, another institution is making a huge loss – and that loss (if marked to market transparently) may cause a financial firm to fail. Systemic financial stability risk rises, because derivatives both raise leverage and require each participant in the chain of counterparties to be able to perform their obligations in order for others to be able to perform their own. In this way derivatives raise systemic risk, without adding any new equity or debt capital for the economy.

Derivatives markets have become more concentrated and less competitive, a trend which is exacerbated by regulatory change, so that rising leverage and counterparty risk in global systemically important financial institutions (GSIFIs) is also less diversified (hence reinforcing TBTF). The evolution of the derivatives market is explored in section 2.2. Trends in concentration and competiveness in the various derivatives markets are explored in section 2.3. Derivatives and the regulatory reform process are summarised in section 2.4. The leverage risk related to

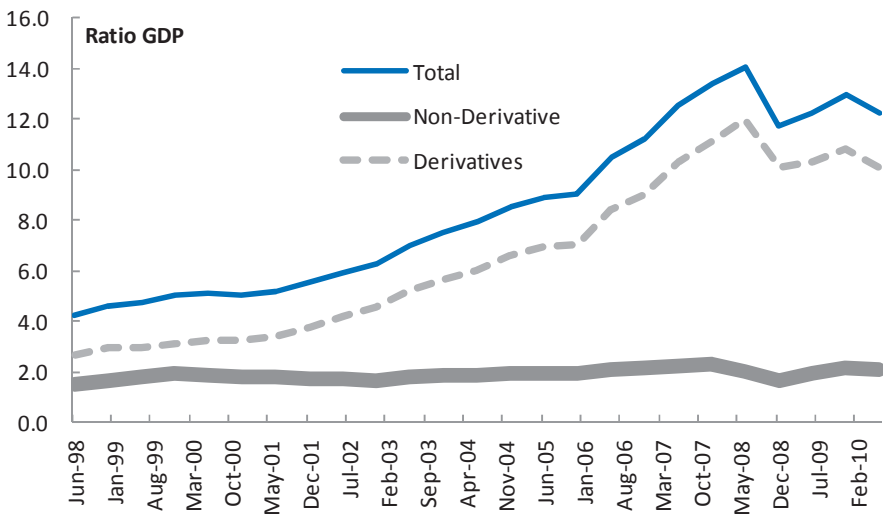
derivatives in increasingly concentrated GSIFIs is analysed in section 2.5. The interaction between concentration and interconnectedness (counterparty) risk is discussed in section 2.6. This discussion focuses on both netting and the impact of Central Clearing Counterparties (CCPs). Finally, some policy options are discussed in section 2.7.

2.2. Derivative markets

Derivatives are associated with wealth transfer (the shifting of promises embedded in underlying securities and resources, often many times over). Over-the-counter (OTC) derivatives certainly result in strong revenue and profits for GSIFIs, and this profit typically arises as a transfer from other agents in opaque OTC markets where bid-ask spreads are wide and/or by reducing tax and regulatory costs.

Figure 2.1 shows the notional global value of derivatives as a share of global GDP alongside primary global financial instruments. The total of derivatives plus primary securities rises to 14 times world GDP in 2008, before dipping back to 12 times in 2010, following the financial crisis. Global primary financial assets (equity market capitalization, debt securities and bank assets), by contrast, remained within a range of 1.5 to 2 times world GDP over the period 1998 to 2010.

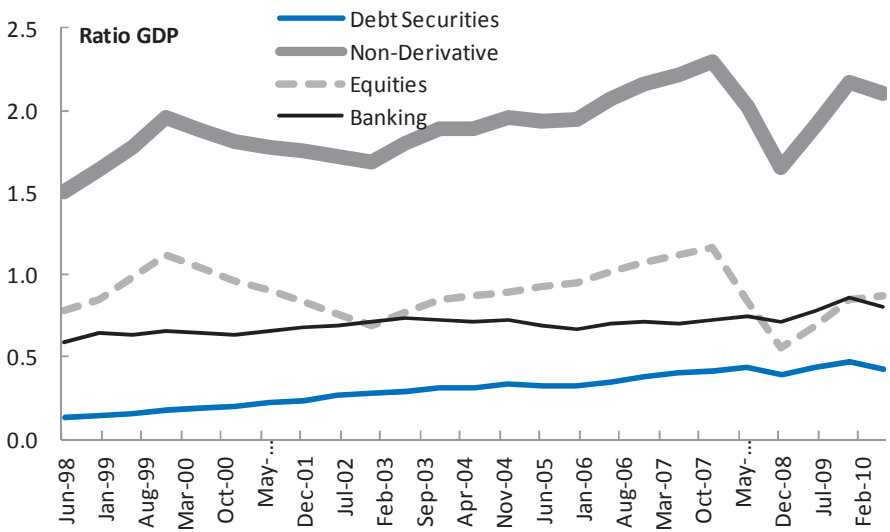
Figure 2.1. **Global notional derivatives versus primary securities**



Source: Authors' calculations based on data from Bank for International Settlements (BIS), Datastream, World Federation of Stock Exchanges.

Figure 2.2 shows the basic components of primary securities. They rose from 1.5 times GDP in 1998 to 2 times by 2000, led by the equity boom in tech stocks. While equity values fell thereafter, the steady growth of banking and securities as a share of GDP offsets this effect by 2010.

Figure 2.2. **Composition of primary securities**

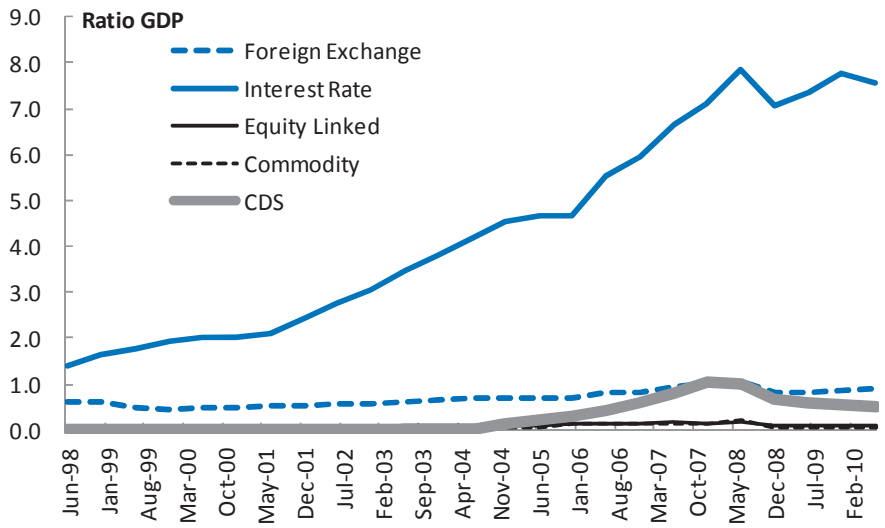


Source: Authors' calculations based on data from Bank for International Settlements (BIS), Datastream, World Federation of Stock Exchanges.

The notional value of derivatives, in contrast, has had spectacular growth, rising from USD 81 trillion in 1998, less than three times world GDP, to USD 605 trillion (around 10 times GDP) by 2010. Most of the derivatives are over-the-counter (OTC), with only USD 28 trillion (or 3.8% of the total) traded on exchanges. Over this same period the gross market (current settlement) value of all derivatives rose from 8.5% to 41% of world GDP.[1]

Figure 2.3 shows the composition of the notional outstanding value of derivatives, which is dominated by interest rate contracts (swaps, options, futures and forwards) currently at USD 452 trillion. Credit Default Swaps (CDS), which played such a major role in the global financial crisis, rose sharply after 2004 to USD 58 trillion, before declining by about half their value after the financial crisis. Currently derivative instruments are made up of: interest rates USD 452 trillion, exchange rates USD 53 trillion, CDS USD 30 trillion, commodities USD 28 trillion and equity-linked derivatives USD 6 trillion.

Figure 2.3. **Composition of derivative securities**



Source: Authors' calculations based on data from Bank for International Settlements (BIS), Datastream, World Federation of Stock Exchanges.

Explaining these trends

Some of this layering of derivatives is for legitimate end-user hedging purposes (e.g. stabilising income streams, and energy and interest costs). But it is difficult to believe that such activities would have increased at an exponential rate versus the reference primary securities on which they are based. Other explanations include some less than socially useful activities, including:

- *Regulatory arbitrage*: Basel capital rules work from the ideas of ex-ante riskiness of assets which can be weighted and added across different risk 'buckets' for the purpose of capital adequacy calculations. But with complete markets in securities and credit, the riskiness of securities can readily be transformed and shifted to where capital charges are lower. An entire industry has built up around this business and some of the spectacular failures in the crisis were directly related to this activity.
- *Tax arbitrage*: the tax treatment of investors and financial products are also very uneven, and derivatives are well suited to take advantage of the opportunities that this presents. Income streams

and tax benefits can be shuffled between agents to achieve the best mix of after-tax returns. Structured tax-efficient products have the advantages of: convenience, tailoring products to suit individual client objectives; opaque pricing with respect to the source of return (income or capital gain); use of bank balance sheets' attractive funding costs; and leverage to increase the profit impact of trading a given spread.

- *Gambling*: where potentially highly profitable but high tail risk investments are made and churned. GSIFI participants benefit from ready low-cost liquidity and cross-subsidisation from the too-big-to-fail (TBTF) status of these firms (a part of the under-pricing of risk).

2.3. Concentration trends in derivative markets

The nature of competition in product segments is such that early movers in new products that exploit the above-mentioned arbitrage opportunities gain revenue share quickly, which then induces entry into the business from other banks. New products are characterised by rapid entry into new revenue streams, which reduces concentration and eventually leads to lower profits or even losses. Consequent exit from the industry leads to a more oligopolistic structure, and the improvement of GSIFI margins for the winners of this process. There are both trends and cyclical movements in concentration and competition, which have implications for financial stability. In the following sections these trends and dynamics are explored for credit, interest rate, exchange rate and equity derivative markets, respectively.

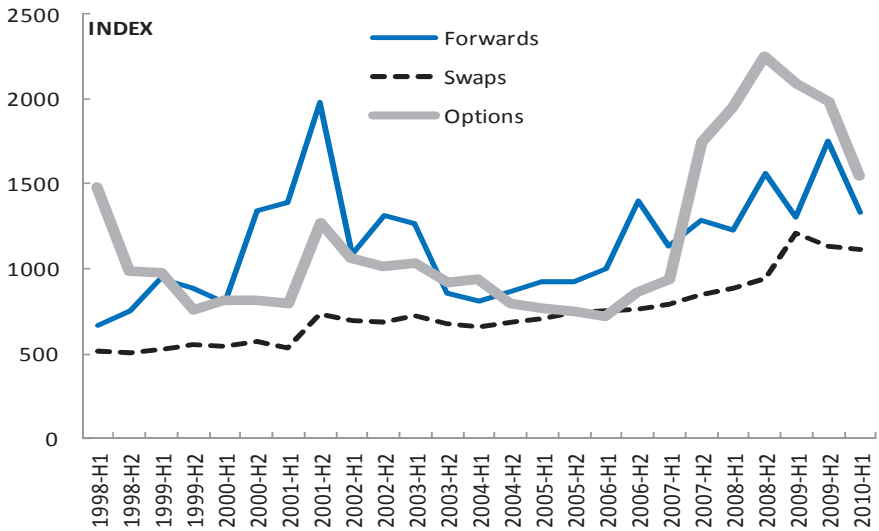
Credit derivatives and structured products

The boom in credit derivatives and structured products after the tech bust saw concentration fall as entry was important for market share and the stock performance of GSIFIs. The CDO/CLO/CDS-based structured product boom also led to new entry from smaller and certainly less experienced players. Risk was being under priced and leverage rose sharply, with the CDS boom and credit rating agencies playing a strong role in both. Subsequently, concentration has begun to rise again as firms have left the industry or reduced their shares. This occurred in the fixed-income area prior to the crisis, with CDOs and CLOs playing a key role – UBS for example was a late entrant in CDOs and suffered the collapse without enjoying a long period of gains.[2] As the structured product boom and bust showed, this entry forces margins down and increases leverage to the point where some players fail.

Interest rate derivatives

Figure 2.4 shows recent trends in the Herfindahl index[3] for interest rate derivatives – forward rate agreements, swaps and options – between BIS reporting banks and non-reporting bank clients.[4] This gives some sense of the trends in competitiveness with respect to the consumers of interest rate derivative financial services. There was a sharp pick up in concentration following the end of the 1990s, when the Gramm-Leach-Bliley Act removed the Glass-Steagall Act, and firms re-positioned in the lucrative US market.[5]

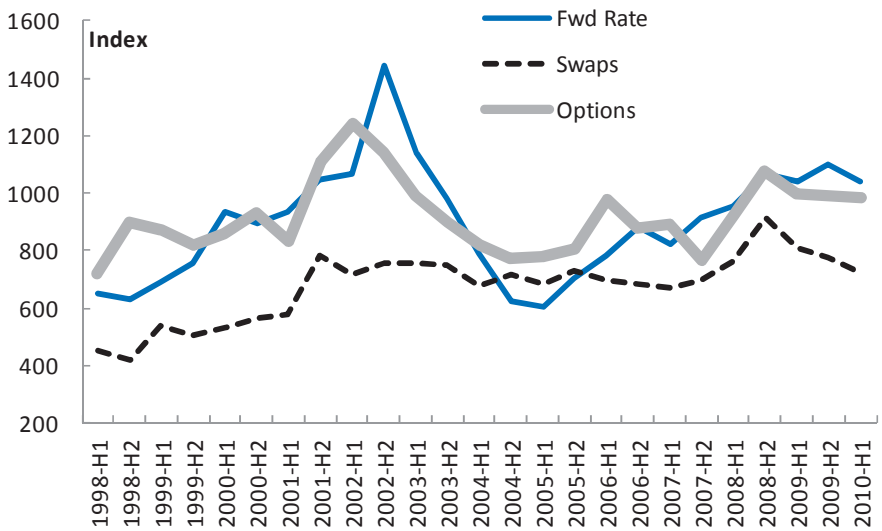
Figure 2.4. **Herfindahl index: interest rate derivatives, bank-to-non-bank clients**



Source: Bank for International Settlements (BIS).

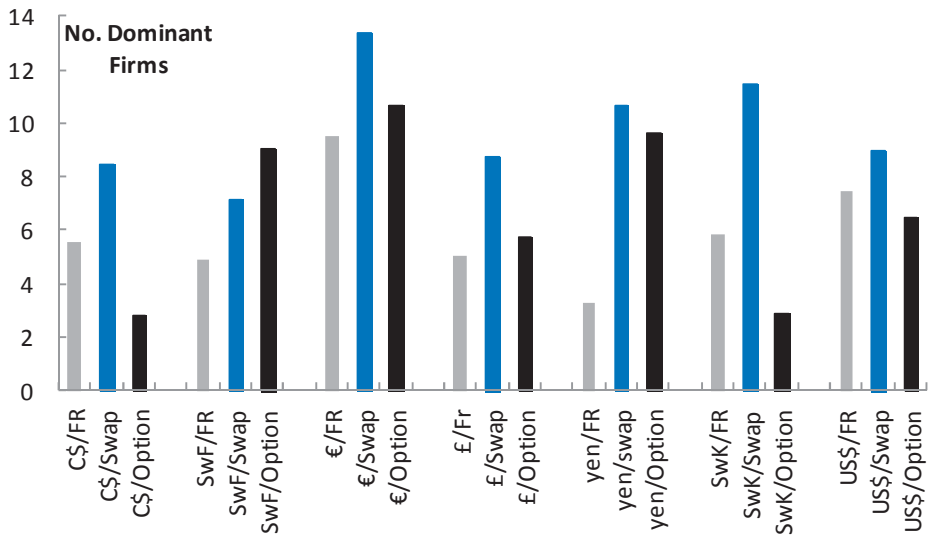
Similar patterns emerge when the trends for contracts between reporting banks are examined, as shown in Figure 2.5. These patterns give some idea of which way concentration is moving in the inter-bank market, where financial stability concerns related to interdependence arise. There was a sharp pick up in concentration during the M&A period post Glass-Steagall. The crisis has led to exit from the market and concentration, as a consequence, has risen subsequently.

Figure 2.5. **Herfindahl index: interest rate derivatives, bank-to-bank clients**



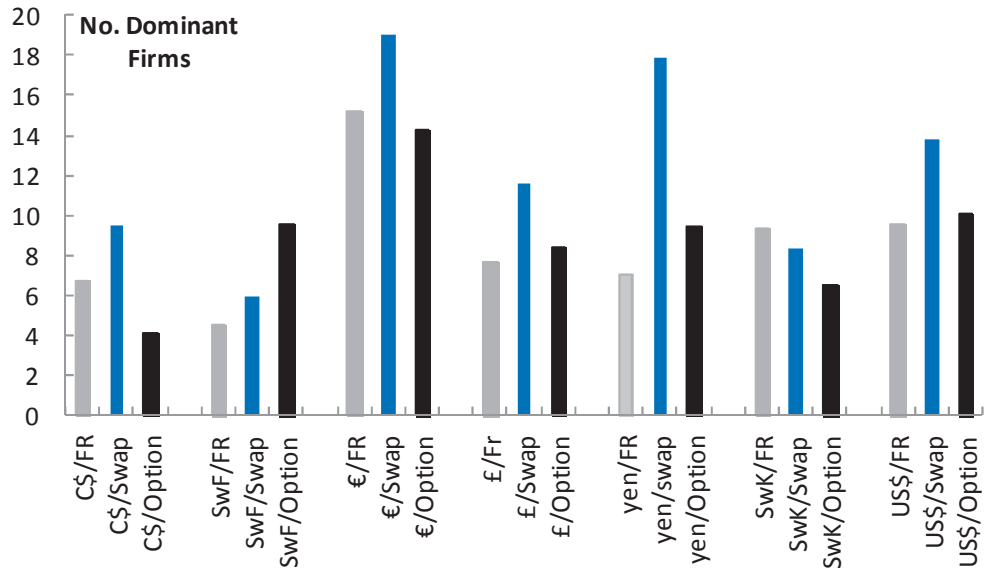
Source: Bank for International Settlements (BIS).

Figure 2.6. **Interest rate derivatives bank-to-non-bank, number of equal share dominant firm equivalents**



Source: Authors' calculations based on Bank for International Settlements (BIS) data.

Figure 2.7. **Interest rate derivatives bank-to-bank, number of equal share dominant firm equivalents**

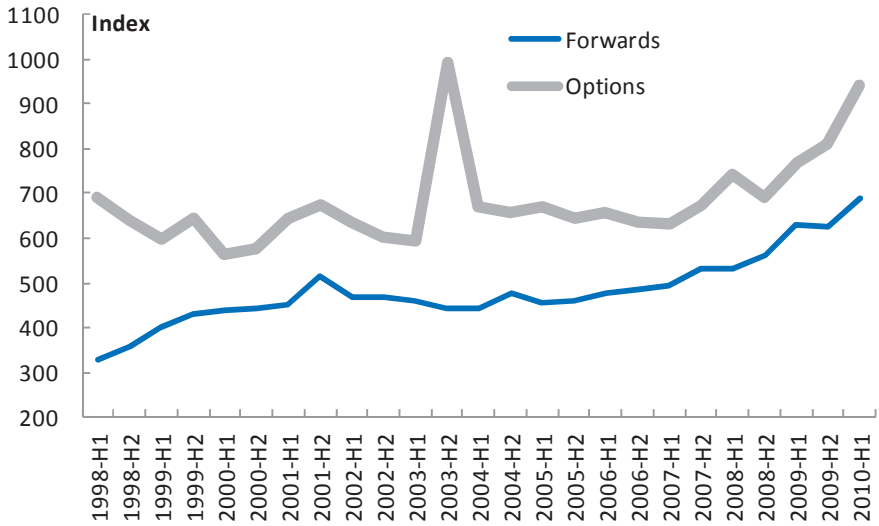


Source: Authors' calculations based on Bank for International Settlements (BIS) data.

Foreign exchange derivatives

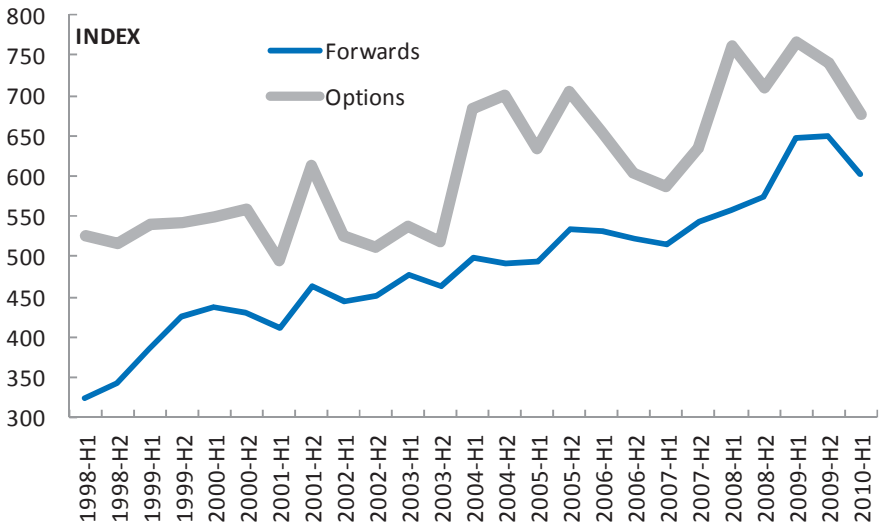
There have been similar concentration trends in the other derivative markets controlled by GSIFIs. Figure 2.8 shows Herfindahl indexes for foreign exchange derivatives, for forward rate agreements and options in the dealings of BIS reporting banks and their non-bank clients. Concentration has risen since the crisis led to the exit of weaker players and as regulatory and other barriers to entry have risen. While 30 equal-size dominant firms served the forward rate market and 14 served the options market at the start of the period (1998), this declined to 14 and 10 firms respectively by 2010.

Figure 2.8. **Herfindahl index: exchange rate derivatives, bank-to-non-bank clients**



Source: Bank for International Settlements (BIS).

Figure 2.9. **Herfindahl index: exchange rate derivatives, bank-to-bank clients**



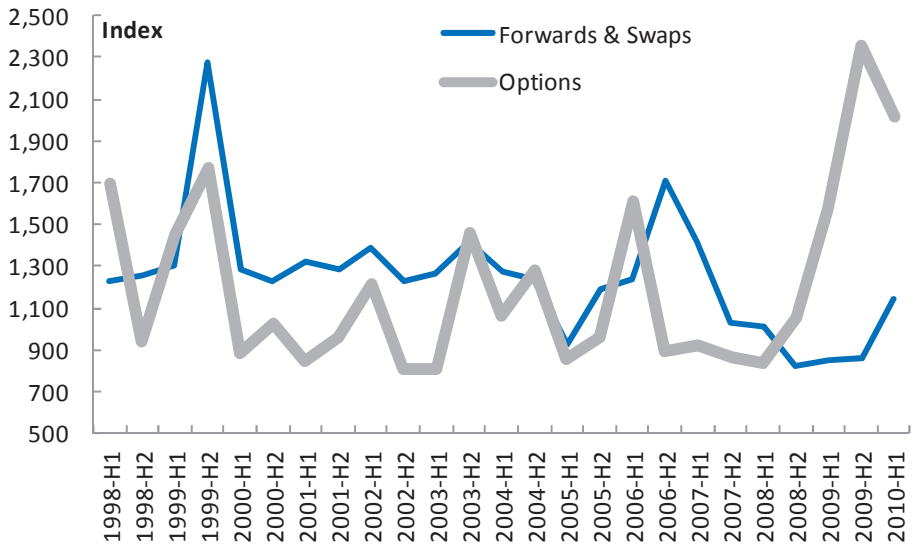
Source: Bank for International Settlements (BIS).

Figure 2.9 shows the same trends for the bank-to-bank foreign exchange derivative contracts. Here there has been an unmistakable upward trend in the concentration ratio. While 31 equal-size dominant firms served the forward rate market and 19 served the options market at the start of the period (1998), this declined to 16 and 15 firms respectively by 2010.

Equity derivatives

Figure 2.10 shows Herfindahl indexes for equity derivatives: for forward rate agreements and swaps (taken together) and for options, for the bank-to-non-bank market. No trends are evident in the concentration in the provision of these services between BIS reporting banks and their clients, except for a large jump up in concentration of option services after the financial crisis.

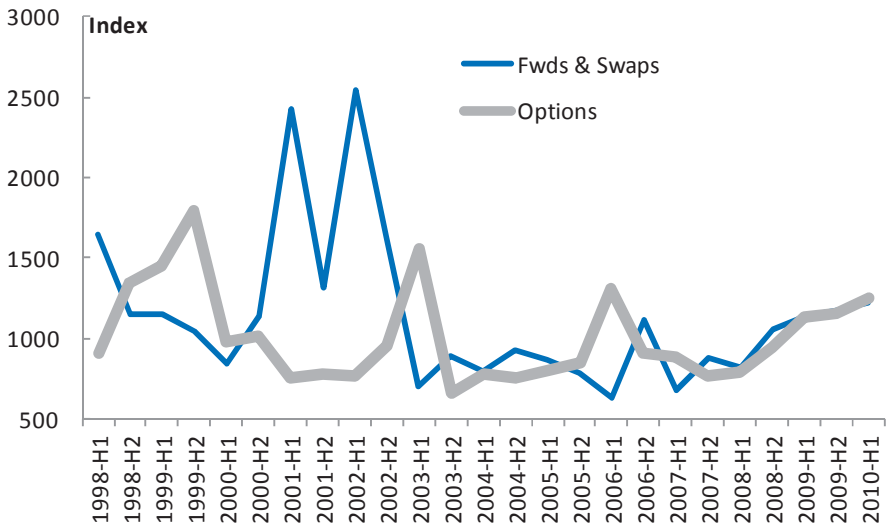
Figure 2.10. **Herfindahl index: equity derivatives, bank-to-non-bank clients**



Source: Bank for International Settlements (BIS).

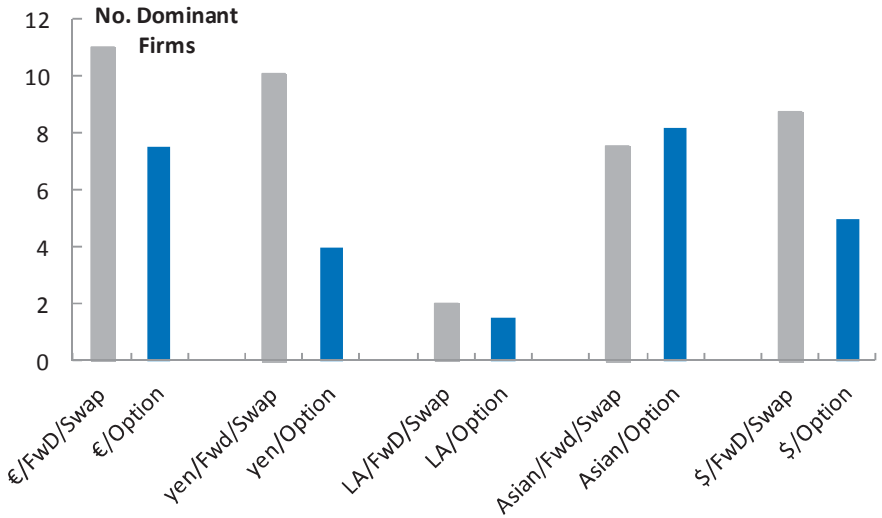
However, the market has tended to be much smaller than the other derivative markets to this point in time, and it has always been more highly concentrated than the other markets since 1998. Similar comments apply to the bank-to-bank market in equity derivatives shown in Figure 2.11. There was a spike in concentration at the end of Glass-Steagall, which subsequently fell away in the mid 2000s. But since the crisis concentration in the market has begun to increase.

Figure 2.11. **Herfindahl index: equity derivatives, bank-to-bank**



Source: Bank for International Settlements (BIS).

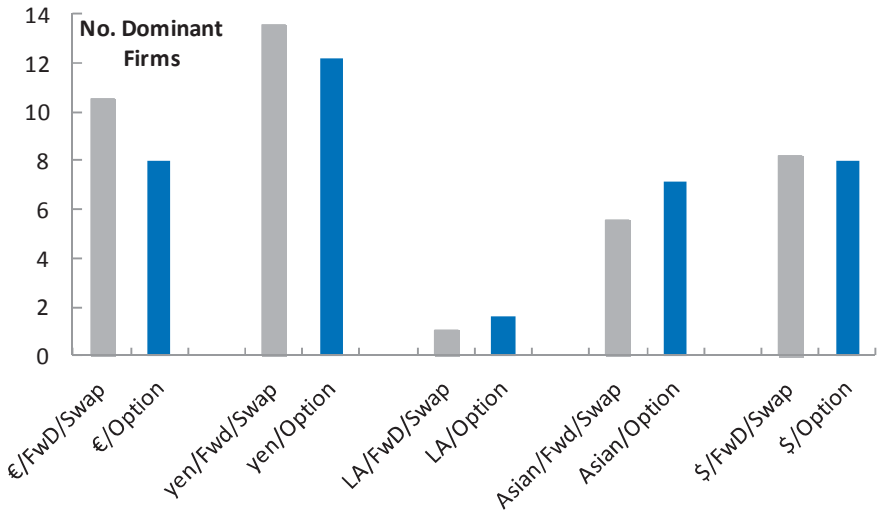
Figure 2.12. **Herfindahl index: equity derivatives, bank-to-non-bank clients**



Source: Authors' calculations based on Bank for International Settlements (BIS) data.

Figure 2.12 shows the number of dominant firms in the equity derivatives business between banks and non-banks: the equivalent of 9 firms serve the dollar forward and swap market, and only 5 serve the options market. Figure 2.13 shows the same calculations for bank-to-bank equity derivatives. Eight dominant firm banks serve the dollar market for forwards, swaps and options.

Figure 2.13. **Herfindahl index: equity derivatives, bank-to-bank clients**



Source: Authors' calculations based on Bank for International Settlements (BIS) data.

Explanations of recent trends

The main likely reasons for this rise in concentration in GSIFI derivative activities are as follows:

M&As

- The financial crisis led to the 'failure' and absorption of some large institutions (Merrill Lynch, Wachovia, Lehman Brothers, Bear Stearns, Northern Rock, Country Wide, etc), which directly raised concentration favouring GSIFIs.

TBTF

- A clear distinction emerged between TBTF banks and those that were not too big. This

TBTF list certainly includes all the GSIFIs considered in this paper. All small banks, insurance companies, hedge funds and other clients of GSIFIs will now recognize that counterparty-risk is reduced by dealing with TBTF-banks. This is a major barrier to entry.

Technology barriers

- There are also high barriers to entry in terms of the set-up costs for large global businesses, and because of the need for sophisticated trading platforms with rapid execution times in derivatives businesses. Related to this are those barriers that arise from the need for strong risk management skills and systems in OTC derivative businesses.

Regulatory costs

- Other things given, higher Basel III and Dodd-Frank regulatory capital costs favour scale and volume.

Margin pressure and exit

- Ex ante margin pressure from regulatory reforms of Basel II & III and the Dodd-Frank Act will elicit the exit of the smaller less efficient firms from some of the derivatives businesses, as they will need to free up capital to look for better opportunities.

The netting incentive

- Regulatory changes under the Basel system permit bilateral counterparty netting for OTC derivatives, and some cross-product netting. This provides an incentive to deal directly with GSIFIs to maximize a greater bilateral netting pool to economise on capital (see the CVA discussion below).

Balance sheet efficiency

- Much of the regulatory arbitrage that arises from agency costs is due to the balance sheet efficiency of large globally interconnected banks that can trade in all jurisdictions and products. This favours a steady agglomeration of business in these GSIFIs.

Competition concerns

These trends are of concern for a number of reasons.

(1) Market efficiency and pricing:

- Most of the derivatives are provided in the opaque OTC market, where pricing is difficult to monitor, due in part to the tailored nature of the products. While transparency will improve somewhat with better reporting and more clearing required of some products in the reform process, it is clear that oligopolistic concentration is conducive to wide bid-ask spreads and lack of price competition.[6]
- Price discovery in financial markets where counterparties are concerned depends on opposite sides of the trade having different views. The fewer players there are the less divergent views on security prices there are likely to be. As already noted at the outset, the financial crisis was caused in part by the mispricing of risk. The increasingly concentrated nature of the derivatives market raises the chances of mispricing assets due to the lack of competition in bid-ask spreads.

(2) Consumer protection:

- The trend towards even more oligopolistic structures in OTC derivative markets will improve pricing power, offsetting the pressure on margins flowing from regulatory reform. This in turn adds to cost for the non-bank client base.

(3) Financial stability and bank interdependence:

- It is evident from the above analysis that concentration is rising in the bank-to-bank provision of derivative services. This is particularly so in the vast interest rate derivatives market and in equity derivatives. While foreign exchange has traditionally been a more competitive derivative market, there is a clear trend towards increased concentration in this market too. Increasing concentration and a smaller number of counterparties raises interdependence and the TBTF problem.
- Fixed income still dominates the revenue base of GSIFIs, and the interest rate derivatives business is a massive 75% of outstanding

notional derivatives. The notional outstanding size of equities derivatives, on the other hand, at 1.1%, is currently very small. Interest rate derivatives contain a lot of plain vanilla low margin business and the crisis has hurt previously very profitable structured products. Much of this business already trades on lower margin exchanges. The equity derivatives business is currently relatively more profitable following the Dodd Frank and Basel III reforms.

- Table 2.1 reproduces some illustrative private sector analysis that shows that the equity derivatives business in total, even after all the regulatory reforms, is expected to be twice as profitable (at 22%) as the overall investment banking business (at 12%). Within the equity derivatives businesses the following points can be noted:

  1. Delta one products (those with no optionality) are more than 3 times as profitable as the overall investment bank business at a 40% return on equity (ROE) on average. It can therefore be expected that exchange-traded funds (ETFs), and swap-based equity products generally, will be prime candidates for the next bubble-like trend in the GSIFI business models.
  2. Convertibles are next most profitable at 30% ROE on average.
  3. Structured equity products and prop trading look especially profitable in the EU, which are less affected by reforms.

Table 2.1. Expected GSIFI ROEs post regulatory reform

	CS	UBS	DBK	GS	MS	BNP	SG	BARC	BAC	Citi	Avg.
ROE before reg. Changes	23.5	22.7	19.9	23.4	19	19.2	17.2	17.8	na	na	20.3
Post Reg. ROE	13	11.5	10.5	13.8	12.4	13.8	10.2	12	na	na	12.1
Equity Derivatives Post Reg. ROE's											
Structure products	15	13	16	11	5	21	27	15	5	4	14
Flow equity	15	15	15	30	18	19	15	21	20	8	18
Delta one (ETFs, swaps, futures, forwards)	38	45	34	32	53	51	55	49	32	23	40
Convertibles	27	36	23	26	42	24	18	42	36	44	30
Prop. Trading	23	36	24	21	37	12	31	29	17	22	24
Total	22	26	21	20	22	24	29	27	17	15	22

Source: JP Morgan.

- Bubbles develop when (i) the macro rate environment is stimulatory; (ii) a clear profit arbitrage opportunity arises, often involving new products; (iii) early movers exploit the opportunities and gain in revenue market share, which induces entry into the business from other banks in a 'herd-like' manner. The equity derivatives business generally, and ETFs in particular, have all the early requirements for a bubble to develop. The sector is still small, particularly swap-based ETFs, and demand for them is high. For example, ETFs tie in nicely with revenue from stock lending and swap based ETFs from opaque derivatives pricing. Early movers were State Street and Black Rock, but now the large GSIFIs are growing these products quickly too. The concern here is that the competition for market share for the most profitable complex products, like the CDO in the lead up to the crisis, is likely to see derivatives activities concentrated in GSIFIs and rising leverage and inter-connectedness.

2.4. Derivatives and regulatory reform

Given the role of derivatives in the crisis, a number of reforms have recently been introduced which will affect – *ex-ante* – GSIFI revenues, ROEs and the structure of their businesses. This is very important, because derivatives involve relationships between counterparties that raise interconnectedness within the financial system. This section summarises recent reforms as they pertain to derivatives.

Dodd-Frank

The US has led the way through the Dodd-Frank Act of July 2010:

- *CCPs*: the aim is to rout a majority of OTC derivatives through central counterparty clearing houses (CCPs), which reduces counterparty and operational risks. However, this shift is unlikely to happen for customised structured products, and exemptions will apply for exchange rate derivatives and corporate end-users of derivatives.
- *SEFs*: all cleared swap transactions have to be traded on exchanges or through swap execution facilities (SEFs). This would lead to ex-ante margin compression for OTC swaps (affecting investment bank revenue which will be resisted) as the more transparent platforms should allow more competition from the shadow banking sector. However, the major GSIFIs control much of the flow in OTC

derivatives and are the natural candidates to be clearing members and will likely dominate the SEFs. There are many exemptions, for customised products, exchange rates and, of course, structured products will not be eligible for clearing.

- *Reporting*: Customized swaps that are subject to mandatory clearing will be subject to real-time reporting of price and volume. This will apply also to swap transactions reported to central repositories or the SEC. The EU is following suit here with similar requirements for all OTC derivatives. This sort of transparency will (other things given) reduce margins, as bid ask spreads are subject to greater scrutiny and competitive comparisons.

- *Bailout prohibition of some swap entities* (Section 716)*:* the '*entity*' definition includes practically everything (dealers, SEFs, CCPs, exchanges and counterparties). However, after some fight-back by banks, it will not apply to interest rate, exchange rate, and gold/silver swaps; nor will it apply to derivatives for hedging banks' own risks. GSIFIs will have to (effectively) ring-fence and separately capitalise and fund those parts of their swaps business to which the rule does apply: agriculture, un-cleared commodities, non-investment grade CDS, most metals, energy, and equity derivatives. Such measures will not apply at all within the EU. The credit rating needed to participate in the swap market would make the cost of transacting with the entities to which the Act applies higher – as banks would need more capital. US banks would therefore suffer in the swaps markets affected versus the EU. The scope is however very limited, as interest rate and foreign exchange derivatives constitute 89% of total derivatives (as shown earlier), and the rule will only apply to new businesses.

- *The Volcker rule:* The Volcker rule bans proprietary trading (i.e. the bank acting as principal using its trading account to deal in securities and derivatives). This will put pressure on ROEs of GSIFIs as this traditionally profitable business migrates elsewhere. But riskiness is reduced, and the large negative ROEs in crisis periods should be partly ameliorated. This measure will not apply within the EU.

Basel III changes affecting derivatives

Basel I, II, and III apply a capital charge to a bank's risk-weighted assets (RWA). Basel III makes the following adjustments to deal with derivatives counterparty risk:

- To add a capital buffer based on a stressed value at risk (VaR) (equal to 3 times the 10-day 99% VaR calculated during a period of high stress) to the ordinary VAR-based capital requirement. This will have the effect of raising RWA. This reform of the counterparty credit risk framework was motivated in part by wrong-way risk – *i.e.* when the probability of default of a counterparty is positively correlated with general market risk factors (like the monoline insurers).

- A Credit Valuation Adjustment (CVA) – is an additional up-front charge to cover mark-to-market unexpected counterparty risk losses, valuing counterparty risk in bond equivalents and applying the market risk (MR) regulatory charge to such bond equivalents (after deducting the IRC – incremental risk charge). The CVA is calculated within each of the netting sets, and is then added across netting sets.[7] The initial end-2009 proposal to multiply the standard benchmark CVA charge was abandoned after consultation with the banks in the final version.

- Standards for collateral management and initial margins will be strengthened, *i.e.* for these to act as offsets to calculated market exposures.

- In the models used by banks, the correlation factor between large financial entities (greater than USD 100bn assets) will be raised 25% to help address the interconnectedness issue (higher risk of exposure to financial firms).

- Central Counterparties (CCPs) are explicitly incorporated in the framework, where fully collateralized positions attract a modest risk weight (in the 1-3% range) – while highly favourable, the non-zero exposure recognises that CCP exposures are not risk free.

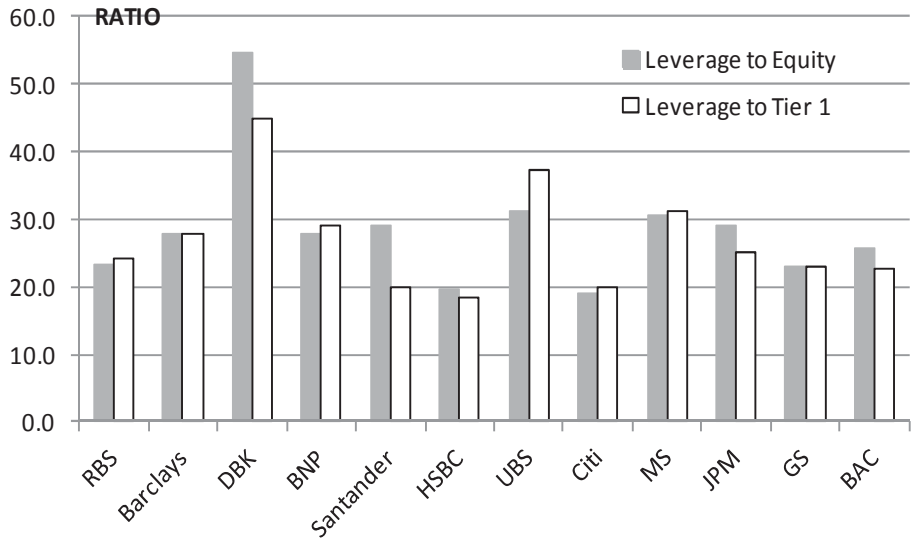
2.5. High leverage in the increasingly concentrated GSIFIs

This section examines the leverage of the GSIFI firms that dominate derivative flows, focusing on the role of derivatives. It also explains why the reforms summarised earlier will not be effective in reducing this element of risk without introducing an explicit leverage ratio. The subsequent section focuses on counterparty risk and explains how competition trends are increasing the concentration of these risks.

US GAAP (Generally Accepted Accounting Principles) accounting permits derivatives subject to netting agreements to be reported on the balance sheet on a fully net basis to measure total assets (TA). International

Financial Reporting Standards (IFRS) include fair value exposures in TA with limited netting.[8] Figure 2.14 shows leverage to Tier 1 capital and to equity less goodwill for US and European banks on a more comparable basis – with derivatives before cash collateral and counterparty netting added back in for the US banks. US banks look similar to other European banks on this basis. The EU banks shown still have on average less capital than US banks, 2.9% versus 4% of assets in the case of equity less goodwill, and slightly closer if Tier 1 is used (the EU banks use more hybrids). The UK banks on average are slightly more capitalized than US banks, and significantly better than the EU group.

Figure 2.14. **Comparing recent US and European leverage**



Source: Authors' calculations based on bank report data.

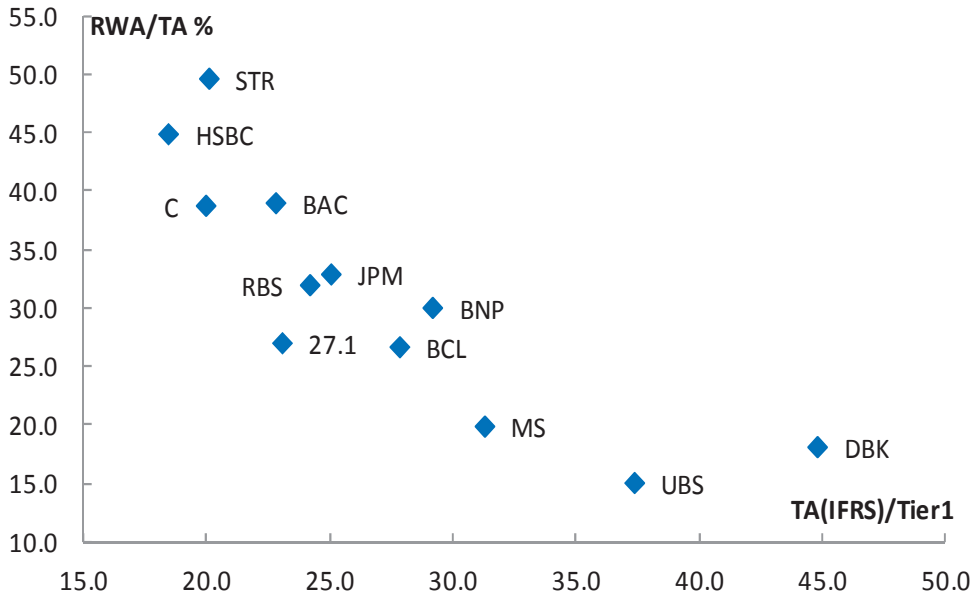
Figure 2.15 shows a cross section of the European and US GISIFIs RWA/TA and leverage ratios to Tier 1 capital, based on the more comparable (though still approximate) IFRS accounting basis at Q4 2010. The negative trade-off between these two variables is very clear. Banks are able to adjust the ratio of RWA/TA via:

- The use of derivatives which allows them to shift risk (e.g. by buying CDS contracts against high risk products written by lower

risk entities, often outside the banking system, as was the case for example with AIG).

- The use of internal risk models which allows banks to calculate exposures with mark-to-model prices for OTC derivatives and leaves considerable scope for judgment: (i) what volatility to consider; (ii) what spreads to use to reflect default risk; (iii) how to handle derivatives with binary outcomes like CDS, including their correlations with derivatives traded in continuous time; etc.
- The way netting and clearing is likely to work with the above regulatory changes (see below).

Figure 2.15. **Leverage and RWA/TA compared: assorted GSIFIs**



Source: Authors' calculations based on bank report data.

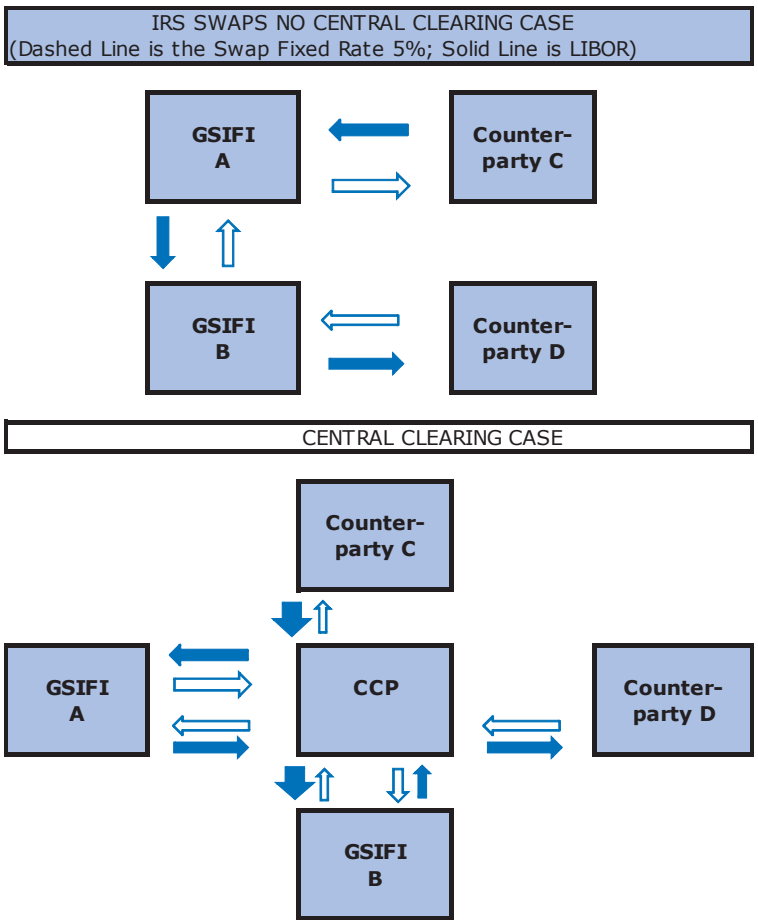
Since the Basel Tier 1 ratio applies to RWA, banks have considerable scope to reduce the ratio of RWA/TA and thereby minimise capital and promote higher leverage. It is of potential concern that such mechanisms would allow the lower leveraged banks shown in the upper left, to move into the higher leveraged area (lower right), with profitability objectives in mind. The question of how leveraged GSIFIs should be as they become more

concentrated remains a key policy issue that needs to be settled when calibrating a leverage ratio in the Basel III *parallel run* exercise.

2.6. Rising interconnectedness risk as the derivatives market becomes more concentrated

This section looks at derivative counterparty risk in the light of rising concentration, CCPs and the advent of the CVA charge. These developments will act to reduce competition and increase risks.

Figure 2.16. **Interest rate swap example**



No clearing: interest rate swap example (IRS)

Figure 2.16 sets out a simple derivatives trade situation without clearing in the upper panel: it is a 10-year fixed 5% (shown by the dashed arrows) versus floating LIBOR (shown by the solid arrows) swap. The two GSIFI banks A and B undertake the swaps with counterparties C and D, and each trade with a notional principal of USD 100m. GSIFIs A and B square up by the dealer practice of hedging the reverse trade with each other.

- If the swap fixed rate rises by 1% pa (from 5% to 6%), the hedgers gain and the losses to the three players with fixed commitments (A, B and D) is the present value of the 1% over the 10 years, or USD 7.4m each, (USD 22.4m in aggregate).
- If a fixed rate spread move of 10% pa should arise, as has occurred recently in European sovereign bond volatility, the loss to the payers of the fixed rate rises to USD 50.2m each, half of the notional value (and USD 150m in aggregate).

This illustrates that the CVA risk can be very large in unexpected stressed conditions, and it is highly unlikely that bank modelling for CCR and CVA will reflect this in an ex-ante sense. Banks never have a problem until they have a problem.

No clearing plus a netting set: GSIFI A (with IRS loss & CDS gain)

Now consider the case of GSIFI bank A, which is down USD 50m on the above IRS swap (the 10% move in rates) but is up USD 60m on a CDS position with counterparty C, where it has a netting agreement. This gives rise to a "current net gain of USD 10m up". Without clearing, and following the above Basel III reforms, the GSIFI bank A would be holding the following capital for that portfolio:

- The counterparty credit risk charge based on model-based expected positive exposure of the entire portfolio using a stressed calibration, which would be additive to the market risk charge that applied under Basel II.
- The CVA charge to address the mark-to-market losses based on loss given default (LGD) and the probability of default (PD), which is additive across netting sets.

TBTF & cross-subsidising risk

As noted earlier, banks have ample scope to reduce the impact of market risk modelling on RWA and hence on capital charges and leverage. From the market structure point of view, the IRB model approach to regulation may work to reinforce TBTF; risk modelling is a barrier to entry, because scale and sophisticated risk groups and technology are required to participate.

Furthermore, the models rely on credit spreads at which counterparties can borrow for discounting future cash flows of exposures. If a variety of collateral is posted for derivative trades it must be discounted at a variety of credit, currency and liquidity risks. Where GSIFIs are concerned, the TBTF problem is present with the result that credit spreads are less than would apply to separate derivative trading entities that do not have access to retail/commercial bank capital and official and unofficial guarantees and support. This reduces the associated capital charges. Risk (particularly from the viewpoint of the taxpayer) is likely to be underpriced and risk activities commensurately greater. Risk is subsidised by the TBTF status (and the explicit and implicit guarantees that lie behind it) while at the same time reduced spreads reinforce dealing with the concentrated entities.

Netting and Clearing

Concentration risk and netting

Close out netting reduces exposures in the event of an actual default. In the above simple netting set example of USD 50m down on the interest rate swap and USD 60m up on the CDS, the most the bank could lose in a close out is USD 10m compared to the USD 60 in the absence of netting. However, the fact that the CVA charge applies at the netting set level, and is additive across netting sets, means that it does not reward diversification. Suppose bank A in Table 2.2 has multiple counterparties (2 here for simplicity) and the gain/loss exposures are as shown. The CVA is additive and in the diverse counterparties case results in a positive capital charge related to the USD 10m and the -USD 10m. In the single counterparty (larger netting set) case there is no exposure for a counterparty charge.

More generally, the additive CVA gives no benefit for using a well-diversified set of counterparties, and instead rewards risk concentration in a smaller number of counterparties.

Table 2.2. **Netting & concentration**

A. Diverse counterparties	
P1: Netting Set 1	
IRS up	100
CDS down	-90
Net	**10**
P2: Netting Set 2	
IRS up	90
IRS down	-100
Net	**-10**

B. Concentration case	
One netting Set	
IRS up	100
CDS down	-90
IRS up	90
CDS down	-100
Net	**0**

The CVA charge in a netting context is therefore likely to reinforce concentration and the use of TBTF banks as counterparties. That is, it will reinforce the trends towards the highly oligopolistic derivative markets illustrated earlier. Risk is increased, because diversification is reduced while capital to absorb unexpected large losses in a crisis is minimised.

Concentration also reduces market efficiency in the pricing of risks. Efficient pricing requires a diversity of views. However, it is precisely this diversity that is undermined by rising concentration. The probability of mispricing risk is increased.

To give some idea of the enormity of derivatives netting some examples from US banks' 2010 accounts are illustrative: Bank of America had USD 1 519bn in gross derivative assets, but with counterparty netting of USD 1 406bn, and allowance for cash collateral, this reduces to only USD 73bn. JP Morgan had USD 1 529bn in gross derivatives that nets to USD 80bn. Citigroup had USD 654bn in gross derivatives that nets to USD 50bn.

Clearing

The lower panel of Figure 2.16 shows the case for the interest rate swaps where all of the deals are entered into with the CCP, instead of bilaterally. The GSIFI payment streams will all cancel each other out, as shown by the sets of 4 arrows for each versus the CCP. Only the un-hedged counterparty

D responsible for fixed yield flows to the CCP would have a USD 50.2m loss (in the case of the 10% spread move) with respect to the clearing house. In this way, clearing through the CCP greatly reduces the aggregate counterparty market risk.

The CCP gives rise to multilateral netting, which is something like Case B of Figure 2.17 on a grander scale.

Problems still remain with clearing

- Mandatory clearing of standardized derivatives that trade on exchanges or via Dodd-Frank SEFs would increase transparency, and undermine the ability of the bank oligopoly to maximize profits via bid-ask spreads. This is a very difficult area for which the way rules will be applied is unclear. Bank resistance to this is assured, and likely to spark new forms of regulatory arbitrage.

- As shown earlier, there are between 6 and 14 GSIFIs that control each of the various dollar derivative products (less for some other currencies). As these institutions dominate trading volume and control flows, they will likely also control an oligopolistic SEF market structure, and the anti-competitive issues discussed previously are unlikely to be fully ameliorated.

- There is likely to be significant exemptions to the use of CCPs. Derivatives traded on exchanges are less than 4% of the total, and of the 96% OTC derivatives many are customized and not traded. Definitions are difficult here, and the scope for GSIFIs to ensure products are exempt from clearing is very large. Furthermore, it has now been determined that the (highly-volatile) foreign exchange swaps will be exempted from clearing under Dodd-Frank. These exclusions and scope for structuring products to avoid the intent of regulation will become very similar to the capital arbitrage via shifting promises outlined earlier.

- Placing the CCP between counterparties does not remove the modelling and concentration problems discussed earlier. Clearing requires both market prices and liquidity, with the clearer taking on risk. Setting initial margins and managing variation margin calls between clients (where these are not exchange traded) will require modelling and all of the associated problems discussed earlier.

Where standard products can be cleared, it is likely that the CCPs will follow the patterns discussed earlier for the trends in derivative market concentration in the lead up to the crisis and its aftermath. That is, they will

likely compete at first on initial margin and variation margin rules. If risk is underpriced as a result of this process, then large losses could wipe out an undercapitalized CCP, and require it to be rescued by another CCP, or via the taxpayer. Indeed, the TBTF problem has in effect been transferred in part to the CCP, with every chance that it will under price risk and generate future problems. A CCP linked with many banks and trades certainly cannot be allowed to fail.

Furthermore, OTC products not subject to clearing will remain, and are in any case still quite capable of leading to another systemic crisis.

2.7. Policy options

Leverage ratio

The OECD has long backed the need for a leverage ratio, where the IFRS concept of derivatives exposure is used in the measure of TA.[9] On this basis, the parallel run idea of a 3% ratio, provided it is based on equity capital, would be a reasonable starting point. The idea that a leverage ratio discriminates against low-risk assets is rejected by the above analysis. The crisis amply demonstrated that in the age of complete markets in credit, there is no such thing as ex-ante fixed risk weights. The ability of financial firms to transform risk at will to obtain capital relief while expanding leverage is a risk in itself that needs to be dealt with by a leverage ratio.

Higher CVA Charge or OTC Derivative Transaction Tax

In principle, the problem of too much interconnectedness risk via derivatives could be dealt with by raising the CVA to a level that fully offset the under-pricing of risk. However, the efficiency of the charge would over time be reduced as it would reinforce the trends in concentration to expand netting sets with GSIFI domination of flows, including SEFs and CCPs.

Historically, the OECD has been against a general Tobin tax due to the negative impact it could have on liquidity in otherwise open and transparent markets. While this view still stands, it is worth considering whether a transactions tax in the form of a regulatory charge could not be applied to the OTC derivatives market.[10] The charge could be accumulated in an insurance fund to help underwrite the solvency guarantee of CCPs. The rationale for this more targeted approach is as follows:

- The OTC market is already characterised by illiquidity, so the standard objection may not apply or matter.
- The charge would raise the cost of derivatives, resulting in higher bid/ask spreads in the OTC markets to cover the additional cost. This would reinforce the demand for standardisation, clearing and trading on exchanges.
- The incidence of the charge would fall more on active trading of a short-term gambling/churning nature in those institutions where such trades were concentrated, rather than on longer-term final user hedging in the corporate sector. It would lengthen the holding period of derivative products.
- Such a charge would help to reduce the trend towards less socially useful derivatives activity implicit in the parabolic trends shown in section 2.

Either of these measures should be seen as a direct response to the under-pricing of risk and the TBTF issue discussed above – a 'subsidy' offset by the 'charge'.

Structural separation

It would also be quite possible to allow existing market mechanisms to manage interconnectedness risk, without the need for regulatory intervention, via initial margins, variation margin and the cost of liquidity provider channels. But this could only be achieved effectively by breaking up GSIFIs so that derivatives were only traded by entities that are legally separate from retail banking and commercial banking activities – not unlike the Dodd-Frank treatment of certain exotic OTC swaps. The OECD has long supported the idea that key investment banking and dealer activities should be carried out within a strict subsidiary structure – a non-operating holding company (NOHC) with firewall provisions.[11] The US Dodd-Frank Act has gone some of the way in this direction with the treatment of certain swap entities and the Volcker rule.[12] The point of separation is to make it clear that deposit insurance and government bail-out mechanisms will not apply to the derivatives entity, which would not be bailed out in the event of a crisis, and where transfers of capital and securities between the different entities within the group would be prohibited or subject to regulatory approval.

This would ensure that collateral requirements of counterparties and clearing houses would be based on the clear understanding that the entity trading derivatives would be separately capitalized (and hence more

expensive) and not a beneficiary of implicit or explicit government guarantees. Liquidity provision for posting collateral would occur in an arms-length manner or (preferably) with third parties. Collateral requirements and liquidity finance would be based on a much better appreciation of the risk that the entity could fail and cross subsidization from TBTF would cease. The cost of transacting derivatives business would rise.

Far from this being perceived as a problem, it should be seen as a counterbalance to the systematic under-pricing of risk and the undercapitalisation of financial institutions – which were the most fundamental basic causes of the global financial crisis.

Notes

1. The correct concept to examine for the purposes of this paper is the notional value of outstanding derivatives, the size of which is the exposure of financial institutions to price risk. It also reflects the potential command over assets and resources that clients have, and is the basis on which fees are paid to broker/dealers. The close out value of vast derivative positions—in the money and out of the money—could in principle be zero, giving a highly misleading picture of the derivatives market in terms of its role in the economy and the risks attached to it.

2. See Blundell-Wignall, A. and P.E. Atkinson (2008), "The Sub-prime Crisis: Causal Distortions and Regulatory Reform", in *Lessons From the Financial Turmoil of 2007 and 2008, Reserve Bank of Australia; and UBS (2008), "Shareholder Report on UBS Writedowns",* UBS AG, 18 April.

3. The Herfindahl index sums squared market shares, expressed in percentages, across all firms with a maximum score of the index of 10000. A score of 10000 would imply that one firm supplies the market. The index is interpreted as the reciprocal of the index times 10000, which is equivalent to the number of firms with equal share that are providing the service.

4. There is a little more competition (less concentration) between reporting banks themselves.

5. The notable failure of Bankers Trust allowed Deutsche Bank to take a strong position in US investment banking.

6. There have also been rumours of collusive behavior in the derivatives market. See Louise Story, "A Secret Banking Elite Rules Trading Derivatives", *The New York Times,* 12/12/2010.

7. The notional of the bond is the EAD of the counterparty, (treated as fixed); the maturity of the 'bond' is the effective maturity of the longest dated netting set of a counterparty; and the time horizon is 1-year (as opposed to the 10 day period for MR).

8. There must be an intent to settle on a net basis, or to realize the asset and settle the liability simultaneously.

9. See OECD (2009), *The Financial Crisis: Reform and Exit Strategies*, Paris.

10. Such a very small charge applies in Germany.

11. See OECD (2009), ibid.

12. At the time of writing there are also press reports that the Swiss regulator favours some form of separation for its banks IB activities. The UK is also considering ring-fencing retail banking activities. See Independent Commission on Banking (2011).