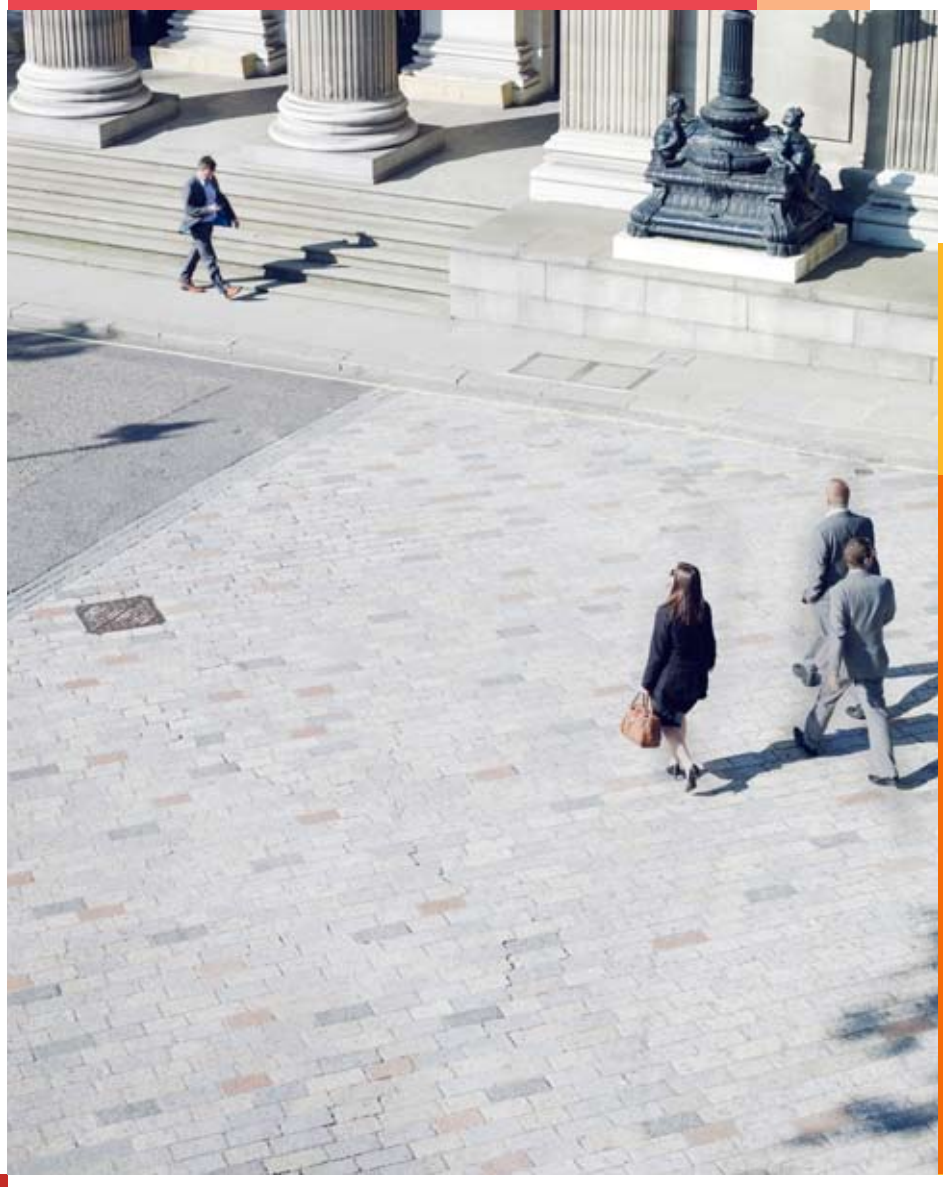
Banking in 2050

How the financial crisis has affected the long term outlook for the global banking industry.

May 2011



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Contents

1. Executive Summary

The accelerating shift in economic power from the developed to emerging economies is dramatically changing the banking industry across the world.

Leaders of financial institutions need to take advantage of the growth opportunities this change is creating. This report provides projections of the long-term trends of the banking sector based on the underlying macro-economic trends, from now until 2050 for the world's leading economies.

PwC* have prepared this report to help organisations develop their long-term strategy and plans. Our analysis quantifies the projected size and growth of the banking sectors for different economies. We identify the projected timing of the key transitions when the emerging economies become leading players. And crucially, we demonstrate these changes have accelerated since the period prior to the global financial crisis, placing greater demands on industry leaders to respond effectively to these opportunities.

The recent global financial crisis shook the world economy and set in motion significant changes to the banking industry. In this report we present updated projections on how large we expect the banking industry to become in the world's largest economies over the next 40 years, building on our 2007 report on this same topic that was produced prior to the onset of the financial crisis,[1] and our updated GDP projections published earlier this year.[2] Our key findings are that:

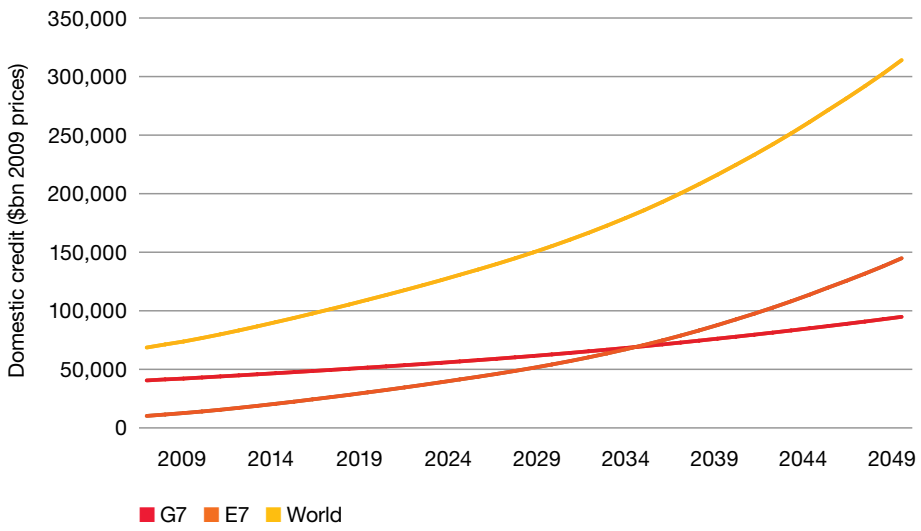
- The emerging economies' banking sectors are expected to outgrow those in the developed economies by an even greater margin than we projected before the financial crisis.
- By 2050 the leading 'E7' emerging economies could have domestic banking assets and profits that exceed those in the G7 by around 50%.
- China could overtake the US in terms of the size of their domestic banking sectors by around 2023.
- India has particularly strong long-term growth potential and our projections suggest it could become the third largest domestic banking sector by 2050 after China and the US, but ahead of Japan, the UK and Germany. Brazil could also rise strongly up the global banking league table over this period.

* "PwC" refers to the network of member firms of PricewaterhouseCoopers International Limited (PwCIL), or, as the context requires, individual member firms of the PwC network.

1 "Banking in 2050: How big will the emerging markets get?", June 2007, http://www.pwc.com/gx/en/world-2050/banking-sector.jhtml

2 "The World in 2050, The accelerating shift of global economic power: challenges and opportunities", January 2011, http://www.pwc.com/gx/en/world-2050/the-accelerating-shift-of-global-economic-power.jhtml

Figure 1: Projections of domestic banking assets in the E7 and G7



Source: PwC analysis, IMF

Table 1: Dates at which E7 economies overtake G7 in terms of the size of their domestic banking assets

Country pairs	Overtaking year (2011 analysis)	Overtaking year (2007 analysis)
E7 overtakes G7	2036	2046
China overtakes US	2023	2043
India overtakes Japan	2033	2041
Brazil overtakes UK	2045	-
Russia overtakes Italy	2039	2047
Mexico overtakes Italy	2048	2038
Turkey overtakes Canada	2045	-

Source: PwC model projections (where no date is shown this indicates overtaking dates beyond 2050)

Our long-term projections for the E7 and G7 domestic banking assets are displayed in Figure 1. Over the projection period we expect the E7's domestic banking assets grow at a faster rate than those of the G7 resulting in the E7 overtaking the G7 around 2036.

Table 1 presents the years in which we project the emerging economies to overtake the developed economies. We compare these projections with those from our 2007 analysis, and broadly we find that the emerging economies overtake the developed economies earlier than in our original projections. This suggests that the financial crisis has brought about an acceleration in the shift in economic power from the developed to the emerging economies.

What questions does this analysis raise?

The analysis in this report can help banks, other financial corporations and policy-makers to identify the key long-term macroeconomic trends likely to affect banking over the next 40 years. This should help to stimulate strategic discussions and identify key opportunities and threats relating to the emerging markets in particular.

Particular questions your organisation may want to consider are:

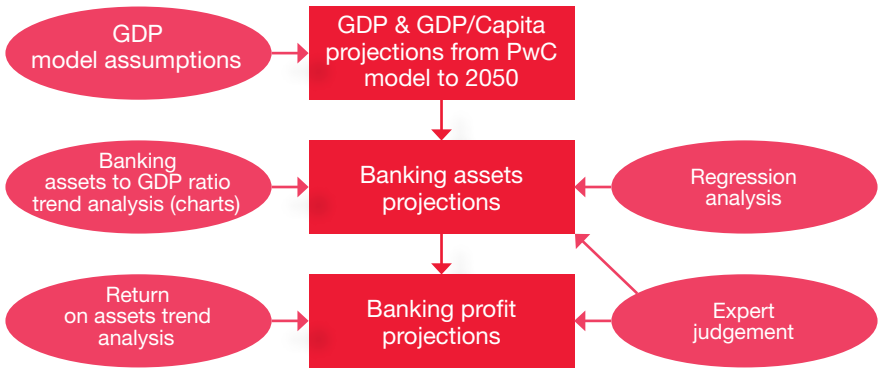
- Which economies have the greatest future potential for growth and investment? What are the areas of greatest competitive advantage for our organisation?
- What growth strategies are open to our business to compete in this shifting global landscape? Will competition become more intense? Is greater consolidation an effective strategy? How should opportunities be valued given these growth expectations?
- What types of banks will we see developing in the emerging economies (e.g. universal high street banks or more specialised or localised players) and how will they integrate with and shape the future evolution of the global financial system (e.g. as regards dominant currencies)?
- How will new regulatory capital and other requirements impact these growth trends globally and within geographies where implementation may be more or less restrictive? How will the use of securitisations impact these growth trends?
- The pace of prospective growth in global banking assets is likely to exceed the sector's capital generation from retained earnings raising the question: where will the capital to support the growth in banking assets come from?
- To what extent will non-bank investors such as funds and insurance companies be able to access the lending markets across the world directly (as lenders) or indirectly (through securitisations)?
- Will the asset growth in Asian banks create a new cadre of international banks that will come to dominate the global markets and feature prominently in banking M&A? What threat could this pose to the current leading banks and could this lead to a defensively inspired phase of banking consolidation?

2. Approach

Overview

In this section we present an overview of our methodology. We follow broadly the same approach that we used in our 2007 analysis, as summarised in Figure 2. Starting from GDP projections (as reported in the latest update of our "World in 2050" report in January 2011[3]), we then developed projections for the amount of domestic banking assets in each economy. We investigated banking profits by applying a country specific net interest margin to the domestic assets. The technical details of this approach are given in the Annex.

Figure 2: Global banking projections model structure



Note: all projections done by country then aggregated to global level

Source: PwC model

3 "The World in 2050, the accelerating shift of global economic power: challenges and opportunities", January 2011, http://www.pwc.com/gx/en/world-2050/the-accelerating-shift-of-global-economic-power.jhtml

4 Note that these five countries were not included in our 2007 'Banking in 2050' report, but are included here as they have long-term potential and were included in the latest update of our 'World in 2050' GDP projections.

5 We concentrate on domestic lending only as this allows for the greatest consistency in data between countries.

We included the following 22 countries in the analysis on the basis that, based on earlier model projections, we expect them to have the largest economies in the world by 2050:

G7 countries: US, Japan, Germany, UK, France, Italy, Canada

E7 countries: China, India, Brazil, Russia, Mexico, Indonesia, Turkey

Other developed economies: Australia, Republic of Korea, Spain

Newly emerging economies: Argentina, Vietnam, Nigeria, Saudi Arabia, South Africa[4]

GDP projections

We began by taking our updated long-term GDP projections as the basis for our projections for domestic credit. As explained further in the Annex, these projections incorporate the effects of:

- the expected growth of the working age population (as projected by the UN);
- projected growth of human capital (proxied by education levels) and physical capital (driven by assumed investment to GDP ratios after allowing for depreciation of the existing capital stock); and
- total factor productivity growth (global technological progress and lower income countries catching up with richer ones by making use of their technologies and resources).

The projections also allow for real exchange rate increases over time in the emerging economies linked to their stronger expected productivity growth (the so-called Balassa-Samuelson effect). This means that real GDP growth in emerging economies is typically higher when measured in US $ terms than in domestic currency (or PPP terms).

We also combined these GDP projections with UN population projections to determine GDP per capita trends. From previous research, we know this per capita income measure is a useful indicator of the state of development of each economy, which is a key driver of the size of an economy's banking sector as a share of GDP.

Domestic banking asset projections

Our baseline projections were derived by assuming an underlying upward trend in the domestic[5] credit to GDP ratio in line with historic trends for the countries concerned (using IMF data). We also allow for gradual convergence to the norm for countries with relatively high or low initial banking to GDP ratios relative to their state of economic development. This convergence occurs at a relatively slow rate of around 2-4.5% per annum, depending on the country concerned (as explained further in the Annex).

Having generated these projections for the ratio of domestic credit to GDP, we then obtained the absolute amount of domestic credit by applying these ratios to our GDP projections at market exchange rates.

Banking profitability

We investigated the projected profitability for the banking sector by determining the profits from the net interest margin (NIM) on domestic banking assets for each economy. Our approach was to take data from Fitch on the NIM in different countries, and to project forward these values under a convergence scenario where the NIM in each country tends to a common value by 2030 (given by the global weighted average NIM in 2004-8). Applying the projected NIM rates to the domestic assets in an economy gives a measure of income from lending activity and thus indicates the level of profits.

In our 2007 report we used return on assets (RoA) as our measure of banking profitability. However, we decided not to use this measure in this updated analysis because it has become much more volatile over the course of the financial crisis and so less reliable as a starting point for a long-term profitability analysis. NIM rates have been less volatile and are more closely related to the domestic asset base used in this study as the measure of banking size in each country.

Key assumptions and uncertainties

Our analysis rests on the following broad assumptions:

1. Governments follow broadly growth-friendly policies across the period for the projections (e.g. maintain reasonable macroeconomic stability, remain open to trade and investment, maintain a reasonable rule of law etc.)
2. There are no catastrophic events that permanently throw growth off track (e.g. nuclear war, major global climate disasters) – as opposed to temporary cyclical fluctuations that we ignore as we are focusing here on long-term potential growth.

These assumptions are, of course, subject to many uncertainties over the projection period. Our results should therefore be taken as indications of the potential future scale of domestic banking assets and profits conditional on these assumptions, rather than being forecasts to which spurious precision is attached. The purpose of the analysis is to point to broad strategic trends in the long run not to make detailed predictions that are bound to be wrong to a greater or lesser degree given the uncertainties involved in any such long-term exercise.

3. How large will the emerging economies become?

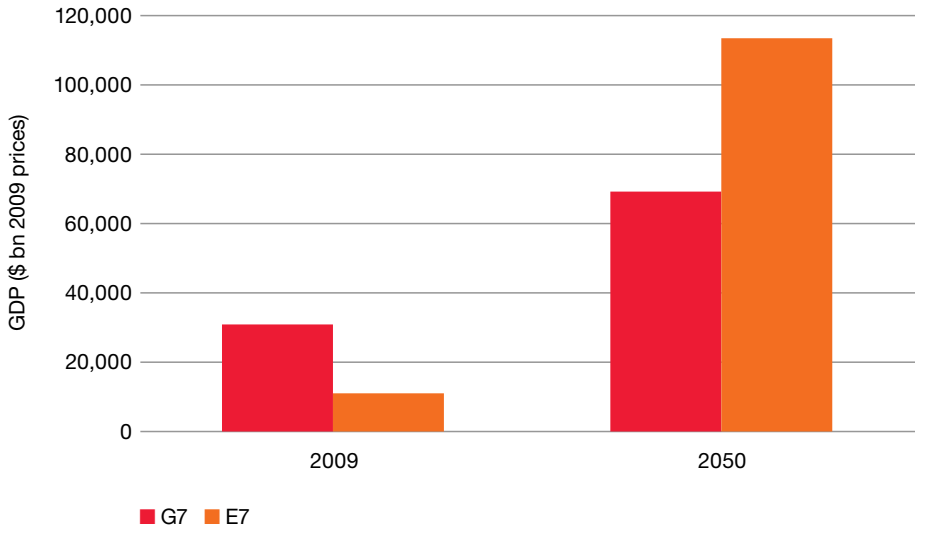
Our analysis for banking assets rests heavily on the trends in GDP and GDP per capita of the countries studied. In our research "World in 2050", we published our projections of the GDP for the different economies considered in this report. In this section we highlight some of the key findings from this research relevant to the results for our banking projections.

The global economic power shift from the G7 to the E7 is speeding up

"World in 2050: The accelerating shift in global economic power: challenges and opportunities" presents our GDP projections for the 20 largest economies in the world. We have used the results from this analysis to determine the size of domestic credit in these economies. Therefore to understand the results for the banks, it is useful to first understand the main changes we expect to see in the size of these economies.

Figure 3 shows the GDPs of the E7 and G7 in 2009 and our updated projections for 2050 (measured in constant 2009 US$ at market exchange rates). We see from the chart that in 2009, the GDP of the E7 is approximately one third the size of the G7, but by 2050 the E7 could grow to be more than 60% larger than the G7. Our analysis also suggests that the E7 could overtake the G7 in terms of GDP at market exchange rates in around 2032 (at PPPs this could occur by 2020, but this is less relevant for the present report).

Figure 3: GDP projections for the G7 and the E7 to 2050



Source: IMF for 2009, PwC model projections for 2050

We expect China could overtake the US by around 2030 based on GDP measured by market exchanges rates (it could be before 2020 based on PPPs). However, we expect China's rate of growth to slow down over time due to its rapidly ageing population as a result of its single child policy and as its growth needs to become increasingly based on its own innovations rather than just replicating the innovations of the developed economies.

India's rate of growth by contrast is expected to overtake that of China's in the long run as it has more catch-up potential and its working age population growth will be much stronger in the long-term. India's share of global GDP in $ terms could therefore increase from only 2% in 2009 to around 13% in 2050 after allowing also for potential real exchange rate increases. This makes it one of the most rapidly growing economies over this time period. However, to sustain these high growth rates India must continue to pursue growth-friendly policies (e.g. invest in infrastructure, open up its markets to increased competition, reduce budget deficits, increase rural education levels particularly for women and reduce bureaucracy).

Table 2 shows how the projected average growth rate for GDP measured in constant 2009 US $ at market exchange rates can be broken down into three components: population growth, real GDP per capita growth and a real exchange rate change.

Table 2 Components of projected potential GDP growth (% pa average, 2010-50)

Country	Contribution from population growth (%)	Contribution from real GDP per capita growth (%)	Real GDP growth in domestic currency terms (%)*	Changes in real market exchange rates (%)	Real GDP growth in US $ terms (%)
	(A)	(B)	(C = A + B)	(D)	(E = C + D)
Vietnam	0.7	6.1	6.8	1.9	8.7
India	0.8	5.3	6.1	1.9	8.0
Nigeria	1.5	5.0	6.5	1.3	7.8
China	0.1	4.6	4.7	1.1	5.8
Indonesia	0.6	4.1	4.7	1.1	5.8
Turkey	0.6	3.4	4.0	1.0	5.0
South Africa	0.3	3.6	3.9	1.1	5.0
Saudi Arabia	1.4	2.7	4.1	0.9	5.0
Argentina	0.6	3.0	3.6	1.2	4.8
Mexico	0.5	3.2	3.7	1.1	4.8
Brazil	0.6	3.3	3.9	0.5	4.4
Russia	-0.7	3.2	2.5	1.4	3.9
Republic of Korea	-0.3	2.6	2.3	0.9	3.2
Australia	0.7	1.9	2.6	-0.2	2.4
US	0.6	1.8	2.4	0.0	2.4
UK	0.3	2.0	2.3	0.1	2.4
Canada	0.6	1.7	2.3	-0.1	2.2
Spain	0.1	1.8	1.9	0.1	2.0
France	0.2	2.0	2.2	-0.5	1.7
Italy	-0.2	1.9	1.7	-0.2	1.5
Germany	-0.3	1.9	1.6	-0.3	1.3
Japan	-0.5	2.1	1.6	-0.5	1.1

Source: PwC long-term GDP growth model projections (World in 2050 report, January 2011)

There are several important points to note from these GDP projections:

1. There is a natural segmentation of the countries into two groups: emerging economies (E7 and the newly emerging economies) with high expected rates of growth (typically 4% or more per annum including real exchange rate appreciation) and the developed economies (G7) with much lower rates of growth (typically less than 2.5% per annum including real exchange rate changes). South Korea is an intermediate case here between the E7 and G7. We will see a similar E7-G7 growth differential when we consider the expected growth rates of domestic banking assets in Figures 4 and 5 on P13.
2. Projected changes in population have an important effect on some countries' relative growth rates. For instance, Russia, Japan and Republic of Korea are expected to experience population falls, depressing overall GDP growth. Nigeria, Saudi Arabia and India are all expected to experience strong population increases, thereby boosting overall GDP growth. Some advanced economies (e.g. US, Australia) are projected to have stronger population growth than some emerging economies (notably China due to its one child policy).
3. The emerging economies' market exchange rates are expected to appreciate over time in real terms due to relative stronger productivity growth (the so-called Balassa-Samuelson effect). This provides a boost to growth in all of the emerging economies when measured in real US$ terms. Note that this real exchange rate appreciation could arise due to nominal appreciation and/or higher inflation rates in the countries concerned.[6]

Of course, as noted in the previous section, the precise growth projections shown in Table 1 are subject to many uncertainties and should be taken as indicators of economic potential rather than precise forecasts. However, the broad messages discussed above on relative growth rates of emerging and developed economies seem likely to be more robust.

6 To illustrate this effect consider the problem of valuing a house located in the Euro zone in US$. Suppose its initial value is €100,000, and the market exchange rate is 1€/$. Then the value of the house in dollars is $100,000. Over time the value of the house will change as measured in local currency, reflecting local market conditions, the economy etc. Measured in US$ however, there could also be a corresponding change in value due to changes in the real exchange rate. If the euro appreciates against the dollar in real terms, it will be worth relatively more in dollar terms. So in our example, suppose that after one year there is an increase in the value of the house of 5% in the local market, and an appreciation of the euro against the dollar resulting in an exchange rate of 0.95 €/$. The value of the house at the end of the year is therefore €105,000 or $110,526. Here we can see that there is a higher rate of growth in the dollar value of the house, arising from the appreciating exchange rate, in addition to the increase in value due to local market conditions. The situation for international comparisons of GDP is analogous to this.

4. Domestic banking assets – historic trends

In this section we review how domestic banking assets in the countries of our study have varied over time. This is useful as it offers insights of important differences between countries and how they are likely to evolve.

Country trends

Developed economies

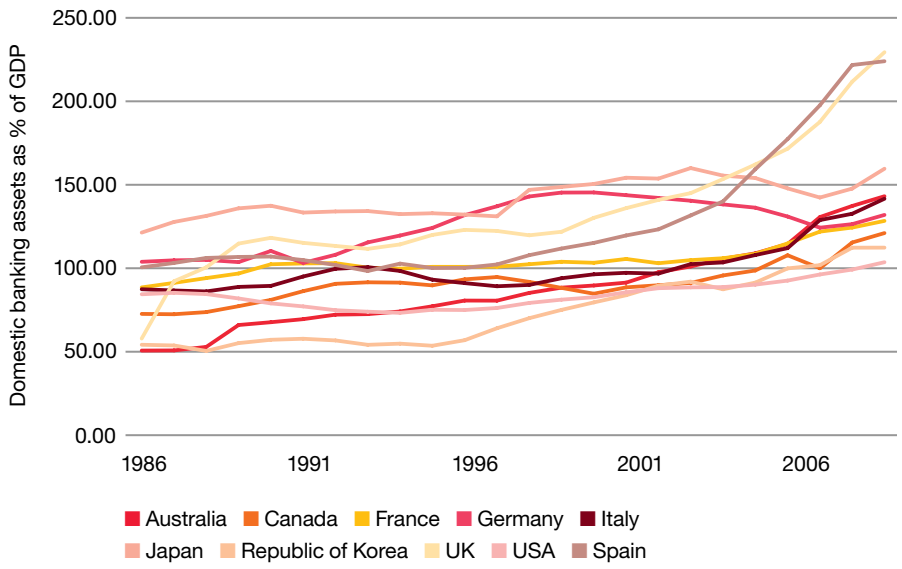
Figure 4 shows historical trends in the ratio of domestic banking assets to GDP for the major developed economies. The general trend is that of a gradual upward trend in the ratio over time from around 50-100% of GDP in 1986 to around 100-230% of GDP in 2009. However, there are considerable variations in these trends across countries. We can note in particular that:

- The banking assets to GDP ratio for the UK and Spain has increased particularly strongly over the past 7 years, resulting in ratios of over 200% of GDP. This is the result of property booms in these countries as well as the role of leveraged private equity deals and general expansion of the financial sector's role in these highly leveraged economies. We consider it most likely that this high level of credit relative to GDP is unsustainable[7] in the long run, and therefore we project this ratio to fall over the coming decades to one that is more in line with other developed economies.
- The US has a relatively low ratio of banking assets to GDP based on the IMF domestic credit definition used here in comparison with most other developed economies. This is likely to be due to the fact that in the US a much greater proportion of financing takes place through securities markets rather than through bank lending.[8] So whilst there are high levels of leverage in the US economy as a whole, a large proportion of this debt will be held by non-bank organisations, and therefore do not feature in this analysis based on the IMF definitions used for this study.

7 For the UK, we looked at this issue of excessive public and private sector debt levels in detail in an article in our November 2010 UK Economic Outlook report, http://www.pwcwebcast.co.uk/ukeo_nov2010_debt.pdf

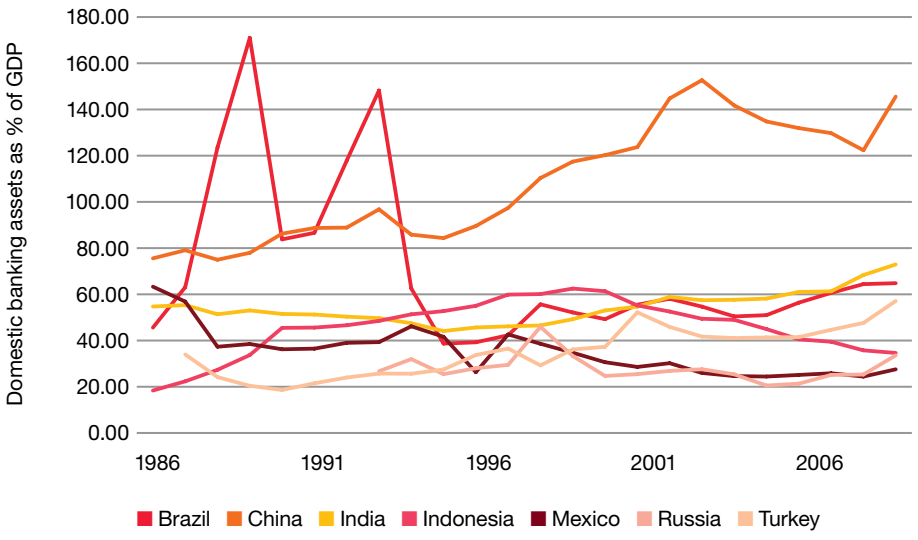
8 The average value of outstanding US securitised debt in 2009 has been variously estimated at between $3.6 trillion and $5 trillion, or around 25-35% of US GDP. However, whether it is appropriate to consider this as part of the assets of the banking sector, and whether there may be double counting if we just add this into our measure of domestic credit, is less clear. For the purposes of this study, therefore, we note this point but do not try to add in securitisation assets for the US or other countries.

Figure 4: Ratio of domestic banking assets to GDP in developed economies



Source: IMF

Figure 5: Ratio of domestic banking assets to GDP in the E7 economies



Source: IMF

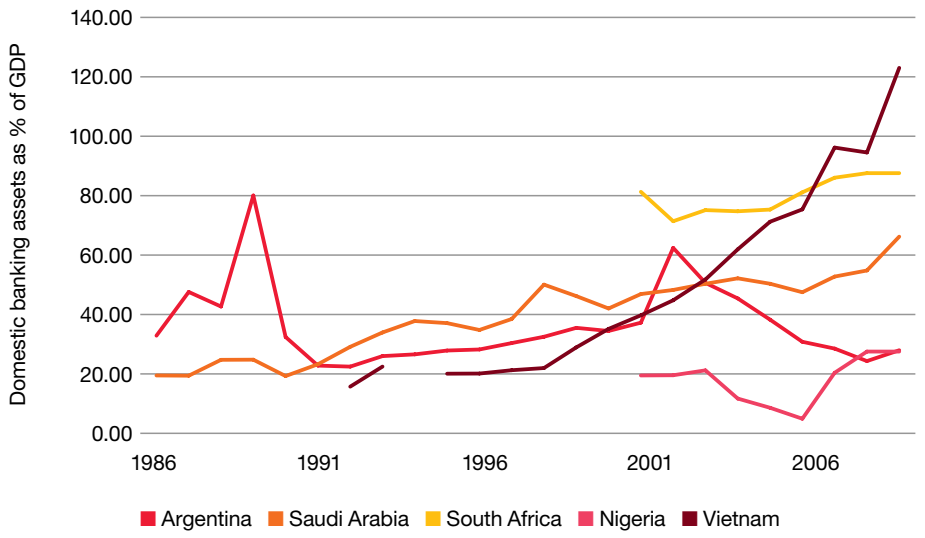
- South Korea is an interesting example of a country that has changed from being an emerging economy into a developed economy over the last 30-40 years. Between 1988 and 2000 Republic of Korea had the lowest ratio of banking assets to GDP of the developed economies considered in this study, but this ratio has since risen to a level more in line with the other developed economies. This mirrors the broad trends we expect in the future from other emerging economies that are currently less far along the development track than Republic of Korea (as discussed in Section 5 of this report).

E7 Economies

In Figure 5 we show the trend in the ratio of domestic banking assets to GDP for the E7 countries. We can note from this chart that:

- China has by far the highest ratio of the E7 economies. In the past this has been due primarily to high levels of lending to state enterprises, although more recently property-related lending has also grown rapidly in China and state enterprise lending has declined in relative importance as the Chinese economy becomes increasingly driven by private sector companies.
- Some of the other countries display the effects of past financial and economic crises. For instance, Brazil has two sharp peaks in its ratio corresponding to its financial crisis and hyperinflations between 1986 and 1994. More recently, however, its economy has been much more stable and its longer term prospects appear strong.

Figure 6: Ratio of domestic banking assets to GDP in newly emerging economies



Source: IMF (no available 1994 data for Vietnam)

- Indonesia and Mexico have both displayed sustained declining banking asset to GDP ratios from 1999 and 1997 respectively, with Mexico stabilising around the middle of the 2000s. This is most likely an after effect of the Peso crisis (Mexico) and the Asian crisis (Indonesia), reflecting a long recovery and rebalancing of their economies. This result is important when we come to consider how developed economies will recover from the financial crisis, particularly for those that are highly leveraged (e.g. UK, Spain). History suggests that it takes a long time for banking systems to recover fully from such major crises.

Newly emerging economies

Figure 6 shows historic trends in banking asset to GDP ratios in the newly emerging economies. Our analysis of these countries is limited by the availability of data, but we can identify some broad trends:

- Vietnam has shown a strongly increasing ratio since 1998. As in the case of China, this is most likely due to the large amount of lending to state owned enterprises in earlier periods combined with strong growth in property-related lending in more recent years.
- Argentina has seen a declining ratio of banking assets to GDP during its gradual and painful recovery from its financial crisis in the early 2000s.
- From the limited data we have for Nigeria, we see a fair degree of volatility that could originate from a combination of political uncertainty and its dependence on oil revenues. In absolute terms, Nigerian banking assets remain low relative to GDP but have long-term potential if the government can follow broadly growth-friendly policies and diversify its economy away from oil in the long run. Banking sector development will be an important element in this process for Nigeria and other emerging economies that have traditionally been heavily dependent on revenues from natural resources.

Key changes due to the financial crisis

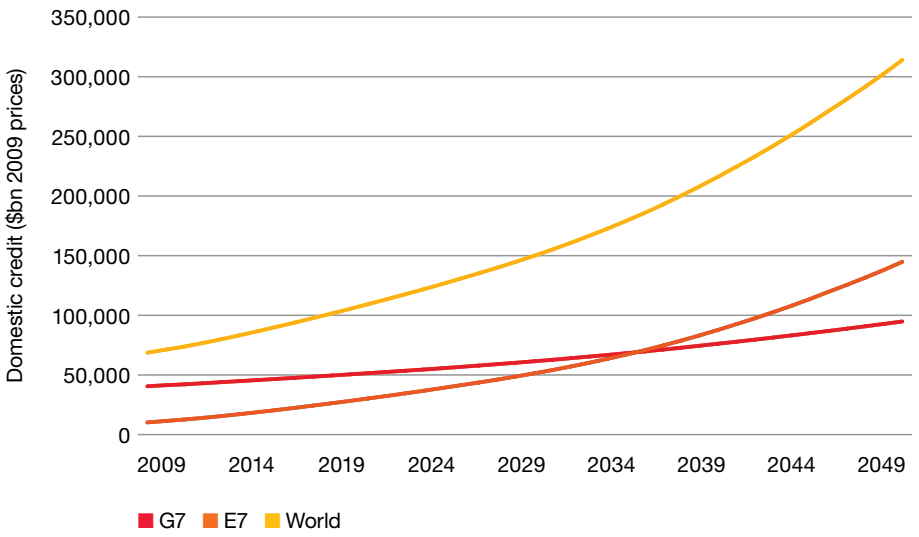
We can see varied trends in how economies' ratios of domestic banking assets to GDP have fared over the financial crisis period since 2007. In most developed economies this ratio kept on increasing, probably reflecting a combination of a decrease/slowdown in GDP and increased lending to governments to finance their fiscal interventions and growing budget deficits. For the E7 and newly emerging economies the ratios also increased, but this largely reflected continued healthy private sector growth after relatively short cyclical downturns due to the crisis. In addition, some countries such as China embarked on significant fiscal stimulus programmes and encouraged higher bank lending to prevent recessions from taking hold.

5. Projections of banking assets and profits to 2050

Projections of domestic banking assets

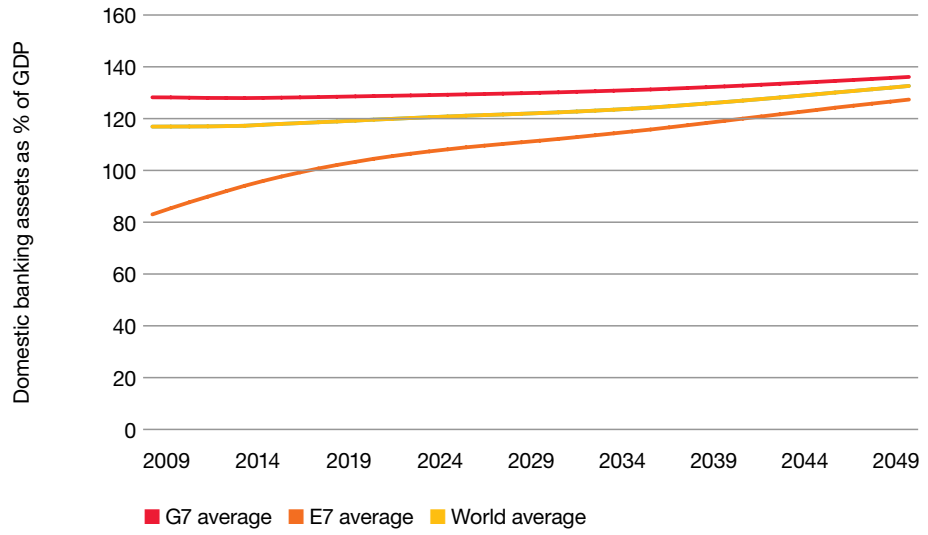
Figure 7 shows the key result of this report. It shows the projected trend level of domestic credit in the G7, E7 and the World over the period to 2050. We project E7 banking assets to grow significantly faster than those in the G7, and to overtake the G7 around 2036 (compared to around 2044 in our 2007 report on this topic). The financial crisis therefore does appear to have accelerated this global shift of economic and financial power to the emerging economies. By 2050 the E7's banking assets are projected to be approximately 50% greater than those in the G7.

Figure 7: Projections of domestic banking assets in the E7 and G7



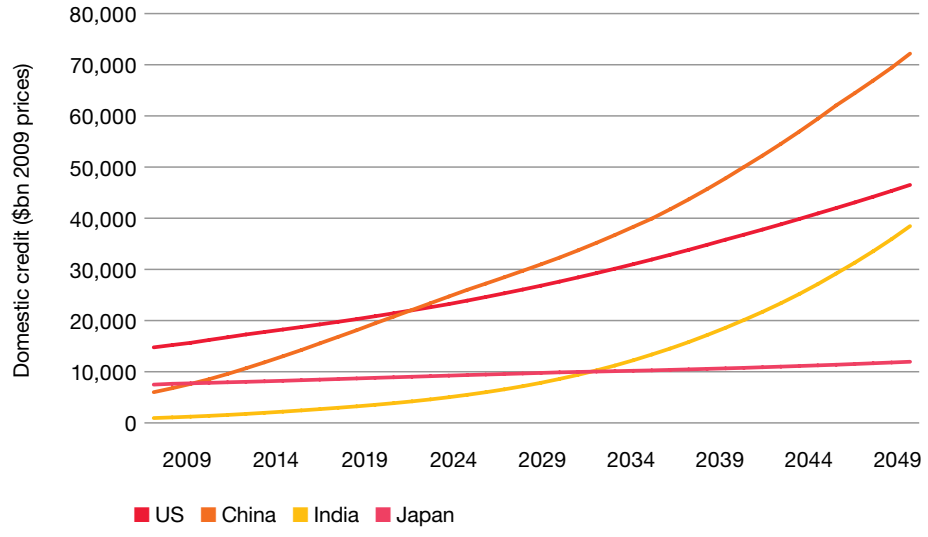
Source: PwC analysis, IMF

Figure 8: Projected ratio of domestic banking assets to GDP



Source: PwC analysis using IMF base year data for 2009

Figure 9: Domestic banking assets for the US, China, India and Japan



Source: PwC analysis using IMF base year data for 2009

It's worth noting that the changes in relative E7/G7 banking assets are not exactly the same as the relative change projected in E7/G7 GDP. The reason for this in our model is that the ratio of domestic banking assets to GDP also evolves over time in different ways for the E7 and G7, as illustrated in Figure 8. The average ratio in the G7 remains relatively stable over the projection period. In the emerging economies the ratio rises fairly quickly initially, but then converges more slowly on the world average towards the end of the projection period. This is the result of these economies maturing into developed economies with slower trend growth rates by the end of the projection period.

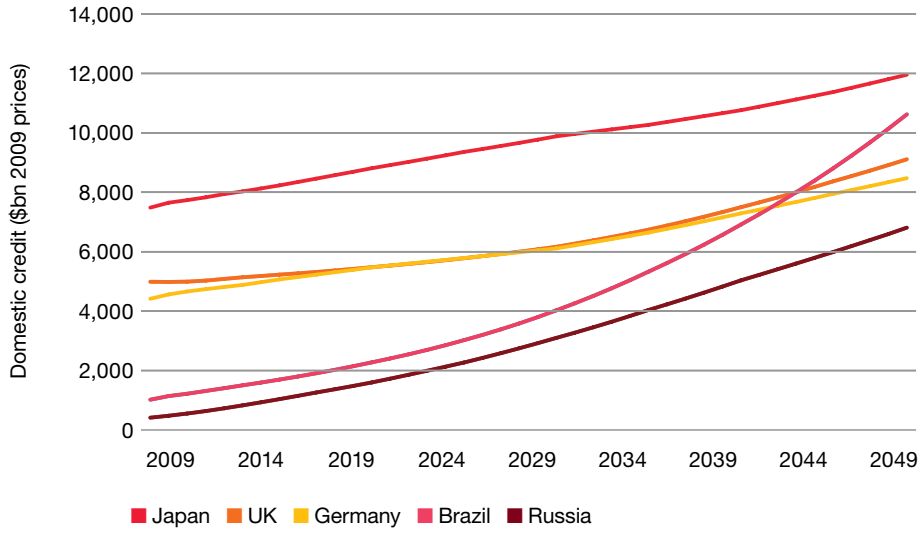
We also looked at projected changes in levels of domestic banking assets at a country level. In Figure 9 we plot the changes in domestic assets over the projection period for the US, China, India and Japan. The key results here are that China could overtake the US in 2023, and India could overtake Japan in 2033. In our previous analysis published in June 2007, China was projected to overtake the US in 2043, and India to overtake Japan in 2041. Although the exact transition dates are open to considerable uncertainty, it seems likely that China will have the largest domestic banking assets in the world at some point within the next 20-30 years and that India will move clearly into third place by 2050.

Table 3: Comparison of previous results with updated results: overtaking years for E7 vs G7 economies

Country pairs	Overtaking year (2011 analysis)	Overtaking year (2007 analysis)
E7 overtakes G7	2036	2046
China overtakes US	2023	2043
India overtakes Japan	2033	2041
Brazil overtakes UK	2045	-
Russia overtakes Italy	2039	2047
Mexico overtakes Italy	2048	2038
Turkey overtakes Canada	2045	-

Source: PwC model projections (where no date is shown this indicates overtaking dates beyond 2050)

Figure 10: Domestic banking assets for Japan, UK, Germany, Brazil and Russia



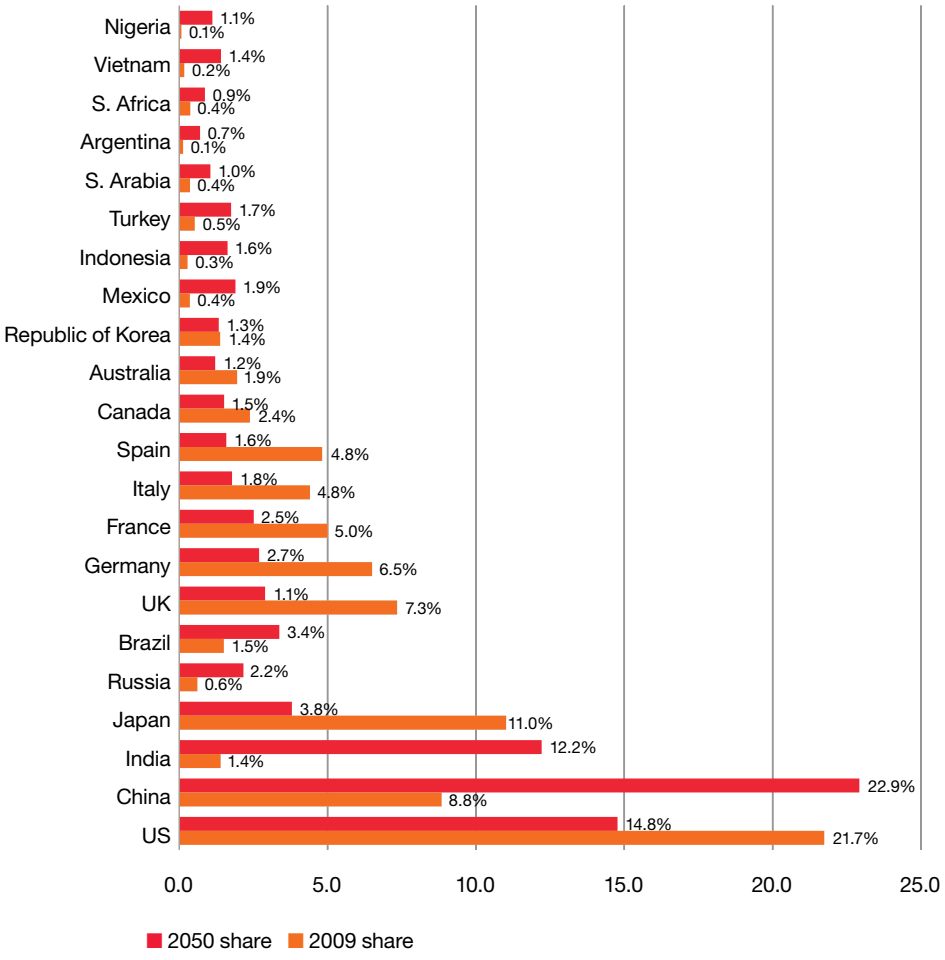
Source: PwC analysis using IMF base year data for 2009

Figure 10 shows the projected trends for banking assets in Japan, Germany, UK, Brazil and Russia. The key point here is that Brazil's domestic banking assets are expected to grow relatively fast over the projection period, resulting in it overtaking both Germany and the UK by around 2045. Russia is projected to have strong growth, but not fast enough to overtake the UK, Germany or Japan within this period.

In Table 3 we summarise some of the key overtaking dates mentioned above, and compare them with the results from our 2007 projections. The main point to note is that the analysis suggests that emerging economies will overtake the developed economies earlier than we had anticipated before the financial crisis. The exception to this trend is transition for Mexico and Italy; we project that it is going to take longer for this to take place than our 2007 projection had suggested. We expect that this is due to Mexico's domestic banking assets not having grown as fast as other developing countries since our last report.

Projected changes in the shares of the world's domestic banking assets are shown in Figure 11. Our analysis suggests that China and India could have a combined share of around 35% of global banking assets by 2050. Other somewhat smaller emerging economies such as Brazil and Russia will also see their shares rise significantly. The US, Japan and Western Europe are all projected to see large falls in their share of global banking assets in the coming decades.

Figure 11: Share of total global banking assets



Source: IMF data for 2009, PwC model projections for 2050

We present in declining size order the current and projected future values in 2030 and 2050 of domestic banking assets for each of the countries we analysed in Table 4. We see that in 2050 China is projected to have clearly the highest banking assets, with India and Brazil moving up to acquire top 5 positions from the UK and Germany. Mexico and Indonesia make large moves up the rankings over time, while Australia and Canada fall back. The newly emerging economies tend to occupy the lower rankings but with relatively fast growth rates over time, particularly for Vietnam and Nigeria (although these are heavily dependent on continuing to pursue broadly growth-friendly policies as discussed in Section 3).

What factors are responsible for the speeding up of change?

The main reason why the shift of global banking power to the emerging economies is now projected to be faster than in our 2007 report is due to the short and long-term effects of the global financial crisis.

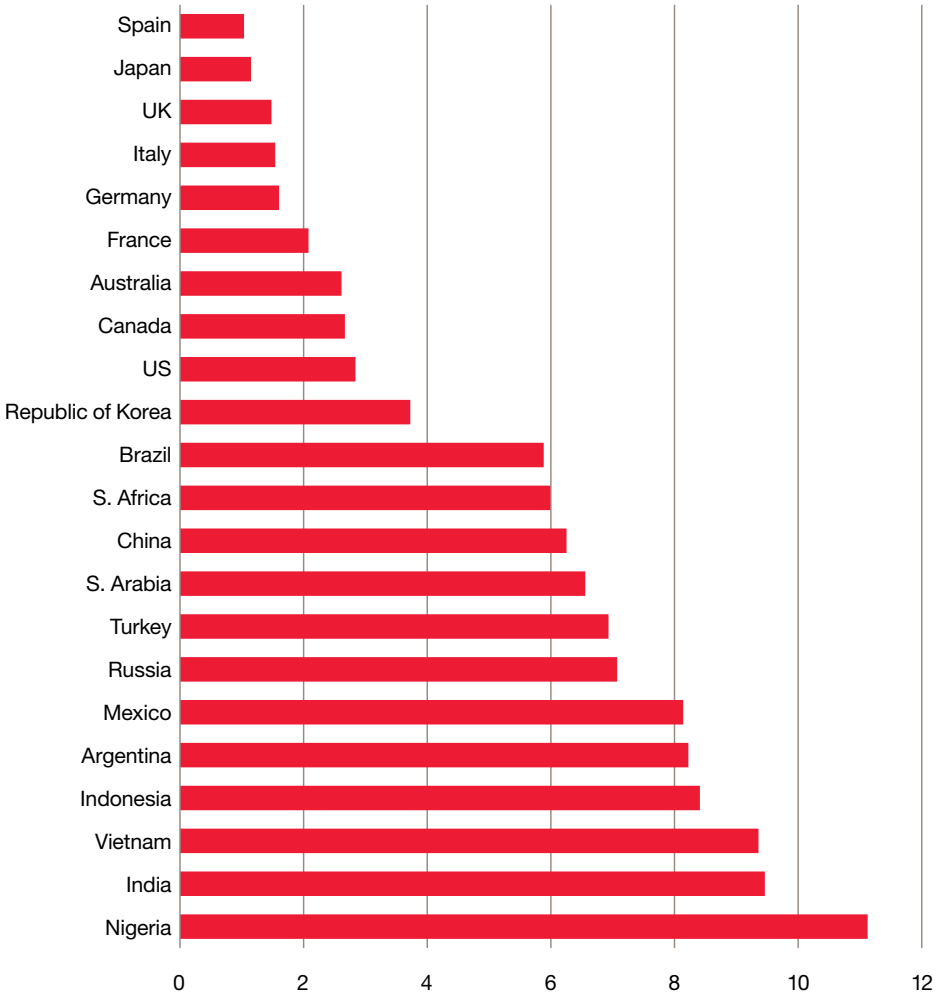
- In the short-term, most developed economies experienced a significant economic slowdown or recession in 2008-9, reducing significantly the growth of domestic banking assets.
- Emerging economies by contrast tended to maintain relatively high growth rates, although some temporary economic slowdown was experienced in certain cases. In 2010, however, emerging economies grew strongly in general, while the recovery in Europe in particular remained relatively weak.

Table 4 Global leader board of domestic banking assets in 2009, 2030 and 2050

Country rankings in 2009	Domestic assets 2009 (US$ bn, constant 2009 prices)	Country rankings in 2030	Domestic assets 2030 (US$ bn, constant 2009 prices)	Country rankings in 2050	Domestic assets 2050 (US$ bn, constant 2009 prices)
1. US	14,772	1. China	31,018	1. China	72,228
2. Japan	7,486	2. US	26,841	2. US	46,544
3. China	6,006	3. Japan	9,774	3. India	38,484
4. UK	4,989	4. India	7,848	4. Japan	11,959
5. Germany	4,416	5. UK	6,082	5. Brazil	10,624
6. France	3,401	6. Germany	6,047	6. UK	9,112
7. Spain	3,271	7. France	5,136	7. Germany	8,477
8. Italy	2,993	8. Italy	4,053	8. France	7,909
9. Canada	1,618	9. Brazil	3,799	9. Russia	6,811
10. Australia	1,324	10. Spain	3,756	10. Mexico	5,965
11. Brazil	1,019	11. Russia	2,922	11. Italy	5,601
12. India	945	12. Canada	2,810	12. Turkey	5,502
13. Republic of Korea	935	13. Republic of Korea	2,515	13. Indonesia	5,129
14. Russia	413	14. Australia	2,286	14. Spain	4,992
15. Turkey	352	15. Mexico	1,804	15. Canada	4,761
16. South Africa	250	16. Turkey	1,738	16. Vietnam	4,426
17. Saudi Arabia	244	17. Indonesia	1,394	17. Republic of Korea	4,191
18. Mexico	241	18. Saudi Arabia	1,088	18. Australia	3,812
19. Indonesia	187	19. Vietnam	933	19. Nigeria	3,514
20. Vietnam	113	20. South Africa	843	20. Saudi Arabia	3,303
21. Argentina	86	21. Argentina	637	21. South Africa	2,722
22. Nigeria	47	22. Nigeria	524	22. Argentina	2,205

Source: IMF for 2009, PwC model projections for 2030 and 2050 (note the rankings relate only to these 22 countries; we would not rule out other developed countries featuring in the rankings for some time periods although these are likely to lose ground to the emerging economies over time).

Figure 12: Average annual real growth rates of domestic banking assets 2010-2050 (% pa in US $ terms)



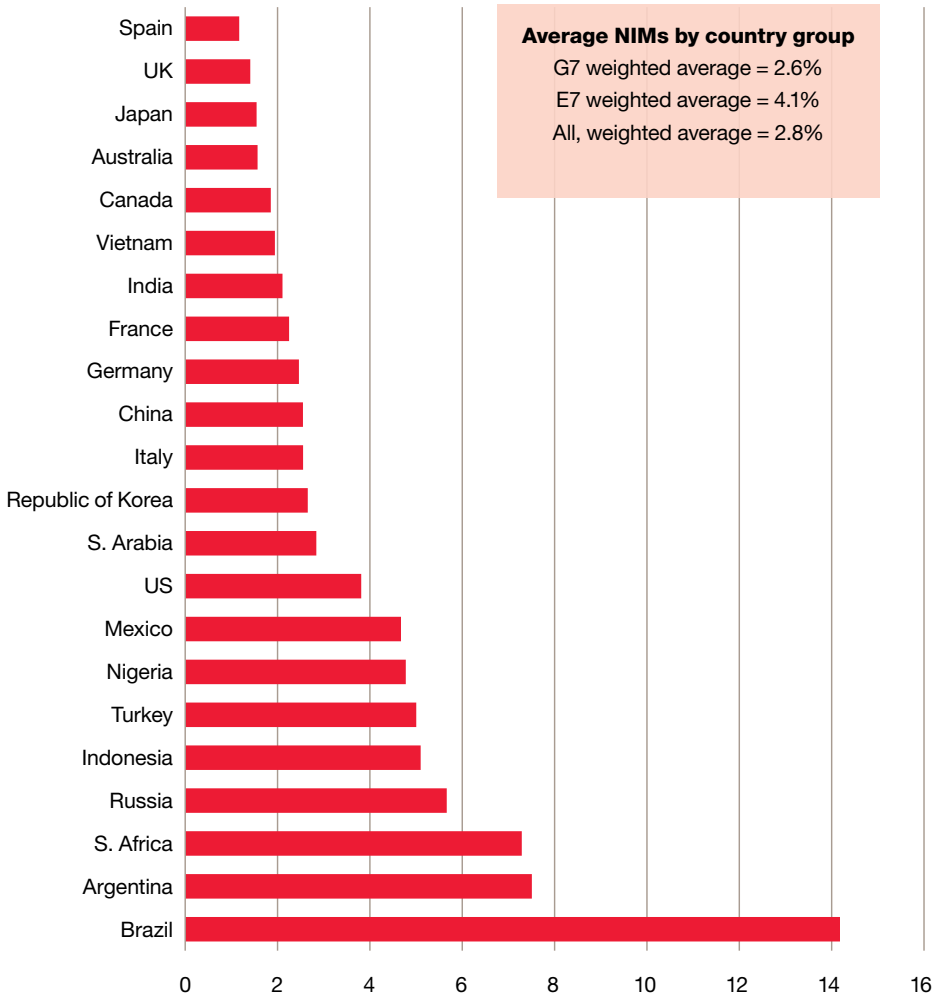
Source: PwC model projections

- Developed economies' financial systems came under severe stress due to the crisis. The value of assets declined sharply and some financial institutions faced potential bankruptcy and had to be bailed out by governments. Emerging economies by contrast were relatively shielded from these effects, leaving their banking systems in much better shape to fund long-term economic growth.
- The financial crisis therefore led to a general downward revision for the estimates of sustainable trend growth across many developed economies, but little change in long-term trend growth projections for the major emerging economies (or even upgrades due to the crisis revealing their greater resilience relative to earlier crises that often tended to focus on emerging economies such as Latin America in the 1980s and early 1990s or Asia in the late 1990s).

Banking growth differentials between emerging and developed economies

The strong growth in emerging economies' domestic banking assets can be seen in Figure 12 where we plot the compound annual growth rate of the different economies domestic banking assets. Here we note that the emerging and developed economies can be divided into two groups: the developed economies appear to have low growth (e.g. from US upwards in the chart), whereas emerging economies tend to have high growth rates, with Republic of Korea as an intermediate case as with our long-term GDP projections.

Figure 13: Net interest margin by country (2008)

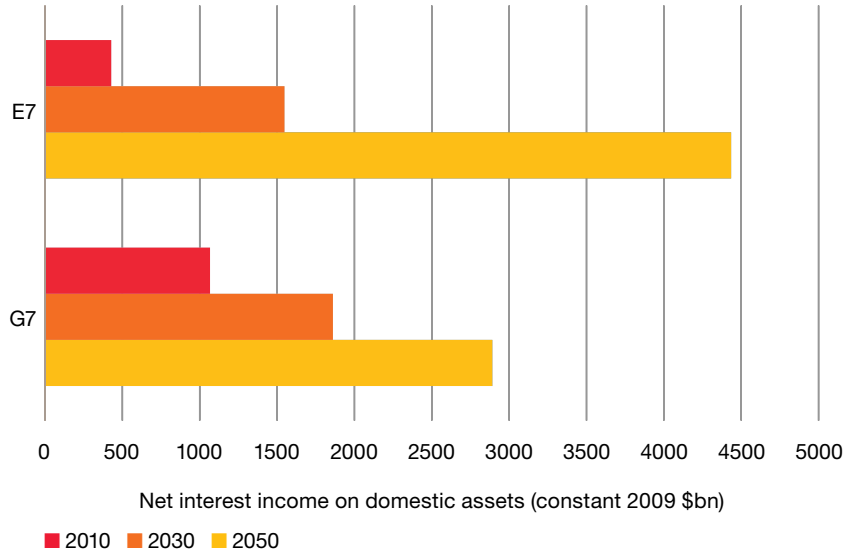


Source: Fitch

In our model the level of the quantity of banking assets is determined by both the overall size of the economy and the rate of growth in GDP per capita, which is assumed to translate into a rise in the ratio of banking assets to GDP as economic development proceeds. Stronger rates of growth in both of these variables push up emerging economy banking assets in our model. Nigeria, India, Vietnam, China and Indonesia have the highest rates of growth in GDP and GDP per capita in our sample and this translates to strong growth in banking assets as well, albeit subject to many uncertainties as discussed above and dependent on continuing to pursue broadly growth-friendly policies in these countries.

As described in Section 3, this growth is generally driven by improvements in physical and human capital in emerging economies and catching up with technology levels in developed economies. We also expect the real market exchange rate of all the emerging economies to appreciate over time to come in line with purchasing power parity estimates. This increases banking assets measured in $ terms in all these emerging markets. Population growth also contributes positively to growth in India, Vietnam, Indonesia and Nigeria. There is a much lower contribution from population growth in China as a result of its ageing population and its one child policy.

Figure 14: Illustrative banking profits pool projections for the E7 and G7 based on net interest margins on assets (at constant 2009 US $)



Source: PwC analysis drawing on base year data from Fitch and the IMF

Banking profits projections

Based on our projections for banking assets in each economy we can estimate the potential profits of the banking sector associated with these assets. We have used data from Fitch on the net interest margin (NIM) for banks in the different economies as a measure of profitability. We have used net interest margin as an indicator because we expect it to be less volatile in times of economic stress than return on assets (RoA), which we used in our 2007 Banking in 2050 report. NIM is also a more direct measure of the income from banking assets, which we can then relate to the long-term changes in the economy. Alternative measures of profitability such as RoA tend to include other sources of income such as fees, which we cannot always relate directly to the ownership of bank assets.

In Figure 13 we present estimated average NIMs for our 22 countries in 2008. In our analysis we use these values as a proxy for the 2009 values and then linearly project them so that they converge to a weighted average[9] of NIMs over 2004-2008[10] by 2030. We use the 2008 values so as to start from a position that reflects the current economic situation as accurately as we can. We use a weighted average for the convergence value of the NIM based on 2004-08 data rather than 2008 data alone because this provides a more robust basis for the long-term projections due to potential short-term distortions to NIM levels in 2008 from the financial crisis.

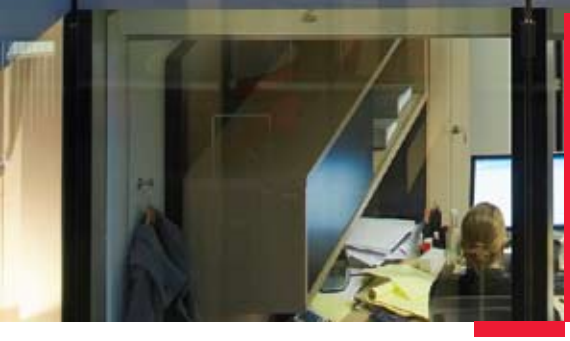
From Figure 13 we can see that Brazil has a particularly high NIM, making it a clear outlier from the rest of the countries. There are a number of reasons why this may be the case: for example, Brazil has many banks still operating at low economies of scale, keeping costs high; a large portion of lending is directed to households limiting the opportunities for wholesale financing, and Brazil has been subject to episodes of high inflation in the past. In our convergence scenario we expect that, as Brazil develops, its banks will see lower NIMs as a result of increasing competition, increased financial sophistication and the realisation of scale economies.

Some emerging economies such as China, India and Vietnam tend to have relatively low NIMs. We expect that this is a result of the relatively high levels of lending to state companies. Such activity is likely to result in reduced banking profits as capital is often allocated to achieve political objectives rather than necessarily pursuing the most profitable opportunities (as would otherwise occur in a free market). Over time, however, lending to the private sector is becoming more important in these economies and profitability levels should tend to increase over time.

Finally we note that most developed economies tend to have lower NIMs, whereas emerging economies exhibit a broad range. However, almost all of the higher value NIMs belong to the emerging economies. The US is interesting in that it has the highest NIM for the developed economies, which could be a reflection of its many regional banks.

Projecting our NIM measures to 2050 we can investigate how profitable banking sectors could be by 2050 (Figure 14). The key point from this graph is that the E7 sees a large increase in its share of global banking profits in relation to the G7 over time. The E7's profit pool is around 50% larger than that of the G7's by 2050 having already not been far behind in 2030. In our last report we expected this E7 vs G7 difference in 2050 to be around 25% (based on profits analysis derived from RoA), but the short and long term effects of the financial crisis has intensified this trend.

9 We use the country's domestic assets in 2009 as the weights in the weighted average calculation.
10 Our weighted average of NIMs includes the NIM for Brazil.



6. Conclusion and key questions

The conclusion from our analysis is that shifts from the G7 to the E7 in the global shares of domestic banking assets and related profits are accelerating following the financial crisis. However, our analysis also raises questions as to how the global banking industry will evolve over the next few decades. To address all of these issues would take us beyond the scope of this report. In this section, however, we outline some key questions arising as a stimulus for future debate.

How are banking systems going to adapt?

How will banking and financial systems in emerging and developing economies evolve in response to the rising significance of emerging economies? For instance where will all the new capital to underpin these additional banking assets come from? Will it come from domestic sources or will we see increased levels of international capital flows?

As the emerging economies develop they will require increasingly sophisticated financial services and banks are likely to expand to meet this need and reap the benefits of greater economies of scale as a result. This then throws up questions about the strategic options and scenarios that banks in emerging and developed economies should be looking at, as well as how policy-makers should respond to this challenge. For example:

- Will we see increasing consolidation in markets that take smaller shares of the global pot (e.g. Europe)?

- Will we see overseas expansion of banks from the emerging economies (e.g. following the earlier approach of some universal US and UK banks in global markets), or will they tend to focus their operations mostly within their own home economies or as a support to the overseas trading of domestic companies (e.g. as has tended to be the case for the Japanese banks).
- Will economies develop market or bank oriented financial systems? Could we, for example, come to see more financial intermediation through banks, or will we see greater disintermediation? How will this affect incumbent banks in these markets and potential entrants?
- How can established banks from emerging economies tap into the markets where expected profits are highest? Will policy-makers in emerging economies open up their markets to foreign competition?

In our reports "The Day After Tomorrow"[11], and "The Future of Banking"[12] we reviewed some of these issues, focussing on the key questions that will shape the strategies of banks as they recover from the financial crisis. With significant changes in the banking landscape already in progress, it will be important for banks to adapt their strategies accordingly.

What effects from the financial crisis will have long lasting effects?

Economic volatility from the financial crisis still remains, with high levels of leverage still in place in many developed economies. This poses important questions as to how the global banking industry will change in the longer term as a result of the financial crisis. For example:

- How long will it take for the major developed economies to recover fully from the crisis? With many economies still bearing high levels of debt, how long will it be before they return to more sustainable levels? We saw in Section 4 that some emerging economies that had in the past experienced severe financial/economic crises (e.g. Mexico, Argentina and Indonesia) had long recovery periods in excess of 5 years, as shown in the decline of their domestic banking asset to GDP ratios for many years after these crises. We also saw particularly high levels of domestic assets relative to GDP in Spain and the UK. The lesson from history may be that it will take a long time for these countries to deleverage following the crisis and return their economies and banks to a healthy position (the problems of Japan since the early 1990s is another example here of how long such adjustment can take after a banking crisis, although that was an extreme case).
- Changes in regulation since the financial crisis will play a profound role in the development of the banking industry going forward. For instance, increased capital requirements from the Basel III regulations and associated national changes, which are designed to increase the level of buffers in the financial system, could see decreased profitability of banks. However, the rules are not complete and the full impact of these regulations will take years to understand. Despite this, their effects are likely to be felt, at least in part, almost immediately as regulators and market counterparties hold banks to the new requirements. In addition, it is likely that further banking and financial sector regulations and or amendments to existing regulations will be implemented at national and/or international level. Therefore the regulatory outlook and its impact remain very uncertain for the banking sector.
- Such significant changes in the banking industry will affect the way that banks operate, and how they structure themselves to deliver their services. We focussed on this in our recent publication "Operating in the Future"[13], where we reported on the challenges facing banks in reforming their business models in the post-crisis environment. Such large changes require a comprehensive look from all angles of a bank's business from how it supports its people and operations through to its governance, legal and tax structures.

Other socio-economic issues

Over the projection period we can expect to face substantial socio-economic challenges that may affect the type of borrowing and lending required. Issues such as ageing societies, increasing demand for natural resources, the effects of climate change and the move to a low carbon economy will all pose challenges to the banking industry but also create potentially significant new business opportunities.

In ageing societies, for instance, we might expect to see changes in the balance between consumption and saving. How will increasing dependency ratios in economies with ageing populations affect the demand for credit and saving? As increasing proportions of the population draw down their wealth for consumption in retirement, where will this money be spent? How will banks manage this transition and how will it affect profitability in the sector? In our recent publication "The New Rule of 10%" we examined the likely drivers and possible impacts on financial institutions in the US from changes in the saving rate. In this report we identified the need for financial institutions to re-examine their strategies; whether it be changing business models, development of wealth management services, or becoming less reliant on consumer lending and transactions revenue.[14]

While we expect these socio-economic developments and issues to determine the range of financial services in different economies, however, they do not affect the broad conclusion of a shift in economic power from the developed to the emerging economies that is the central theme of this report.

11 "The Day After Tomorrow", http://www.pwc.co.uk/eng/publications/the_day_after_tomorrow_pwc_perspective_on_the_global_financial_crisis.html
12 "The Future of Banking", http://www.pwc.co.uk/eng/publications/the_future_of_banking_july_2009.html
13 "Operating in the Future: Is your operating vision clearly defined?", http://www.pwc.co.uk/eng/publications/operating_in_the_future.html
14 "The New Rule of 10%", http://www.pwc.com/us/en/financial-services/publications/viewpoints/viewpoint-US-savings-rate.jhtml

Annex: Methodology and data

Long-term economic growth model

The model used to project long-term economic growth in this paper is described in detail in our earlier series of "The World in 2050" reports. The model is a standard one in the academic research literature in which economic growth is driven by four main factors feeding into an aggregate production function:

- ***Technological progress,*** including 'catch-up' effects for emerging economies that vary according to their state of institutional development and stability;
- ***Demographic change,*** in particular the growth rate of working age population;
- ***Investment,*** in plant, machinery, buildings and other physical assets, which contribute to the long-term growth of the capital stock in the economy; and
- ***Trends in education levels***, which are critical to the quality of the labour force and their ability to make the most of new technologies.

The assumptions used in this model reflect a broad range of research by bodies such as the IMF and the World Bank, as well as leading academic economists. While any such assumptions are subject to many uncertainties, we believe that the baseline economic growth scenario used in this paper is plausible.

Exchange rate projections

Purchasing power parity (PPP) exchange rates are assumed to remain constant over time in real terms, while market exchange rates converge gradually over time to these levels in the very long-term (due to faster productivity growth in the emerging economies relative to the developed economies). This means that the relative value of E7 and other emerging banking markets in dollar terms tends to rise in the long run due both to faster economic growth in these countries and to projected real exchange rate appreciation.

Banking assets data and projections

For banking assets, we used data on total domestic credit (to households, companies and government) since this seemed most likely to be related to GDP. For consistency, all such data were taken from the latest online version of the IMF's International Financial Statistics database.

Using the results from our 2007 analysis, we see a clear and statistically significant positive relationship between GDP per capita growth and the average annual rise in the domestic credit to GDP ratio. In other words, the faster an economy develops, the faster its banking sector grows relative to the economy as a whole.

This relationship is measured using IMF data over several decades in most cases, which gives some reassurance in projecting forward a broadly similar relationship in the long-term. In practice, of course, this will not be a smooth process: there will be economic and credit cycles of varying length and severity in all countries that we cannot hope to predict with any accuracy. We can, however, look through these short-to-medium-term cycles to identify plausible scenarios for the long-term underlying trend in banking sector assets by country, and here we are more confident about making broad projections based on the underlying trends seen in the historic data. This is particularly true when looking at portfolios of countries such as the E7, within which individual country variations in the long-term health of the banking sector should tend to cancel out over time.

In our 2007 analysis, we carried out a variety of statistical analyses of trends in the banking assets to GDP ratio over time and across countries, using GDP per capita levels as the key explanatory variable. For the purposes of providing a basis for future projections, we found that simple cross-sectional relationships tended to produce more plausible results than more sophisticated panel data analysis, which suffered from some econometric problems due to autocorrelation of residuals. After some experimentation, a log-linear relationship between domestic credit to GDP ratios and GDP per capita levels in PPP terms provided the preferred basis for our projections model. We found a highly statistically significant (at the 99% level) positive relationship between these two variables. As the most recent data points available in 2008-9 are subject to distortion due to the financial crisis, we used the original relationship between the growth in the ratio of domestic credit to GDP and GDP per capita growth in earlier years to ensure that the long-term projections were not reflecting mid-crisis conditions.

Given our projections for GDP per capita in PPP terms, we were therefore able to project forward a 'target' domestic credit to GDP ratio for each country, with the exception of the US, where we used a country-specific time series trend. For the other countries, we then assumed in our baseline scenario that their actual domestic credit to GDP ratios converged gradually to their target ratios, with 2% of the difference being eliminated each year on this convergence path. For China, we assumed a somewhat higher convergence ratio of 3%, since there is evidence from the past couple of years that the ratio is likely to decline more rapidly in the short-term due to past problems with non-performing loans being corrected, although the ratio should then rise again in the longer term as the retail lending market in particular grows rapidly. We also assumed higher convergence rates for the UK, Spain and Australia of 4.5%, 4.5% and 3% respectively. The rationale for this is that in the past few years these countries have seen sharp increases in the levels of domestic assets relative to GDP that we expect to fall back over the course of the projection period to more sustainable levels in the long-term.

A maximum limit of domestic credit of 250% of GDP was imposed in our model reflecting our assumptions on the upper limit to a sustainable level of debt in an economy. Under ordinary conditions we would expect debt levels to remain lower than 200% based on the experience in Switzerland (where the ratio appears to have topped out at around 180% over the past decade) and analysis of minimum plausible interest cover ratios based on US and UK data. However, recent data in the UK and Spain show domestic banking asset to GDP ratios in excess of 200%. Therefore we have raised our maximum ratio limit, but imposed higher convergence rates on these two countries to reflect our view that their overall level of assets will fall to more sustainable levels in the long run as described above.

Banking profits data and projections

Our data on banking profits were sourced from Fitch and covered the leading banks in each of the countries included in our model. We used net interest margin (NIM) as a measure of profits, instead of return on assets (RoA), which we used in our 2007 analysis. The rationale for this is that net interest margin is likely to be a less volatile measure of banking profits than return on assets and therefore is a better starting point for setting long-term projections.

We assumed a scenario of linear convergence from the net interest margin ratios shown in Figure 13 to a global weighted average net interest of 3.1% from 2030 onwards. This can be taken to reflect the impact of cross-border competition and M&A in normalising profits across the banking sectors of the major world economies.

This net interest margin scenario was then combined with our GDP growth and domestic credit to GDP ratio scenarios to produce banking profits pools projections in the G7 and the E7 economies, as summarised in Figure 14 in the main text.

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