

The geography of foreign exchange trading: Currencies and international financial centres

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Abstract

We propose a conceptual framework for the political-economic geography of foreign exchange trading, focusing on the causes and consequences of the relationship between the international currency system and international financial centres. The framework is used to analyse data for 1995-2013 demonstrating that while the trading activity has boomed, its structure by currency, with USD in the lead, has remained remarkably stable, and its concentration in the NYLON axis has grown. We show that Asian currencies and financial centres have made little progress in the foreign exchange market, and argue that any challenge of RMB to USD would require nothing short of an unprecedented geo-political and geo-economic transformation.

Keywords: foreign exchange, financial centres, geo-politics, geo-economics

JEL codes: F31, F33, G15, O18

1. Introduction

With a global daily turnover of \$6.7 trillion in April 2013 compared to the annual value of foreign trade in goods and services of \$4.7 trillion in the same year, foreign exchange (shortly forex) markets are sheer is size and central to debates about the global financial system. One of them concerns the fragile 'balance of financial terror' (Summers, 2004), whereby China sponsors a large part of the US trade deficit by buying US (mainly short-term) government securities and accumulating multi \$trillion currency reserves. For the time being China allows its currency to appreciate slowly, nevertheless forex markets remain an important stage of economic tensions between the two superpowers (Eichengreen, 2011). Another issue involves decentralised and unregulated currencies such as bitcoin challenging the monopoly of governments over currency issuance. The pressure on forex traders and their employers is rising as well. In late 2014 Barclays, Citi, Credit Suisse, JP Morgan, RBS, and UBS agreed to pay regulators in the USA, UK, Switzerland and Hong Kong \$4.3bn to settle allegations about manipulating benchmark forex rates and front-running customers' orders. The case fuels demands for more transparency in forex markets, including proposals to move trading onto regulated exchanges, reminiscent of earlier calls for moving all forex trading onto a single transparent global exchange (Mendez, 1996). It also encourages the proponents of the financial transactions tax, inspired by the ideas of the Nobel Laureate James Tobin (1978), who proposed to tax forex transactions at a low rate, say 0.5%, in order to curb speculation and cushion short-term exchange rate fluctuations. As of late 2015, the EU Financial Transactions Tax proposal, covering forex

derivatives, is supported by Germany and France, but contested by the UK, Netherlands, Scandinavian member states, and most 2004-7 accession countries. In short, the battle for the future of forex markets is on.

The salience of forex markets is well recognised in geography. Clark and Thrift (2005) described forex trading as a “vital cog in the global economy”, essential for business, trade, investment and government (6). “No national economy is immune from its effects” (ibid. 7). Agnew has referred to USD as “the main instrument of globalization” (2010, 228). The geo-political and geo-economic ramifications of forex markets are well-known. What is less known, and where geography can make a distinctive contribution is the relationship of the international monetary system with international financial centres. Agnew pointed in this direction by highlighting the significance of financial centres in geo-economics and geo-politics: “(...) the networks connecting the various global financial centers (in New York, London, and Tokyo, in particular) are increasingly the collective center of the globalist regime.” (...) “It is under its auspices that markets have tended to challenge the authority of states through the privileged role of the world-city network as a system of authority and control.” (Agnew 2009, 220). While research situating the development of individual leading financial centres, like the City of London, in a geo-political context has a long tradition (Leyshon and Thrift, 1997), what in our opinion is missing, is an analysis of forex markets as an articulation of the international monetary system with the system of international financial centres. Paying explicit attention to financial centres, such analysis could address the knowledge gap on forex markets left open by macro-focused approaches of political

economy (Helleiner, 2002), and micro-focused approaches of economic sociology (Knorr Cetina and Bruegger, 2002).

This paper proposes a conceptual framework for the political-economic geography of foreign exchange trading, focusing on the causes and consequences of the relationship between the international currency system and international financial centres. Politics is a vital driver of forex markets, permeating all of its building blocks including state, banks, and financial centres. Our framework, presented in section 2, is thus an exercise in politicising economic geography, and builds on the tradition of politicising financial geography in particular (Corbridge, Martin and Thrift, 1994). It helps to politicise globalisation, finance, and spatial clusters at the same time (Agnew, 2012). In a nutshell, the framework suggests that both the system of currencies and that of financial centres exhibit strong but not unlimited tendencies towards concentration, facilitated by technological developments. Put together they generate a system of forex market centres deeply embedded in geo-politics and geo-economics.

Our second objective is to apply this framework to analysing data from triennial surveys of the Bank for International Settlements (BIS) for the period of 1995-2013. This is the best data available on forex trading, which in conjunction with the conceptual framework allows us to address big questions. How and why has the structure of forex trading by currency and financial centre evolved over time? Is there indeed a growing concentration and what are its limits? Is the centre of forex markets shifting to Asia? Results are presented in section 3, demonstrating that while the trading activity has boomed, its structure by currency, with USD in the lead, has remained remarkably stable, and its

concentration in the NYLON axis has grown. We show that Asian currencies and financial centres have made little progress in the foreign exchange market, and argue that any challenge of RMB to USD would require nothing short of an unprecedented geo-political and geo-economic transformation. In section 4 we conclude by presenting the implications of our results for geo-politics and geo-economics in the 21st century.

2. The political-economic geography of foreign exchange trading

The *forex market* is a private market, dominated by large banks, trading currencies in spot transactions and derivatives including forwards, futures, options, and swaps, on their own account (as dealers) and on account of their customers (as brokers) (Mackenzie, 2014). The main customers of broker-dealers are asset managers and institutional investors like pension funds, mutual funds, and insurance companies; hedge funds and high frequency traders; smaller banks; non-financial companies; and official entities, like central banks and sovereign wealth funds. The market relies on high-speed electronic networks. In what follows, we outline factors that shape the political-economic geography of forex markets. Our strategy is to distil these factors by analysing the relationship between the geography of international currencies and the geography of entities trading currencies, with banks in the lead. Figure 1 presents the key building blocks and relationships in our framework.

Forex trading is one of many uses of currencies, which include invoicing in trade for goods and services, reserve keeping, and denominating financial claims in a domestic or foreign currency. Forex trading, however, to a large extent reflects these activities, overwhelms them in terms of value, and is considered “the

clearest indicator of a money's international status" (Cohen, 2011, 62). This leads to the following question. What makes a currency international and affects its popularity in forex markets? To start with the international status of a currency is affected by the exchange arrangements and restrictions of the issuing country. *Ceteris paribus* the more freely convertible into other currencies, and the more freely priced by market forces a currency is, the more popular it is likely to be in forex markets (Cohen, 1998). Convertibility and float, however, are only the starting point, as there are dozens of currencies with free convertibility and fully independent float. Thus, we need to distinguish three further groups of key factors behind the development of *international currencies*. First comes confidence in a currency, influenced by the political and economic stability of the issuing country (Helleiner, 2008). Secondly, the issuing country needs a developed and open domestic financial market, with a wide array of actively traded instruments, as this offers investors (as customers of forex traders) a broad choice of products and low transactions costs thanks to liquidity (Eichengreen, 2011). Finally, the issuing country needs large network of traders buying and selling its currency (Cohen, 1998).

The international currency system has a tendency towards concentration, forming a *currency pyramid* (Cohen, 1998), with few currencies at the top, and layers of less significant currencies beneath it. This has to be seen from both an economic and political perspective. The significance of stability, financial breadth, and depth privileges powerful countries with large economies. As Kindleberger (1967) remarked: the choice of international currency was made 'not on merit, or moral worth, but on size'. Network externalities add to this tendency, as

people benefit from using the currency that other people use. This implies, as Krugman (1984) noted, that a country's currency status may be much bigger than its economic status and it may last after its economic status declines. The currency pyramid can also be viewed through the lens of the hegemonic stability theory in political economy, which in its simplest form argues that "the existence of an economic 'hegemon' leads to a liberal international economic order in which transactions are conducted by means of the hegemon's currency" (Ingham, 1994, 29). Of course, the link between economic hegemony and currency hegemony is not straightforward. Economic hegemony is just a resource that helps currency hegemony; what is also necessary is economic openness and "appropriate institutional infrastructure: competent and trustworthy markets and banks" (Ingham, 1994, 32). To be sure there are limits to the process of concentration in a currency system. As most people are risk-averse, they want to diversify their wealth, and different currencies offer an important means of diversification. At the extreme, a single global currency would eliminate all currency trading.

Let us now move from the geography of currencies to that of large *banks*, which dominate forex trading. They have to be large to be global, and to be able to afford the technology, talent, and capital necessary for trading. Forex trading typically accounts for a small part of the activities of the banks concerned, but offers significant complementarities with other activities (Clark, 2002). Exchange rates affect the pricing of all kinds of financial instruments, from equities, through commodities, to fixed income products. Therefore, knowledge generated in forex trading complements that from other types of trading in a large bank,

but also knowledge used in non-trading activities such as advisory on public offerings of securities as well as mergers & acquisitions. The complementarity between forex trading and other high-risk and high-value added bank activities, combined with the tacit character of the knowledge involved in forex trading, tends to keep all of these activities within the same company, and in the same place, typically at the headquarters of a large bank. What in turn keeps these headquarters in a large financial centre, is the proximity of other banks and major customers, including the headquarters of non-financial companies and institutional investors, as well as opportunities of sharing a large and deep labour market, infrastructure, and knowledge (Martin, 1999; Hall, 2007; Wójcik, 2011).

Forex trading is thus subject to economies of scale, scope and agglomeration, which lead to its concentration within a *hierarchical network of financial centres*. Further factors that underpin the success of a financial centre within the network are remarkably similar to the forces shaping the world of currencies. First, financial trading, including forex trading benefits from the political and economic stability of the country hosting it. Consider for example the decline of the status of Amsterdam in the early 19th c. and Montreal in mid to late 20th c., triggered by political instability (Cassis, 2006; Polèse and Shearmur, 2004). Second, financial centres benefit from developed domestic financial markets. The variety and volume of financial products provides the raw material for trading (Michie, 2006). Finally, successful international financial centres need to be nodes in the networks of financial traders (Taylor, 2004). The tendency towards the spatial concentration in forex trading are likely to be stronger than for most

other financial products, including corporate bonds or equity. As Clark and O'Connor (1997) argued, forex is a transparent product, with global market scope, since information relevant to it is not bound to the place of its origin (issuance). Successful trading of USD versus EUR for example requires knowledge about macroeconomic conditions in the USA, Eurozone, and the rest of the world combined with insight into the dynamics of the global marketplace.

Just as there are limits to the currency pyramid collapsing into a single global currency, there are limits to forex trading concentrating in a single financial centre. These have to do with physical geography. Any company serious about forex trading has to operate 24 hours a day, since events relevant to exchange rates happen around the clock. This implies that such a company needs global scope, but how is it to structure its operations across time zones? The answer lies with the location of the prime meridian over Greenwich, London and the international data line over the Pacific, which means that each day daytime financial trading can open first in the Far East and last in North America or the Eastern Pacific. It is only in the European time zone that a global forex trading firm can connect with Far Eastern and American markets on the same day, giving it time to analyse and take over positions from traders in the Far East, and then analyse and pass the positions on to traders in North America (Clark and Thrift, 2005). The short overlap between trading hours in the Far East and Europe, and the long overlap between Europe and the Eastern USA is of particular value to forex markets, because it means that more traders from different parts of the world can participate at the same time. As a result "liquidity in currency markets

is typically highest at the London open and in the overlapping hours of London and New York” (Rime and Schrimpf, 2013, 32).

How the currency pyramid articulates with the hierarchical network of financial centres to shape the geography of *forex market centres* is the result of the contingent processes permeated by *geo-politics* and *geo-economics*, but also by the development of *technology*. To explain these, we need to move from a more abstract and conceptual to a historically-based narrative style. The gold-sterling standard of 1870-1914 was established when the British economy was smaller than Chinese or Indian, and already nearly overtaken by the USA (Maddison, 2007). Other than economic size, key to the status of the British currency was the imperial power and economic openness. The latter was facilitated by sterling convertibility and free trade legislation, which were part of an intentional strategy for London to overtake Amsterdam as the world’s preeminent financial centre (Ingham, 1994). While the US economy was the largest in the world and twice the size of the British economy by 1890, it was still relatively closed and did not have strong international banks. Although by then New York had already emerged as the leading financial centre of the country, its institutions were domestically focused, and were no match for the City-Bank of England-Treasury nexus dedicated to London’s status as an international financial centre (Kindleberger, 1967). This situation prevailed until 1914. After the WWI, the USA had an opportunity to take over the leadership of the international monetary system, but instead joined failed efforts to resuscitate the gold-sterling standard in the 1920s, and in the wake of the Great Depression retreated to focus on domestic finance.

The Bretton Woods conference in 1944 replaced the gold-sterling with the gold-dollar standard, very different from its predecessor. In contrast to relatively free capital flows promoted by the British Empire, the Bretton Woods system aimed at restricting cross-border financial flows unrelated to trade. Forex market activity was subdued, but was soon to be invigorated by US corporations and banks expanding overseas, with the latter creating a Eurodollar market centered on London offering flexible regulation, expertise and connections (Strange, 1986).

The abrogation of Bretton Woods by the US government in the early 1970s is considered the single most important political act that catalyzed the development of forex markets (Agnew, 2012). "Initially designed by the Nixon Administration to make US exports more competitive and to staunch the US balance-of-payments deficit, the floating of the US dollar against other currencies has been a major if unintended stimulus to globalization, both in facilitating trade and in encouraging the explosion of global finance." (Agnew 2009, 222). Governments of most major economies followed suit by floating their currencies, while tens of others pegged their currencies to USD. The combination of USD as the hegemonic currency and floating exchange rates has given the US government, corporations and banks an "exorbitant privilege" (Eichengreen, 2011). The US government could borrow more cheaply, exercise power as the lender of last resort, and acquire real resources by simply printing more money, some of which would remain in circulation abroad and never return to the USA to request any goods or services in exchange. US corporations and banks would have an advantage over foreign competitors, having direct access to the USD, and

enjoying lower exchange rate risk and transaction costs. Ultimately, the US government working in tandem with US banks could deny whole countries access to USD, thus undermining their ability to conduct international transactions. Reflecting on financial geography Clark (2005) stated that “money flows like mercury”, penetrating every nook and cranny of the economy. When we consider the political-economic geography of finance seriously, we should rather say that on a global scale only USD really flows like mercury.

Given the privileges afforded by the post-Bretton Woods system to US banks, it is not surprising that the modern global investment banks, the key players in the forex markets, emerged in the USA. Being beneficiaries and agents of US-led globalization, they converged on London as the main base of their forex market activities due to the combination of more permissive regulation, time-zone advantages, and existing expertise and connections, legacy of the gold-sterling era, and Eurocurrency markets. Already by 1980 US banks in London outnumbered British banks (Ingham, 1994). Many continental European and some Asian banks tried to emulate US banks, developing their forex and other complementary international banking activities in London (Augar, 2008). In this way, forex market has helped London establish itself as a place from which the power of the USD is ‘transmitted’ to the rest of the world. It leads the evaluation of both strengths and weakness of the US economy, and leads the settings of rates at which most other economies relate to each other in terms of trade but also power.

Revolution in information technologies has had a major impact on forex markets. Until the early 1990s forex deals were conducted on the phone. In 1992 the first

electronic forex brokers emerged, with orders entered into and executed by computers. With time, electronic trading lowered transactions costs and opened the market up to retail investors, hedge funds, as well as smaller banks and institutional investors. Electronic forex brokers were modeled after those developed in share trading (Mackenzie, 2014). In contrast to share trading, however, in forex electronic brokers never managed to disrupt the market dominance of large banks. Large broker-dealers responded to the challenge by improving their trading systems for clients in the early 2000s, driving transaction costs further down (King and Rime, 2010). Since the 2000s electronic trading accounts for the majority of global forex turnover, but voice trading retains a steady 40-45% share. This is because voice trading offers some advantages over electronic trading: additional information can be exchanged, and some trades, like swaps, are just too complicated to standardise (unlike spot transactions).

Like electronic trading in general, high frequency trading (HFT), taking advantage of millisecond-short arbitrage opportunities, has developed in share trading before it entered forex markets (Lewis, 2014). While, HFT has boomed since mid 2000s and is estimated to account for 20% of global forex trading, it has not yet affected forex trading to the degree it influenced share trading (Grote and Zook, 2014). Large banks conduct HFT forex trading themselves to compete with hedge funds and specialist HFT traders, but have an ambivalent attitude towards it, seeing forex as a market where people come to trade risk rather than to race. Many bank-owned and other forex trading platforms purposefully slow down order execution to curb HFT trading. Like electronic brokers HFT traders

have to cultivate good relationships with big banks to retain access to markets (Mackenzie, 2014).

Considering the continued dominance of big banks in forex markets, and the high degree of complementarity between their forex and other trading and investment bank activities, we should not expect technology to act as a major centrifugal force in the geography of forex markets. In fact, major new technology providers in forex markets tend to operate in proximity to large banks. CLS Bank, which settles about half of all forex transactions, minimising settlement risk, operates out of New York, London, Hong Kong and Tokyo (King and Rime, 2010). The leading electronic brokers are Thomson Reuters, headquartered in New York and EBS owned by ICAP headquartered in London. Their main order matching engines are located in Secaucus, New Jersey, just across the Hudson River from Manhattan, and in Slough near London. In fact, New Jersey and the direct vicinity of Greater London have become the world's leading locations of computer servers and data centres generating and matching orders in financial markets, and storing financial trading data (Wójcik, 2011). This concentration of financial trading technology is driven by the logic of co-location, whereby traders want their computers to be as close to matching engines as possible, to beat competing orders, even if only by milliseconds. The fastest transatlantic fiber-optic cable under construction in 2015, called Hibernia Express, is to link traders and markets in London and New York, with a primary purpose of serving forex markets.

Overall, the political-economic geography of forex markets is subject to powerful inertia. Economies of scale, scope and network privilege incumbent banks,

currency pyramid, and the incumbent system of international financial centres (Sassen, 1991). Geo-politics and geo-economics add further to inertia. The issuer of the hegemonic currency reaps huge political and economic benefits, which reinforce its general hegemonic status, which it is bound to try and defend. Likewise hosting an international financial centre is a source of geo-political and geo-economic power. This does not preclude the possibility of a quick rise or decline of an international currency or an international financial centre, once it gains or loses a critical mass vis-à-vis its competitors (Laulajainen, 2001). Financial history however shows that with regard to top international currencies and financial centres, this does not happen without a major geo-political and geo-economic shift, like that which accompanied the shift from Amsterdam to London as the leading financial centre in early 19th or the shift from sterling to USD in the first half of the 20th century. More reshuffling and more prominent role of technology may in turn be expected in lower tiers of international currencies and financial centres, where incumbency effects are weaker. Consider for example the transition from Montreal to Toronto, and from Rio de Janeiro to São Paulo as leading international financial centres of Canada and Brazil, respectively, both affected significantly, but not only, by the rising significance of air transport, and declining role of sea transport in trade and financial networks (Porteous, 1995).

With the framework of the political-economic geography of forex markets illustrated in figure 1, we will now move to analyzing the evolution of forex markets since 1995. Our narrative will focus in turn on the overall size of the market, its structure by currency and by financial centre. We will give particular

attention to Asia-Pacific and China, commonly expected as a major source of disruption for the established system of currencies and financial centres.

3. Foreign exchange trading 1995-2013

3.1. Booming markets and stable currency pyramid

Figure 2 presents growth in forex trading since 1995 based on data from triennial surveys of the BIS. The data covers the whole suite of forex trades including spot transactions, outright forwards, foreign exchange swaps, currency swaps, currency options, currency swaptions, and other forex products (BIS, 2010). Forex turnover rose more than fourfold between 1995 and 2013 in nominal terms, from \$1.6trn to \$6.7trn daily, which considering US inflation represents a real growth of 163%. Between 1995 and 1998 forex trading and the MSCI World Index, tracking the performance of equity markets, grew faster than foreign trade, which may be explained by the dot.com stock market boom in the US and international markets. By 2001, when the dot.com bubble burst, forex activity fell almost to its 1995 level. This contraction of the forex market was due largely to the introduction of the Euro, which eliminated forex transactions among the old currencies of countries that joined Eurozone. From 2001 until 2007 we have seen rapid growth in forex trading, in line with global economic activity. Since 2007, the forex market has continued to grow at a pace faster than foreign trade, and without suffering a setback experienced by equity markets. Comparison between 2007 and 2010 may be a bit misleading. As monthly data from individual countries suggests, forex activity in the period peaked in 2008, and registered little growth until 2010 (King and Rime, 2010). Nevertheless, we

have to conclude that the forex market demonstrated a remarkable robustness in the face of the US subprime and Eurozone crises.

A crucial driver of growth in forex markets in the face the financial crises has been technology, which lowered the costs of transactions. HFT trading, conducted by specialist HFT firms, hedge funds and large broker-dealer banks, have boomed since the mid 2000s, adding to trading volumes. The certainty of trade settlement has improved and the cost has decreased through the operations of global clearing and settlement institutions with the CLS Bank in the lead. Forex markets have also been boosted by the growth of institutional investors, such as pension funds and mutual funds and their asset managers (Clark, 2000). As they strive to diversify their portfolios, they treat foreign currency as a viable asset class, worth investing and trading in. In addition, they use forex trading to hedge against the risks involved in investing in assets denominated in various currencies.

The structure of forex trading by currency has been remarkably stable (figure 3). The total amounts to 200% as every forex deal involves two currencies. USD dominates, with its share moving within the range of 84% in 1995 to 91% in 2001, finishing with 87% in 2013. The euro trails far behind the USD, with its peak share of 39% in 2010, only slightly higher than the share of DM in 1995 of 37%. It suffered a decline to 33.5% in 2013, driven by the lingering Eurozone crisis. Japanese yen (JPY) comes third, falling from 24% in 1995 to 17% in 2007, but since bouncing back to 23% in 2013, possibly due to Abenomics promising to revive the Japanese economy from stagnation and deflation. Fourth comes the GBP, with the most fluctuations, from 9% in 1995 to 17% in 2004, and down to

12% in 2013. The peak share in 2004 may be partly explained by the high USD/GBP exchange rate at the time. The Swiss franc (CHF) started the period in sixth place (after the French franc), and occupied the fifth place from 1998 until 2010, when it was taken over by the Australian dollar (AUD). This high status of CHF can be understood given the confidence-inducing political and economic stability of Switzerland, but also the extensive international transactional networks afforded to its currency through its financial institutions, with Credit Suisse and UBS in the lead. The firm fifth position of AUD is probably underpinned by its relative distance from the economic instability in the USA and Europe, and its close and growing linkages with Asian economies.

The composition of the top 4 currencies has not changed throughout the period, and should not surprise us. USD, EUR, and JPY represent the three largest economies of the period (Japan being overtaken by China only recently). GBP represents a former economic superpower, and has the largest capital markets in the world after the USA, Eurozone and Japan. All top 4 currencies are fully convertible and have an independent float, with rates established in the forex market. EUR has never challenged the primacy of the USD. The main reasons suggested by existing research include the lack of unified macroeconomic policy, which, as the Eurozone crisis demonstrates, undermines confidence in EUR; and less developed and integrated financial markets than those in the USA (Cohen, 2011; Helleiner, 2008; Pollard and Sidaway, 2002). Even at home, in most Eurozone economies, including Germany and France, USD is traded in larger amounts than EUR. Together, the top 4 currencies held a stable share of close to 80% (or 160% out of 200%) of global forex trading.

Considering the US subprime crisis of 2007-8, the continued supremacy of USD must be surprising even considering the failure of EUR. The following factors, however may help explain it. The US economy has recovered from the subprime crisis, while the Eurozone crisis is lingering, and growth in some emerging economies including Brazil and China have slowed down. Foreigners still seem to regard the US economy as relatively stable and attractive destination of investment. US banks (with major support from the government) recovered from the crisis relatively fast as well,. US banks, hedge funds, and specialist traders have also championed the technological development, including HFT, not least because most of these innovations originate from the US stock market (Mackenzie, 2014). In short, geo-economics, geo-politics, network economies, and technology still conspire to maintain the USD status as a hegemonic currency at the top of the currency pyramid.

3.2. Growing concentration and offshoring

The BIS data is available for countries, not cities. Even the BIS, however, interprets the data as data for financial centres, referring to the UK figures as London's, the US figures as New York's, etc. The implicit assumption is that within countries, forex trading is concentrated in a single financial centre. Prior research and our knowledge of banks engaged in forex trading gained through interviews around the world, justify such a generalisation, and so do the details of the BIS data collection process. The organisation contributing UK data to the BIS is the London Foreign Exchange Joint Standing Committee, covering 30 institutions, all with the headquarters of their UK operations in London. US data is contributed by the New York Federal Reserve Bank, with almost all dealers

conducting their forex operations out of New York. The same applies to Tokyo Foreign Exchange Committee collecting data in Japan. The composition of forex trading by country shows clear trends presented in figure 4, 5 and the appendix. The share of the UK increased from 29% in 1995 to 41% in 2013. The USA consolidated its second position, rising from 16% to 19%. Thus, the joint share of the USA and the UK rose from 45% to 60%, confirming the growing power of the New York-London axis of global finance (Wójcik, 2013). London is the largest trading centre for all of the top seven most traded currencies in the world (USD, EUR, JPY, GBP, AUD, CHF, CAD), as well as the currencies of many other countries including Hungary, Poland, Sweden, Turkey, South Africa, and New Zealand. It is the leading offshore trading hub for emerging market currencies, accounting for 30% of all non-domestic emerging market currency trading, compared to a 16% share of New York (Ehlers and Packer, 2013).

A contributor to London's success was its capture of EUR trading. This was not a surprise. Already in 1995, London was the leading centre for trading the currencies of Germany, France, and the ECU. Proximity to the European Central Bank, was never a match for economies of scope, scale, agglomeration, and networks offered by London (Beaverstock et al., 2005). In fact, in 2013 Frankfurt fell behind Switzerland and France. Switzerland has UBS and Credit Suisse, two global banks active in forex markets, in addition to a booming financial trading industry made of smaller specialist firms, France has an equally large asset management industry as Germany, and regulation more friendly towards hedge funds and other short term investors and high-frequency traders (Comair, 2013). The high position of Denmark, emerging as a leader in Scandinavia may be

explained by relatively flexible labour laws, facilitating hiring and firing. This was an explanation given to us by a leading Nordic bank, which has concentrated most of its capital market activities in Copenhagen. Southern European economies played a marginal part in forex trading.

Figure 6 confirms growing concentration at the global level, driven predominantly by the European time-zone. This is what we expected in our conceptual framework of forex market centres, which highlighted the centripetal tendencies of the system of international financial centres, explained to a large extent by scale, scope and network economies affecting the operation of banks. Consistently with this framework institutional concentration of forex trading, has grown spectacularly over time (table 1). Concentration has not decreased in any country for which data is available. While in the UK and the USA it took at least 20 firms to account for $\frac{3}{4}$ of the activity in 1998, in 2010 it took only 9 and 7 respectively, many of which are likely to be the same global banks. Regulation in the wake of the global financial crisis may contribute to the growing institutional concentration, as increased capital requirements, and stricter regulation regarding the execution of customers' orders, make economies of scale ever more important in forex trading (Wójcik and MacDonald-Korth, 2015).

Concentration has been accompanied by offshoring (figure 7). For all seven most traded currencies in 2013, with the exception of GBP, over 80% of trading took place outside of the country where the currency is issued. Growing offshoring seems to reflect growing geographical concentration rather than regulatory arbitrage pushing trading away from home countries. An example of this phenomenon is Canada, whose share in global forex trading declined

precipitously, and its share in trading CAD fell from 41% in 1995 to just 13% in 2013. The primary reason is that Canadian banks have moved their forex trading activity to New York (Financial News, 2014).

3.3. Asian exceptionalism and the Chinese challenge

While New York and London account for over 90% and 70% of forex trading in their time-zones respectively, forex market in the Asian time-zone remains fragmented. This fragmentation is underpinned by a low level of financial integration. There are still restrictions on cross-border financial flows (most notably in China), and infrastructure for connecting different markets is relatively underdeveloped. The role of institutional investors, hedge funds, and electronic trading is much weaker in Asia than in Europe or North America. The institutional structure of forex trading is dispersed. While in the UK 9 banks control at least $\frac{3}{4}$ of a huge market, in Singapore, Hong Kong and South Korea, it takes between 10 and 16 (table 1). Leading Asian economies, except for Japan, and including Hong Kong, India, South Korea, Singapore and Taiwan, are the biggest trading centres for their home currencies. This low level of offshoring is in sharp contrast to the emerging economies of Latin America and Eastern Europe, whose currencies are traded mainly out of New York and London respectively (Ehlers and Packer, 2013). Relatively low level of both internal and external financial integration also hampers growth of forex trading in the Asian time-zone. In fact, its share in global forex trading of 21.5% in 2013 was at its lowest in at least 25 years. The exceptional character of forex markets in the

Asian time-zone is also evident in figure 6, demonstrating a decreasing level of concentration in trading by country.

The political-economic geography of forex markets in Asia is in a state of flux, and competition for the status of the leading trading hub of the time-zone is open (see data in the appendix). In 2013, Singapore had the lead, just ahead of Japan. Hong Kong was a close third, with Australia as a strong fourth. Japan lost the strong lead from the early 1990s, but since 2007, it has stopped declining, presumably due to more buoyant financial markets in Japan, with Abenomics promising financial reforms, including plans for the revival of Tokyo as an international financial centre (The Economist, 2014). Hong Kong's position was stable, showing little damage from the 1997 handover to China (Meyer, 2000). Australia has also been remarkably resilient, with an impressive rise from the late 1990s until 2007, driven partly by a strong USD/AUD rate, combined with the rising status of AUD among currencies.

USD has been the dominant currency used in international transactions of Asian economies since at least WWII, after which much of the region depended on the USA as an export market, source of investment and military protection (Helleiner, 2008). Since the 1980s, China has also embraced USD as a means of exchange (in foreign trade) and store of value (building up USD reserves). Not surprisingly then USD is on one side of nearly 90% of forex deals in Asia-Pacific (figure 8). In the wake of the Asian financial crisis of 1997-8 Japan promoted the idea of an Asian Monetary Fund to strengthen Asian currencies and counter the dollarisation of Asian economies, but after encountering resistance from the USA, the idea was shelved (Katada, 2008). Although the share of USD in forex trading

both globally and in Asia has been remarkably stable over the last two decades, the Chinese renminbi CNY is often proclaimed as a potential challenger. In 2013 CNY was only the ninth most traded currency, behind Mexican peso. It was however, the fastest growing currency covered by the BIS data. The rise of China and CNY pose two of the most topical question in contemporary geo-politics and geo-economics. Is CNY going to challenge the hegemony of USD? Which financial centres are going to lead CNY trading? Our conceptual framework and empirical analysis offers clues with regard to both issues.

To start with, for CNY to climb to the top of the currency pyramid, economic size is not enough. Necessary are also deep, open and trusted Chinese financial markets. These conditions are far from being met. China lacks a big and diverse bond market (Walter and Howie, 2011; Naughton, 2006). CNY lacks full convertibility and a float determined by markets. After moving from a fixed rate versus USD to a managed float in 2005, CNY was re-pegged to USD in August 2008, as China's export sector came under pressure during the US subprime crisis. And most importantly of all, to be trusted Chinese financial markets have to be underpinned by the rule of law, protecting private property and contracts from the state and the Communist Party of China.

In terms of financial centres, the lesson is clear. The CNY trading hub does not have to be in China, and does not have to radically change the hierarchy of international financial centres. According to BIS in 2013 CNY was traded most actively in: Hong Kong (35%), Mainland China (24%), UK and Singapore (17% each), and the USA (6%). While supporting Shanghai as the future hub of forex trading in Mainland China, Chinese authorities seem perfectly aware of the need

to build a global network of offshore CNY trading centres. This strategy is related closely to that of nurturing the global expansion of Chinese national champions in banking (Wójcik and Camilleri, 2015). The goal for China, consistent with our framework, seems to be simultaneously to elevate CNY to a global currency status, make Chinese banks join the elites of global banking, and develop Shanghai into a global financial centre. Ultimately, as our framework and history suggest, such transformations cannot happen other than a part and parcel of a major geo-political and geo-economic shift, changing the power relations between China and the USA. In this respect, it is symptomatic to see that to date no financial centre in the USA, in contrast to Toronto and over 30 other centres around the world, has received support from China in developing CNY trading. Equally revealing about the articulation of geo-politics and international financial centres is that San Francisco, not New York, may become the first US city to receive such support (Sheehan, 2014).

6. Conclusions and implications

The forex market is a globalised, networked and hierarchical system, with a 40% share of the leading centre and currency, 20% share of the runner-up and the rest of the market divided among smaller financial centres and currencies. USD as the vehicle currency in foreign trade and cross-border financial transactions and London, as the world's most global financial centre, are at the heart of the system. The market has undergone spatial concentration in the last 20 years, and seems on course for further concentration, driven by economies of scale, scope, agglomeration, and networks. Technology, with electronic and high-frequency trading, adds to the centripetal forces. While it does not render voice

transactions and face-to-face contact among forex traders and between them and traders in other financial products redundant, it raises capital requirements for trading firms, thus fuelling scale economies, and thrives on co-location of computers generating and executing orders. New regulation rolled out in the wake of the crisis, making compliance a bigger part of fixed costs, enhances economies of scale, as well as attractiveness of incumbent international financial centres offering the best pools of labour for compliance functions.

The growing concentration of forex trading in London and New York, underpinned by its growing concentration in the hands of few global banks, should be a concern. While the latter exacerbates the 'too big to fail' problems, the former raise the issue of geographical risk. A spatially concentrated structure may be more efficient but less resilient. If, for any reason, trading in London was to shut down, the whole forex market would be paralysed (Goldin and Mariathasan, 2014). The problem with concentrated forex trading is also a part of a much bigger issue – the concentration of power. Speculating on the rise of CNY, even the Economist argues that “a global monetary system with multiple poles could in theory engender greater economic stability” (1 August, 9). Others, however, pointing to the hegemonic stability theory, claim that a dollar-yuan system could be unstable with much room for friction and accidents (Wheatley, 2014).

Normatively we would agree with John Agnew, who in 2009 welcomed the rise of non-US led 'money games'. A global financial system with a strong centre or centres in Asia might allow greater political agency by governments around the world, and be more sensitive to different levels and modes of development. Our

results, however, provide little encouragement that such a system is indeed emerging.

To be sure, as we made clear at the very beginning of the paper, forex trading is not the only indicator of the international status of a currency. In terms of exchange rate arrangements, one could document a shift away from USD and from independent float promoted by the USA since the collapse of the Bretton Woods system. While this trend has started already in late 1990s (Agnew, 2009), it has accelerated in the wake of the global financial crisis. Between 2007 and 2014 the share of IMF members using independent float fell from 19% to 15%. Soft peg now represents the most popular exchange rate arrangements, prevalent in 43.5% of IMF members, including China. In addition, the share of IMF members using USD as an exchange rate anchor fell from 33% in 2008 to 22.5% in 2014 (IMF, 2014). While these trends may reflect the erosion of the power of USD, they do not seem, however, to indicate any clear winner, as most countries that dropped USD as an exchange rate anchor moved to a basket of currencies (often undisclosed) or other monetary policy indicators (IMF, 2014).

While exchange rate arrangements, as well as the use of reserve currencies, and other aspects of international currencies require more research, the above trends make sense in the light of our framework. Due to network economies, the dominance of the USD is not only likely to outlive the economic and political dominance of the USA as a country, but in addition the dominance of the USD in forex trading may outlive its dominance in exchange rate arrangements, more likely to be driven by political factors. In any case, we live at a historical juncture in the evolution of forex markets, critical for understanding geo-economics and

geo-politics. We hope that our conceptual model and analysis will contribute to this understanding.

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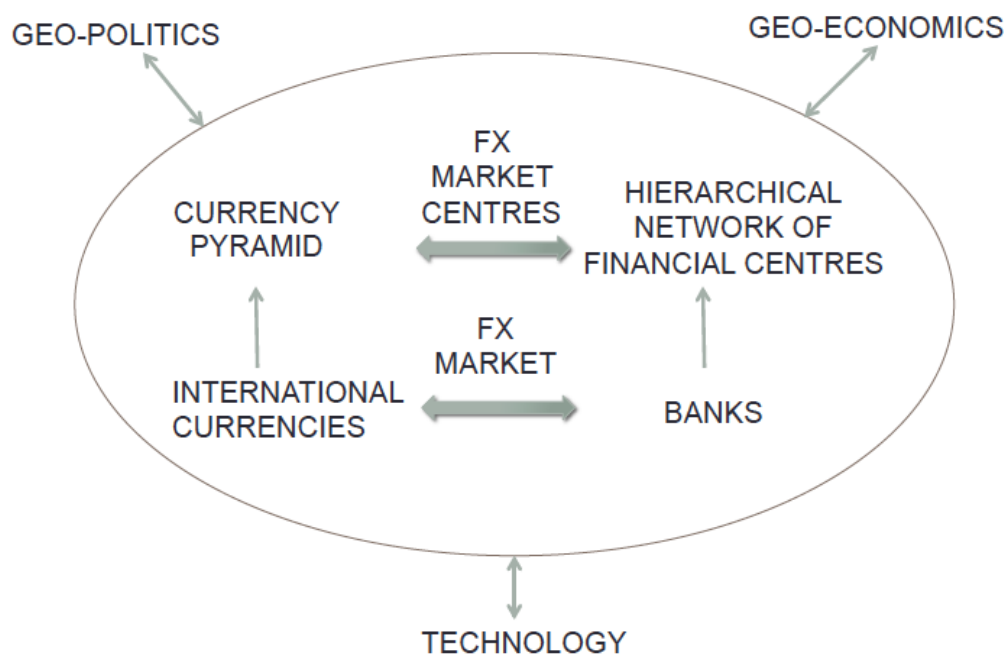


Figure 1. Framework for the political-economic geography of forex markets

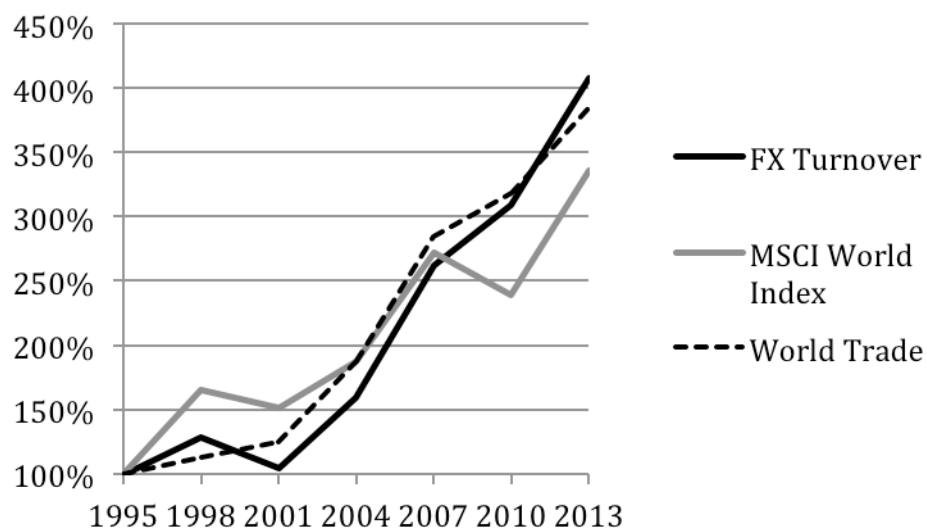


Figure 2. Growth in forex trading (1995=100).
Source: Authors based on data from BIS, MSCI, and UNCTAD.

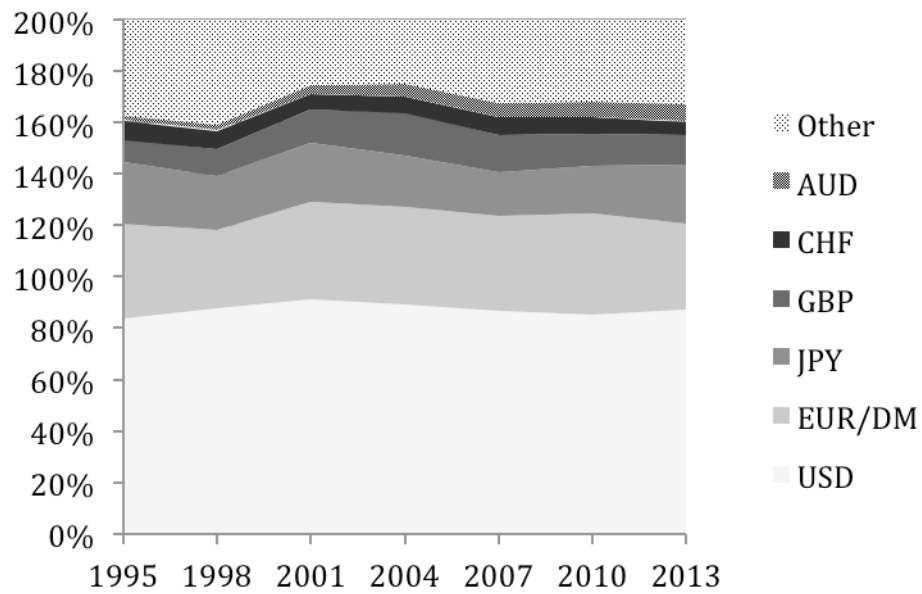


Figure 3. Global forex trading by currency
Source: BIS (for all figures and tables unless stated otherwise)

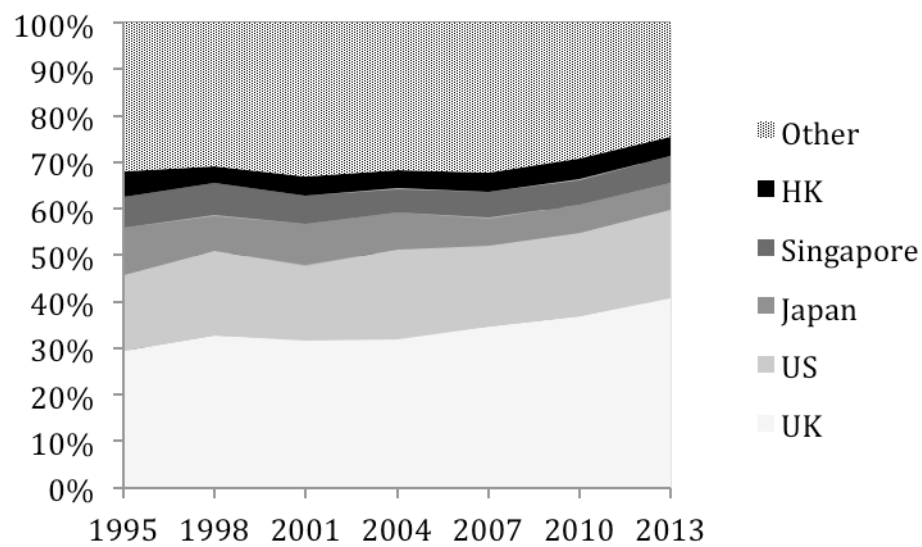


Figure 4. Global forex trading by country

Figure 5. Forex trading in 2013 (see separate file)

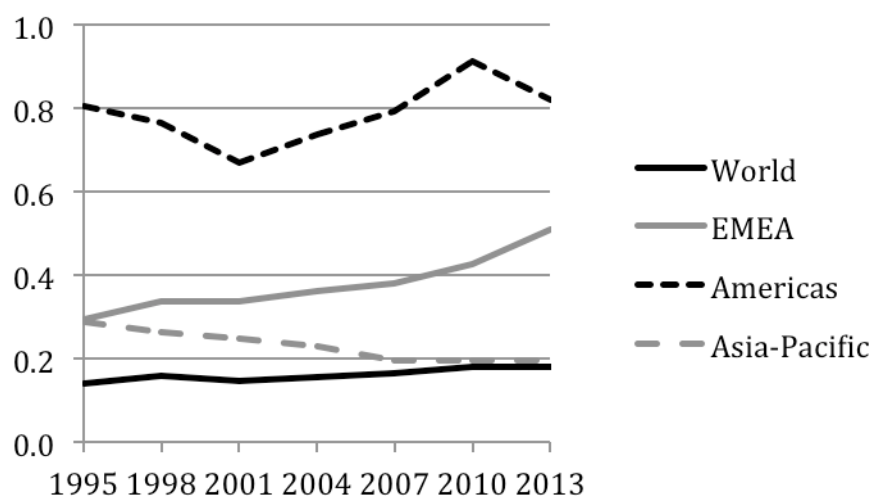


Figure 6. Geographical concentration of forex trading

Note: Vertical axis shows value of Herfindahl index, calculated as the sum of squared fraction shares (e.g. 0.1 for 10%) of each country in the world (or time-zone) total forex trading.

Table 1. Number of banks accounting for 75% of forex trading
Source: BIS, 2010

Country	1998	2001	2004	2007	2010
Denmark	3	3	2	2	3
Sweden	3	3	3	3	3
France	7	6	6	4	4
Canada	6	5	4	6	5
Germany	9	5	4	5	5
Australia	9	10	8	8	7
USA	20	13	11	10	7
Japan	19	17	11	9	8
UK	24	17	16	12	9
Singapore	23	18	11	11	10
Hong Kong	26	14	11	12	14
South Korea	21	14	12	12	16

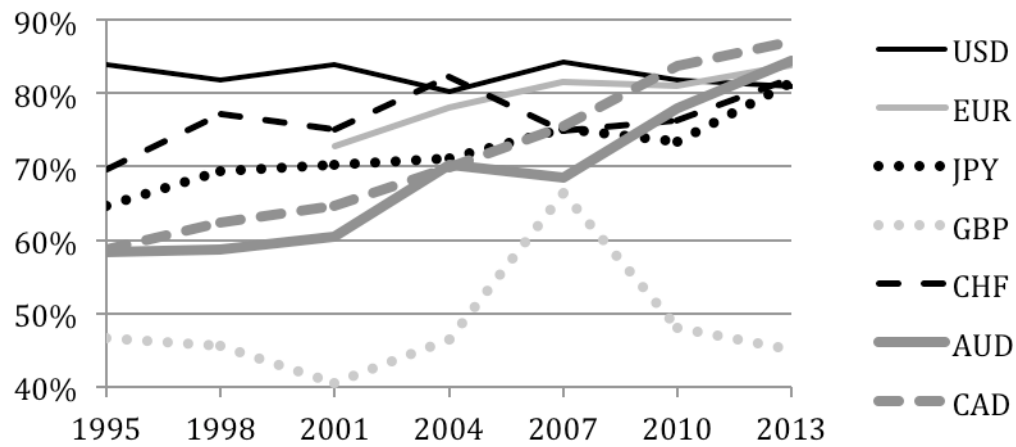


Figure 7. The share of trading conducted outside of the country of issuance (%)

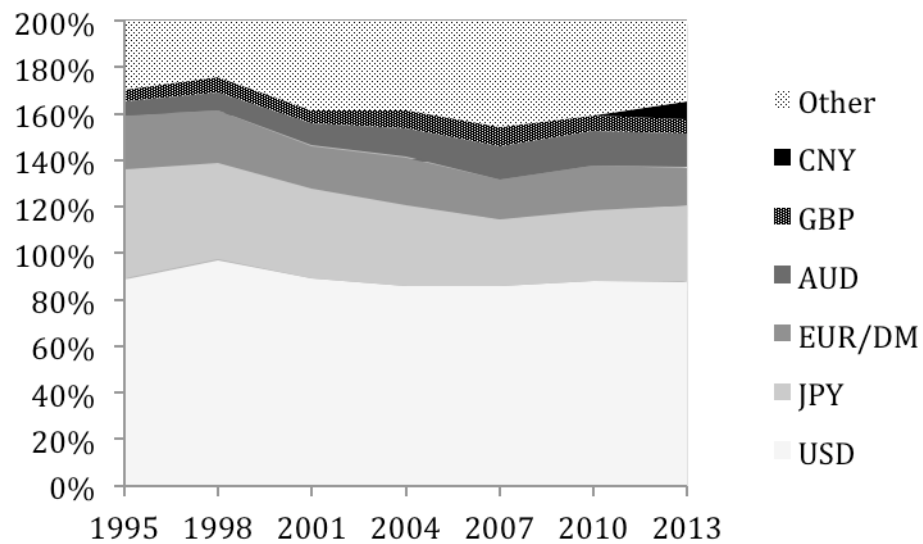


Figure 8. Forex trading in Asia-Pacific by currency

Appendix. Forex trading by country as % of time-zone

Country	1995	1998	2001	2004	2007	2010	2013
USA	89.6	87.4	81.6	85.8	88.9	89.7	90.5
Canada	10.4	8.7	13.3	10.2	7.6	6.1	4.6
Mexico	0	2.0	2.6	2.6	1.8	1.7	2.3
Brazil	0	1.2	1.7	0.7	0.7	1.4	1.2
Chile	0	0.3	0.7	0.4	0.5	0.5	0.9
Other	0	0.4	0.2	0.3	0.5	0.6	0.5
Americas	100	100	100	100	100	100	100
UK	51.9	56.3	56.4	59.0	60.2	64.3	71.0
Switzerland	9.6	7.5	7.9	6.0	10.3	9.1	5.6
France	6.7	6.3	5.2	4.7	5.1	5.3	4.9
Netherlands	2.9	3.5	3.2	3.7	1.0	0.6	2.9
Germany	8.6	8.2	9.5	8.5	4.1	3.8	2.9
Denmark	3.4	2.3	2.5	3.0	3.6	4.2	2.7
Russia	0	0.6	1.0	2.1	2.0	1.4	1.6
Luxembourg	2.1	1.9	1.4	1.0	1.8	1.2	1.3
Sweden	2.2	1.3	2.6	2.3	1.8	1.6	1.1
Spain	2.0	1.6	0.8	1.0	0.7	1.0	1.1
Other	10.6	10.4	9.5	8.8	9.3	7.6	4.8
EMEA	100	100	100	100	100	100	100
Singapore	25.9	31.7	25.3	22.7	24.7	22.8	26.7
Japan	40.5	34.8	37.2	35.2	25.5	26.8	26.1
Hong Kong	22.0	17.5	16.7	18.0	18.5	20.4	19.1
Australia	9.8	10.6	13.2	14.6	18.0	16.5	12.7
S. Korea	0	0.8	2.4	3.5	3.6	3.8	3.3
M. China	0	0	0	0.1	0.9	1.7	3.1
Other	1.7	4.6	5.3	5.9	8.8	8.1	9.0
Asia-Pacific	100	100	100	100	100	100	100