China's structural transformation: reaching potential GDP in the financial services sector

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China's economy faces the daunting challenge of shifting from a manufacturing-based economy to a services-based economy. Reforms in the services sector are slated to continue to take place in the coming years, including in the financial sector. In this paper, we explore China's success and challenges with structural change, then take a closer look at the financial services sector to find out where reforms have occurred, where the potential lies, and what the future will bring. We first describe structural change with regard to growth and TFP, then as it applies to China. We examine China's financial services sector. Next, we calculate potential GDP of the financial services sector now and with the implementation of expected reforms. We find that, given even conservative estimates, the value added of the financial intermediation sector could double, as labor, capital, technology, and elasticity respond to liberalization policies. Whether potential GDP under reforms is reached is another question; therefore, we recommend that China both increase the pace of implementation, focusing in particular on reducing the oligopoly in the banking sector, increasing investment options by reforming its bond and equity markets, and enhancing innovation in the financial sphere while controlling for risk.

Key words: China; financial sector; structural transformation; banking

1. Background

China's economy faces the daunting challenge of shifting from a manufacturing-based economy to a services-based economy. Reforms in the services sector are slated to continue to take place in the coming years, including in the financial sector. In this paper, we explore China's success and challenges with structural change, then take a closer look at the financial services sector to find out where reforms have occurred, where the potential lies, and what the future will bring. There is little written about the potential impacts of opening up China's financial sector on GDP and potential GDP, yet it is critical to understand the role that China's massive targeted structural change will have upon growth and other factors. This paper seeks to fill the gap in the literature on the economic impact China's financial service sector reforms can have.

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Structural change is a complex process that transforms an economy in a basic manner. While China has been successful in transforming from an agricultural-based economy to a manufacturing-based economy, it is unclear to what extent China will be successful in moving to a service-based economy. China's financial sector in particular faces challenges since financial institutions are closely tied to the state, whose institutional structure has prevented improvements in efficiency.

Multiple reforms are expected to occur in the financial sector, but the current economic slowdown, coupled with enduring state interests, present barriers to change. Still, if the reforms were successful, they could potentially generate far more GDP than they do at present. Better productivity, greater employment, and more capital in the banking sector alone could lead to large economic gains. In what follows, we first describe structural change and TFP, as well as structural change as it applies to China, then examine China's financial services sector. Next, we calculate potential GDP of the financial services sector now and with the implementation of expected reforms. We conclude with policy recommendations.

2. Structural change, TFP and growth

The relationship between economic growth, structural transformation and TFP has been examined to some extent in the literature. This relationship has been illustrated through different models, and results in different conclusions depending on countries and sectors examined.

Bah and Brada (2009) estimate total factor productivity at the sectoral level, developing a model that estimates sectoral TFP from data on sectoral employment and GDP per capita, in order to examine structural change in Eastern Europe. The authors evaluate TFP in industry, service, and agriculture, finding that the former Communist regimes in Eastern Europe have experienced structural change through the services sector, and that TFP is growing rapidly relative to that in Austria. Bah and Brada (2014) look at labor market developments in former Communist nations of Eastern Europe and the Soviet Union, specifically studying the interaction between aggregate output and employment, and later analyzing the impact of privatization on employment outcomes in the context of sectoral restructuring.

Buera and Kaboski (2012) analyze the role of specialized high-skilled labor in service sector growth in the United States. The authors create a theory that reflects the shifting demand toward more skill-intensive output as productivity increases. This provides the link between skill accumulation and growth of the services sector.

Duarte and Restuccia (2010) examine sectoral labor productivity to explain structural transformation, finding that the productivity catch-up in industry, across countries and relative to the United States, explains about half the gains in productivity across countries. Using a general equilibrium model, the authors also conclude that low productivity in the services sector and lack of convergence explains stagnation observed across countries.

Ngai and Pissarides (2007) construct a model in which structural change is driven by sectoral labor reallocation dependent on rates of TFP growth. The authors find that

on the balanced growth path, labor that produces consumer goods moves to sectors with low TFP growth rates, while employment shares of intermediate and capital goods remain constant. Acemoglu and Guerrieri (2008) analyze sectoral differences in factor proportions within a two-sector general equilibrium model, showing that as sectoral levels of TFP diverge or capital accumulates, structural change takes place. As in Ngai and Pissarides, Agemoglu and Guerrieri show that structural change is driven by changes in the relative price of factors.

There is little written on the financial services sector per se and structural transformation. Much of the emphasis with respect to financial sector change is associated with regulatory reform and liberalization. This has been discussed with particular reference to developed economies, such as the US, the UK, and Europe (see, Volcker, 2012; Bhatia, 2007 and Riksbank, 2015), especially in the wake of the global crisis, but not with reference to TFP or the structural transition to a service sector-based economy.

3. Structural change theory and application to China

Structural change is an essential, multi-faceted component of development. This is a broad term that implies some important assumptions. Most importantly, while stages of growth theories a la Rostow and others have been deemed too constricting in their approach, neglecting the variation, dynamics, and fluctuations experienced by developing economies, economists continue to view structural change as a movement from a primary sector-based economy to a manufacturing sector-based economy, and ultimately to a service-based economy, or from a traditional sector-based economy to a modern sector-based economy. The reason for this assumption is that structural change is thought to occur in conjunction with an upgrading of skills and capital, with a climb up the "ladder" of primary, secondary, and tertiary sectors largely coinciding with increasingly skill- and capital-intensive processes.This phenomenon has been applied to China in various ways.

Structural change in China has been analyzed across three sectors and across provinces, in the works of Fan, Zhang and Robinson (2003), Fleisher and Yang (2003), Wu and Yao (2003), Heckman (2005), Au and Henderson (2006), Bhaumik and Estrin (2007), Bosworth and Collins (2008), and Gong and Lin (2008). Other works use a macroeconomic framework to describe reallocations between private firms and state-owned enterprises, as in Song et al. (2011) and Dekle and Vandenbroucke (2012).

China has successfully carried out the structural change from agriculture to industry, increasing total factor productivity in agriculture by 6.5% annually between 1991 and 2009 (Cao and Birchenall, 2013). Cao and Birchenall (2013) find that total factor productivity expansion in the agriculture sector explains most of the reorientation of output and employment toward rapid non-agricultural productivity growth. Movement away from a focus on the agricultural sector comprised an important stage of growth in most other countries. Reforms, which started with the agricultural sector, freed up agricultural labor as productivity rose.

Chen, Jefferson and Zhang (2011) use a stochastic frontier sectoral production function to examine total factor productivity growth and quantitative growth of inputs. The authors find that TFP growth exceeded quantitative growth of inputs since 1992, indicating a "structural bonus" as referred to in Timmer and Szirmai (2000), but that the contribution of TFP to output growth declines starting in 2001. Structural change embodied in reforms to factor markets and industrial structure heavily influenced the efficiency of factor allocation over the period in question. This is because factor markets were underdeveloped, and this became clear in particular after 2001. Industrial policies began to favor other, high-profit industries, such as high-tech and heavy industries, which were unable to absorb much labor.

Wang et al. (2014) put forth a new Structural Decomposition Analysis model, which interprets the changes in sectoral output production. The authors incorporate, among more traditional indicators of structural change, the ratio of final goods demand over total output. Analysis is applied to three periods: 1992-1997, a high growth phase, especially for the mechanical and electrical machinery sector; 1997-2002, a soft landing period, in which growth in the mechanical and electrical machinery sector slowed; and 2002-2006, an initial stage of a high growth period, which experienced a surge in the mechanical and electrical machinery sector, combined with declines in the contribution to growth of the agriculture and services sectors. Findings indicate that the driver of China's movement toward increased production of machinery and electrical equipment is external demand for export, while changes in production technology and import substitution have hindered structural change.

Jiang and Shi (2015) use an Eaton-Kortum model to discern total factor productivity differences across provinces. The authors find that different sectoral contributions by province indicate high migration barriers. They conclude that migration barriers actually expand the provincial manufacturing labor share, and that rich provinces gain less from inter-provincial trade than poor provinces.

Lee and Malin (2013) use a structural labor model of sector choice to find that 11% of aggregate growth in output per worker between 1978 and 2004 can be explained by increased education, with most of the growth (9%) stemming from sectoral reallocations of labor.

Relatedly, a sizeable literature exists on whether China has reached the Lewis turning point, moving from a period of surplus labor in the agricultural sector to a period of rising wages in the agricultural and industrial sectors. This literature indicates that China may have completed the first phase of development and moved into the second, modern-sector stage.Scholars noticed in the late 2000s that wages were rising and that labor shortages in some coastal cities were presenting bottlenecks to production. This led to the rise of such literature, with some authors concluding China has reached the turning point, and others finding that it has not. The discussion can be found in Zhang, Yang and Wang (2011), Zhu and Cai (2012), Cai and Du (2011), Golley and Meng (2011), Cai (2010), Yao and Zhang (2010), Minami and Ma (2010), and others.

While we do not discuss the Lewis turning point per se, the demographic implications of these studies is essential to understanding China's ability to undergo structural change to a service-based economy. What we can gather from these studies

is that: a) China's working age population has recently peaked; b) demand for migrant workers remains high in the low-skilled modern urban sector; c) China has entered a new stage of demographic transition, with an aging population, before it has become fully affluent or developed; and d) improvements in human capital and technology are now more important than simple labor or capital inputs. China's financial sector is no exception to these conclusions. We next describe China's financial sector and discuss where it is heading.

4. China's financial sector

First, we must understand China's financial sector, its reform status, and where it is heading in order to assess potential structural change in this industry. As is well known, China's financial sector continues to be dominated by a small number of major state owned banks, while private banks play a minimal role. At the same time, demand for financing is high among underserved populations such as rural areas and small and medium sized enterprises. Financing constraints among the banking sector gave rise to the shadow banking sector after 2007, alternative methods of financing that sought to serve smaller and riskier borrowers. Leveling the playing field among banks and reducing regulations would increase competition and efficiency in this sector, and enhance the role of the financial industry in China's restructuring process. Not only would improving competition create employment in this sector, but reducing financing constraints would complement the growth of other industries.

China's Big Four banks, the Industrial and Commercial Bank of China, Bank of China, Agricultural Bank of China and China Construction Bank, have far more market power over the financial industry than do the thousands of other financial institutions. The Big Four comprise 40-50% of the bank loan market share and 93% of banking sector market capital. The industry is therefore moderately oligopolistic.By contrast, foreign subsidiaries control only about 1% of the market share. Barriers to entry in the financial sector are mainly explicit and implicit government preference.

The Big Four Banks, ironically, are less profitable, less efficient, and have lower asset quality than other types of banks (Lin and Zhang, 2009; Fu and Heffernan, 2009). In this way, these firms are atypical oligopolies as to some degree they are tools of the state. China's banking structure contradicts the X-efficiency hypothesis, which says that more X-efficient banks have lower costs, higher profits, and larger market shares (Demsetz, 1973, 1974). China's X-inefficiency increased between 1985 and 2002, especially among state owned banks, indicating a rise in moral hazard (Fu and Heffernan, 2009). China's banking structure also fails to support the relative scale-efficiency hypothesis, which finds that banks that are at the appropriate economy of scale will have lower costs and higher profits that can lead to greater market concentration (Lambson, 1987).

Other banks include joint-stock commercial banks, policy banks, credit cooperatives, and urban commercial banks. All of these together comprise a little

over half of lending activity in China.These institutions, along with the Big Four, are constrained by interest rate ceilings on deposits and lending quotas. Interest rate ceilings on deposits pinch the potential returns on savings that depositors may earn. In times of higher inflation, real returns on deposits have even turned out to be negative. Savers have few viable savings and investment outlets other than bank deposits, and the deposit interest rate ceiling reinforces their dissatisfaction with China's financial system. What is more, lending quotas may restrict the amount of loans that banks can lend.

In recent years, a sizeable shadow banking sector has grown up to serve institutions that cannot obtain loans from the formal banking sector. The shadow banking sector includes trust companies, internet lending platforms, credit guarantee companies, and other institutions, and products include wealth management and trust products, bankers' acceptance bills, and entrusted loans. Shadow banking encompasses means through which riskier and non-state firms can obtain loans, as the formal banking sector is constrained in its lending. Risks associated with the shadow banking sector are higher than in the banking system, as credit, liquidity, and solvency risks present substantial threats among institutions, products, and borrowers.

The bond market includes government and corporate bonds. Government bonds are issued by the MOF and local governments and Central bank notes and Policy Bank bonds are most actively traded, but are purchased by state owned banks. Corporate bonds incur large transactions costs during the issuance process and have been insufficiently rated by China's ratings agencies, leading to potential defaults of companies whose debt quality was overestimated.The stock market is the second largest in the world by equity value but is dominated by state owned firms. Market prices are inefficient at present, as an asset price bubble looms.

Capital controls restrict interaction with the international financial sector. Controls over currency conversion and flows have been loosened, particularly in the current account, but persist in the capital account. The question is, however, to what extent do capital controls stand in the way of domestic financial reform? There are two answers to this: one is that allowing larger capital inflows for investment purposes would help to deepen China's financial system, while the other, contradicting, view, is that China's financial system is fragile and must be protected from larger capital inflows. Which argument would best support financial reform as measured by financial deepening?

Experience tells us that maintaining a fixed (even within a band) currency in conjunction with porous capital controls and a weak financial system can result in volatile capital flows, shocking the financial and then real economic sectors. However, if all of these elements are to be liberalized over time (and we do not underscore the many arguments in favor of liberalization here—see Eichengreen, 2001 and Kose et al., 2006 for discussion), there may be a period in which exposure to capital flows disrupts the economy. To combat this, economists have advocated for a proper order of financial liberalization. McKinnon (1993) is one of the heavyweights on the order of economic liberalization. He argues that one of the first orders of reform should be that interest rates are liberalized to reflect borrowing and lending costs, and that private debt contracts be enforced through the legal system.Chinn and Ito (2006) find

that increasing financial openness contributes to the development of equity markets only after a threshold of strong legal systems and institutions is attained and after some development in the banking sector has also occurred. The authors also find that liberalization of cross-border goods is a precondition for liberalization of the capital account. In terms of order of capital and exchange rate liberalization, most scholars contend that first the exchange rate and then the capital account should be liberalized (Eichengreen, 2001). The argument is that liberalizing the exchange rate first can reduce speculative pressure.

Expanding flexibility of the exchange rate would ideally take place in periods of stability in exchange markets, and as a second best position, should occur when the domestic economy is strong and there are pressure for the currency to appreciate (Prasad, Rumbaugh, and Wang, 2005; Eichengreen and Mussa, 1998 and Agénor, 2004).

Exchange rate liberalization will help to alleviate "hot money" inflows and outflows that increase as appreciation and depreciation expectations rise. However, there are dangers associated with this, including currency speculation, creation of adverse conditions for trade, fluctuation in the real value of foreign debt claims, and generation of inflation. The biggest challenge is maintain financial stability and minimizing shocks. Currency speculations trigger a hostile environment of uncertainty. Investors will tend to shy away from investment. This uncertainty encourages consumer prices volatility which is exacerbated by inflation. This is an adverse environment for trade and economic growth.

McKinnon (2006) points out that even (and especially) Chinese holders of US public debt may experience deterioration of their assets. Perhaps even more importantly, McKinnon and Schnabl (2012) state that China cannot fully float its currency since it will not be able to lend an amount sufficient to balance the trade surplus; the RMB would continue to appreciate unless the central bank stepped in to purchase dollars. China is seeking to expand lending in RMB through its Silk Road projects and participation in global lending institutions. Over time, this will provide China with further room in which to liberalize its exchange rate.

A more flexible exchange rate regime would permit China to support a more independent monetary policy, ensuring a buffer against domestic and external shocks that would reduce its vulnerability. In an ever more globalized world, where countries and economies are becoming more integrated, it is in China's own benefit to reduce its exposure to potential external macroeconomic shocks. The current overall exposure of the corporate sector and banks in China to foreign exchange risks appears to have been growing slowly as it has become an important player in the international arena. Prasad et al. (2005) however, advocate that China's banking system is "unlikely to be subject to substantial stress simply as a result of greater exchange rate flexibility".

China's titanic growth has been in great part a result of its trade flows and FDI inflows. For this reason, many policymakers argue that a more flexible exchange rate would negatively influence these trade and FDI flows, hindering China's growth. On the other hand, studies from Clark, Tamirisa and Wei (2004) believe that exchange rate volatility does not influence trade flows significantly. The renminbi's real value keeps a close eye on the dollar and maintains a stable exchange rate, whereas, with its other major trading counterparties, China allows greater exchange volatility. This

behavior does not seem to prove an obstacle for China's expanding trade strategies in other countries. Furthermore, the benefits of enjoying macroeconomic stability that could emanate from increasing exchange rate flexibility could compensate and offset the effects of reduced trade flows. With a greater flexibility the Chinese financial market would also grow deeper and stronger, together with the foreign exchange market.

It is important to note that China need not fully liberalize its exchange rate in order to create more room for a consumption and market-based economy. China may choose to follow the example of a nation like South Korea, which has a weakly managed float in place in order to smooth volatility rather than to manipulate exchange rates. China may reduce its control over the currency by decreasing intervention in the foreign exchange market.

Capital account liberalization will help to reduce interest rate differentials between China and other nations, but this may destabilize the economy where large interest rate differentials persist. Currency appreciation expectations may surge given rapid capital inflows, and some basic controls must be put into place to prevent this from occurring.

Barriers to reform of the financial system are many, but some of the most pressing include leveling the playing field to make banks outside the Big Four more competitive, fully allowing interest rates to reflect market forces, and improving the credit scoring system. Measures to liberalize interest rates are under way: while the lending floor was lifted in July 2013 and a new prime lending rate was created in October 2013, steps to remove the deposit rate ceilings are under way. The People's Bank of China (PBOC) implemented deposit insurance in May 2015 in order to ensure that once deposit interest rate ceilings are lifted, depositors are protected from risky competitive behavior engaged in by banks.China is also in the process of implementing a social credit score to rate individuals and firms based on the credit history and other data. This is expected to be rolled out in 2017. Local provincial governments are collecting credit information as well to improve lending at to local institutions.

Banks suffer from some issues with non-performing loans, although the Ministry of Finance is able to combat this problem by using asset management companies to purchase non-performing loans. Foreign competition is also restricted.

China's leadership is well aware of the need for changes and has laid out an ambitious reform agenda for the financial sector. China's reform agenda aims to:

(a) Open up the financial sector by allowing small private banks to emerge;
(b) Promote bond and equity finance;
(c) Improve insurance compensation process;
(d) Bring about inclusive finance;
(e) Promote financial innovation;
(f) Increase exchange and interest rate liberalization;
(g) Increase capital account liberalization;
(h) Regulate capital flows within a macroprudential framework;
(i) Enhance financial regulation; and
(j) Reform financial institutions' exit mechanism.

Most banking reforms that have already been carried out have not radically changed the sector's market structure. Banking reforms include the following (see table 1):

Table 1
Banking reforms in China

Date	Policy	Description
7/1/2013	Guidelines on Financial Support for Economic Restructuring, Transformation and Upgrading	Allows some changes in capital investment structure
7/26/2013	Guiding Opinions on Strengthening Financing Services to Support SMEs	Requires government agencies to enhance financing to SMEs
8/8/2013	Implementation Opinion on Providing Financial Support for Small and Micro Enterprises	Provides new financing options to SMEs
8/30/2013	Guidelines on Protecting Rights and Interests of Consumers	Requires banks to improve governance to protect consumer rights
9/27/2013	Measures on Consumer Finance Pilots	Creates 10 consumer finance business pilots
11/8/2013	Guidance on Commercial Banks Issuing Corporate Bonds to Replenish Capital	Allows listed commercial banks to issue corporate bonds
1/6/2014	Notice on Issues Concerning Strengthening the Supervision on Shadow Banking	Focuses on stabilizing shadow banking
2/14/2014	General Plan for the Qingdao Wealth Management Comprehensive Reform Pilot	Creates a pilot zone to encourage wealth management zone
2/14/2014	Measures for the Administration of Service Prices of Commercial Banks	Regulates commercial banks' service prices
2/19/2014	Circular on the Reapproval of Charging Standards of Supervision Fees for the Banking Sector	Changes standards on collecting fees for banks
2/20/2014	Administrative Measures for the Liquidity Risk of Commercial banks	Implements measure to assess liquidity risk
2/27/2014	Credit Industry Management Act	Calls for social credit information system
3/17/2014	Regulations on Financial Leasing Companies	Clarifies operating rules for financial leasing industry
3/27/2014	Opinions on Accelerating the Construction of Microenterprise and Rural Credit Systems	Creates credit risk system for micro and rural enterprises
7/24/2014	Notice on Improving and Innovating Loans to Small and Micro Enterprises to Improve the Financial Services to Small and Micro Enterprises	Improves loans to small enterprises
7/25/2014	CBRC Approvals to create Qianhai Weizhong Bank, Wenzhou Private Bank, and Tianjin Jincheng Private Bank	Establishes three private banks
9/26/2014	CBRC Approvals to create Shanghai Huarui Private Bank and Zhejiang Web Commercial Bank	Establishes private banks

Source: US-China Business Council (2015).

Small-scale reforms have also worked to provide finance to smaller borrowers in order to make finance more inclusive. Although some P2P firms have engaged in risky lending, other internet firms such as Eloan.cn have worked to provide small-scale finance to SMEs and rural borrowers.

Foreign entry into China's financial sector began in 2006 as part of China's commitment to the WTO agreement.Foreign bank activity is highly restricted by Chinese regulators. Limitations include lending and deposit constraints, foreign exchange constraints, large capital requirements, and murky regulatory framework

(PWC, 2014).

The capital account has been opened to a limited extent under the QFII and QDII programs. Qualified Domestic Retail Investor (QDRI) and Qualified Domestic Individual Investor (QDII2) programs are also in the making.Under the Qualified Domestic Individual Investor scheme individuals in Guangzhou and Shenzhen (at present) can purchase securities listed on the Hong Kong market. These investors are required to have at least 1.5 million RMB in financial assets. The Qualified Domestic Retail Investor program, still in the planning stage, would allow citizens to invest in overseas stocks and properties.

Through the Qualified Domestic Institutional Investor system, mainland institutions can invest in foreign exchange products. Approved financial institutions may purchase and sell foreign currency or RMB denominated financial products to mainland investors. Such products include money market instruments, fixed income products, equity products, mutual funds, and structured products.

The Shanghai-Hong Kong Stock Connect which opened in April 2014 now allows cross-border stock investment between the Shanghai and Hong Kong stock exchanges, but had a limited impact. Funds will soon be added to sales of cross border shares through the Shanghai-Hong Kong Stock Connect, and a Shenzhen-Hong Kong Stock connect is expected open in the future. However, strong deviation in prices for the same stocks sold in Shanghai and Hong Kong has revealed lack of market efficiency as well as lack of investor sophistication.

Some exchange rate reform has also been carried out. More substantive recent reform measures include reforming foreign exchange management under companies' capital accounts, expanding multinational use of foreign exchange, setting up pilot zones in which foreign companies can convert foreign capital into RMB (US-China Business Council, 2015). Less impactful reforms include promotion of the foreign currency cash business, simplification of cross-border foreign exchange guarantee, providing instructions to government bodies on how to expand foreign trade, clarifying procedures in foreign exchange settlement, and allowing foreign invested banks to convert currency for operating capital.

The Shanghai Pilot Free Trade Zone is an example of one of China's initiatives to implement economic and social reforms in a controlled manner. As announced by the State Administration of Foreign Exchange (SAFE) Shanghai branch on 28 February 2014, the Shanghai Free Trade Zone (FTZ) will allow yuan convertibility and unrestricted foreign currency exchange. Furthermore, it will also permit a tax-free period of 10 years for the businesses in the area as a means to simplify the process of foreign direct investment (FDI) and facilitate the management of capital accounts.

In a nutshell, the Shanghai FTZ's aim is to facilitate and encourage business. The main benefits entities within the Shanghai FTZ will benefit from are listed below (McBride, 2014):

(a) Simplified cross-border payment procedures-Shanghai FTZ entities can open capital accounts without prolonged government foreign exchange (FX) registration approvals and banks are now authorized to carry out FX registration and renminbi (RMB) cross-border settlement directly;

(b) Free trade accounts-Shanghai FTZ entities can open free trade accounts (FTA) and transfer funds freely between FTAs, other offshore accounts and onshore non-resident accounts;

(c) Loosening of control over cross-border finance-controls over outbound security and FX finance have been relaxed so Shanghai FTZ entities may now borrow offshore RMB funds subject to certain requirements (for example, limits on the use of such offshore RMB funds and maturity profile);

(d) RMB convertibility-Shanghai FTZ entities enjoy full capital account RMB convertibility along with the benefits of future FX reforms (for example, FIEs can immediately convert foreign exchange into RMB and utilize RMB hedging, whereas a non-Shanghai FTZ FIE must wait until there is a commercial contract requiring hard currency payment before it can make the conversion);

(e) Deposit rate liberalization-Shanghai FTZ entities may be offered higher interest rates for foreign exchange and RMB deposits with banks due to the loosening of the statutory interest rate limits.

However, there is some distance between the current reforms and reform targets and where the financial sector would be to maximize GDP growth. First, the Big Four banks' oligopoly should be ended by eliminating policy favoritism and implicit government guarantees. A much better information mechanism needs to be implemented to judge risk and return, particularly for small and medium sized enterprises, which provide most of China's economic growth but remain extremely credit constrained. These two banking-specific reforms in and of themselves would require massive reorientation of the banking sector to implement. Government projects should rely less on Big Four banks for funding and seek other types of financing, including tax revenue funding, bond financing (in which bonds would be held by the public rather than mainly banks), and perhaps loans from designated institutions such as the policy banks. Breaking up the Big Four oligopoly is not even on the reform agenda, but reducing market share of these institutions would go a long way to freeing up finance for other types of firms.

Development of the bond market is also quite nascent and will take massive effort to truly marketize and expand.Well-functioning bond markets are prerequisites for relaxing capital controls and are channels of transmission for an interest rate-led monetary policy.China's bond market has been growing in leaps and bounds: bond issues are on the rise; market capitalization is expanding substantially; turnover in the secondary market is surging; and the number and variety of market participants and instruments are rapidly increasing. After more than 10 years of development, China's bond market is now the third largest in the world at about RMB 35.89 trillion, or about USD 4.24 trillion.

China has two bond markets: the Inter-bank bond market, which is regulated by the People's Bank of China (PBOC), and the Exchange bond market, which is regulated by the China Securities Regulatory Commission (CSRC). The Inter-bank market plays the leading role, accounting for more than 95% of total trading volume.

Commercial banks dominate trading activity in China's Inter-bank bond market, accounting for around 70% of trading volume (Sachs, 2015). Foreign investors may access the Chinese bond market through two programs. The first program is

the Qualified Foreign Institutional Investor (QFII) program, which allows foreign investors access to both the Exchange bond market and the Inter-bank bond market. The other program was launched in 2010 to allow three types of offshore institutions to invest in China's largely closed Inter-bank bond market. The qualified institutions include: Foreign central banks, lenders in Hong Kong and Macao that have already conducted renminbi clearing, and overseas banks involved in renminbi cross-border trade settlement.

When taking a look at China's fiscal and social landscape there is pressure to increase public expenditure to cover welfare benefits of an aging population. The population also demands higher investments in education, the health system and labor protection. These expenditures cannot be financed merely through tax receipts. Thus, the supply of public bonds would need to rise to meet these demands (Aglietta and Maarek, 2007). In an attempt to boost demand for its bonds, China has also been allowing more foreign institutional investors to trade on its interbank market. The decision to eliminate quotas on interbank trading leads to opening up the bond market and the capital account, but much more will need to be done to truly develop China's financial markets. Essential reforms require better ratings of bonds and better information management.

An important feature of China's financial development is its stock market growth since 1991.The Chinese government is highly engaged in fostering a stock market that can compete with those of developed countries. In order to achieve this objective, the Chinese Government is committed to apply reforms that affect share issue privatization (SIP), the reform of non-tradable shares, the reform of firms' access to the capital market, the regulation of financial intermediaries, the refinement of the legal system governing the capital market, the convergence of Chinese accounting standards with International Financial Reporting Standards (IFRS), and audit market reforms.

According to Megginson and Netter (2001), Gupta (2005), Shleifer (1998), share issue privatization (SIP), in which the government sells shares in SOEs to private investors, has been the most profitable and successful method of privatization since it has contributed to increase firm's efficiency.

The development and growth of the Chinese stock market must be studied in the context of the "partial privatization" of state-owned enterprises (SOEs) in the 1990s. At the beginning of the 1980s, the Chinese Government launched the SOE reform aiming to decentralize the central government's managerial decision rights in SOEs. In the following decade, the SOEs became partially privatized and began to issue new and minority shares to individual investors, who could trade their shares freely on the newly developed Shanghai and Shenzhen stock markets (set up in early 1990 and 1991, respectively).

The idea was to give birth to a stock market that were representative of the different geographical regions and industries in China. The central government decided which subset of SOEs was to be selected and listed. Due to this partial privatization process, the government could no longer sell controlling stake in the firms. The shares held by public investors became freely tradable on the stock market, while the shares held by the state and legal persons were still not tradable.

Lu and Fu (2014) describe China's privatization strategy as a two-step approach. The first step is 'partial' privatization, which involves SOEs selling a minority stake to public investors which are listed on the stock market, while the majority of stakes are still owned by the State. The second step is known as 'complete' privatization, in which the government sells its controlling rights in selected SOEs to private investors. Chinese listed companies can be grouped into SOEs controlled by state asset management bureaus (SAMBs), SOEs affiliated to the central government, and SOEs affiliated to the local government (Chen, Firth, and Xu, 2009).

The question of capital account opening is difficult to answer—to what extent must the capital account be opened to induce growth without bringing on too much financial fragility? The banking system continues to be underdeveloped and is unable to effectively handle risk and return. If the capital account is liberalized and foreign capital surges into the banking system, there is a good chance that excessive risk will build up in this sector since channels for obtaining information on borrowers are insufficient. The same is true for capital inflows into the bond and equity markets, which continue to be controlled in the types of firms that can finance through these means, which is not based on risk and return per se. Capital outflows may result in the collapse of the banking system, which is dependent on funding from deposits.

If the banking, equity, and bond markets were not constrained, the foreign financial inflows may help to boost growth by funding promising projects. Even so, foreign capital inflows can also result in currency overvaluation under a liberalized exchange rate regime and repress export growth. Further, even though economic theory states that foreign finance will expand the funds available for investment and growth in a developing country, the relationship between external finance and growth is in practice not guaranteed. For example, Aizenmann, Pinto and Radziwill (2004) find that for the 1990s, countries that self-financed enjoyed higher growth rates than countries that had lower levels of self-financing.Prasad, Rajan, and Subramanian (2007) provide evidence that developing countries that rely more on foreign finance have not grown faster in the long run. The question of capital controls and their growth-distance from capital account liberalization remains unresolved and we can choose to leave it out of the equation.

It is possible that that capital account and exchange rate liberalization can generate growth but also uncertainty and volatility, which may present negative shocks. We therefore examine the potential GDP in China's financial sector while focusing on assessing and increasing domestic production inputs while leaving opening up reforms to later research. We now turn to the model to assess potential growth in the financial sector, given the present reform trajectory.

5. Methods and results: modelling financial sector potential

We calculate potential GDP of the financial sector at present and compare it to the current GDP to find the output gap at the current level of reform. We also calculate potential GDP based on assumptions for labor, capital and TFP given current reforms

and then draw a comparison between the 'before' and 'after' reform scenarios.

To calculate potential GDP, we use the production function approach followed by CBO (2001) and Roeger (2006)(and many others) which is rooted in economic theory. This uses a combination of factor inputs multiplied with the technological level. We use the Cobb-Douglas production function to illustrate potential GDP.

$$Y = (U_L LE_L)^{\alpha}(U_K LK)^{1-\alpha} = L^{\alpha}K^{1-\alpha} * TFP \tag{1}$$

where labor L and capital K, checked by excess capacity U_L, U_K and adjusted for efficiency E_L, E_K determines production Y. Total factor productivity, TFP, is given by:

$$TFP = (E_L^{\alpha}E_K^{1-\alpha})(U_L^{\alpha}U_K^{1-\alpha}) \tag{2}$$

This equation shows to what extent factors of production are used as well as their efficiency or technological level.

We use total wage bill for the financial intermediation sector as a measure of labor input, assuming that the wage bill reflects a real measure of work rather than greed. While we do know the number of employees for the financial intermediation sector and could calculate the hours worked based on this, this would also be an estimate as we would have to assume weeks and hours worked per year and week respectively. Also, when we compare the two figures, TFP for analysis using the wage bill is more realistic than for hours worked.

For simplicity, we assume constant returns to scale, which reflects China's banking sector reality, as rigorously tested in Fu and Heffernan (2008).We use numbers from Chow and Li (2002) and Chow (2008) for the Chinese economy as a whole, which shows that elasticity of labor α is 0.4 and elasticity of capital 1-α is 0.6.

For the capital stock, we use the Penn World Tables Capital Stock table for China which assumes a 3.1% rate of depreciation. This uses the perpetual inventory method as the capital stock becomes a weighted sum of previous capital stock investments.We must still determine the capital stock in the financial sector. We approximate this by multiplying the capital stock by the ratio of the financial sector output to total output (GDP).

$$I = is * YPOT \tag{3}$$

$$K = I + (1 - dep)K(-1)^2 \tag{4}$$

Using figures from 2011, we find that TFP is 1.0345 if the capital stock is proportionately used (proportion of capital stock used by the financial sector is found in terms of the ratio financial sector value added to GDP), 1.563 if half the proportional capital stock is used, and 2.3767 if one quarter the proportional capital stock is used. The capital stock estimate includes not only machinery but also computers and software, which are intensively used in the financial sector. Therefore we do not believe the capital stock is lower than the proportional capital stock.

Since we are working only with the financial sector rather than with the economy

as a whole, we can make various estimations of total potential financial labor force without using the NAIRU and labor force projections for the economy as a whole. Still, we must come up with a rational projection for the financial sector. Current statistics state that there were 5,053,000 employees in financial intermediation in 2011. These employees are mainly college educated.

The rate of unemployment in China is low. Still, among college graduates, unemployment is relatively higher than among other demographic groups (about 7 million graduates). If 1/20 of these college graduates (say) were employed in the financial sector, an additional 350,000 workers could be added if the jobs were available. For capital, we assume that 1/2 the proportionate capital is currently utilized and that if all proportionate capital were utilized, the potential capital stock would be twice as large. TFP is therefore assumed to be 1.563.

We can then use these equations to calculate potential GDP in China's financial sector, and find that it is 3,782,925 million RMB under our assumptions.

The next step is to determine how further reforms would affect potential GDP in the financial sector. The reform with the largest impact includes encouraging financial innovation, if risks are appropriately controlled for. The impact of other reforms depends on how they are carried out.

First, opening up the financial sector by allowing small private banks to emerge will likely have little impact on any factors unless many small private banks are allowed to emerge.

Second, bond and equity finance has a long way to go in terms of truly boosting value added of the financial industry, so it is unlikely that it will contribute very much in the short run. Over time, it is possible that the bond market in particular can be overhauled. (The equity market is currently taking backward steps after government intervention).

Third, bringing about inclusive finance may be successful if it promotes employment and output of SMEs, and this may result in increasing labor elasticity to some degree.

Fourth, promoting financial innovation may increase the elasticity of labor and capital, and will also likely enhance total factor productivity if it introduces more productivity than risk.

Fifth, increasing exchange rate, capital account, and interest rate liberalization may have varied effects. Exchange rate and capital account liberalization will depend very much on whether they properly control for risk and do not remove value added rather than contributing to it. How much these would contribute to labor, capital, and overall value added in China's domestic economy is really a question. There is less debate about interest rate liberalization, as it appears that more market-based interest rates would increase efficiency of the financial sector.

Sixth, regulating capital flows within a macroprudential framework, enhancing financial regulation, and reforming financial institutions' exit mechanism may increase the efficiency of labor and capital, and also prevent losses that might otherwise occur.

In order to calculate potential GDP under the implementation of reforms, we assume slightly increasing returns for labor and capital combined and somewhat larger labor and capital values. We can also assume a small increase in total factor productivity. Suppose that structural change allows for more people to be employed

in the financial sector as more jobs are created, and along with them, the capital stock is built up. We assume that structural change boosts labor, capital, and TFP by 10%, and that elasticity of capital and labor rise by 0.01%. This seems reasonable based on the current reform agenda, as quantity and quality of productive inputs are likely to be increased if all reforms are carried out.

After performing calculations, we find that potential GDP of China's financial sector under these conditions is 5,780,761 million RMB. This is a 53% increase over the current potential GDP and a 132% increase over the current actual GDP.

We do not capture indirect value created by the financial sector in this article. However, we note that the financial sector is a core component of the economy because it provides financial capital to the rest of the economy, which multiplies through the economy as wages are paid and consumed. The larger impact of the financial sector is even greater, such that a 53% or 132% increase in GDP created within the financial sector will result in even greater value added.

6. Discussion and policy recommendations

China is on the road to financial reform, albeit at a gradual pace. If the nation were to implement all of its planned reforms in the financial sector, it could increase GDP and boost the contribution of services to output. Still, China has yet to implement many of the reforms, and must increase its pace in order to accomplish its target outcomes.

First, China should focus on reducing the oligopoly of its largest banks in order to increase competition and efficiency within the banking sector. As a result of this, smaller private banks can be encouraged and have a greater chance of survival. This can also help to promote inclusive finance. Marketization of the banking sector can also be further enhanced by liberalizing deposit interest rates, allowing banks to pay consumers properly for their savings. This is critically important as alternative savings and investment channels are opened up to consumers, and will help banks to maintain their deposit holdings.

Second, China must attempt to increase investment options by reforming its bond and equity sectors. As we have seen from the equity market boom and bust in the summer of 2015, which was fraught with government intervention, the market is not rational and also does not sufficiently reflect firms that provide the greatest sources of growth. Many changes must be made in the bond and equity markets before these can become viable sources of yield.

Third, innovation can be an important source of growth, but can also risky. Proper risks must be controlled for as financial regulation is enhanced, and as failing financial institutions are given a proper exit mechanism. This will help to check risk in the financial sector and allow reforms to flourish.

Without the implementation of these planned reforms, as we can see from our model, output creation in the financial sector will remain relatively low. China's slow progress in the direction of these reforms is positive, but at this pace, the full financial reform agenda will not be realized in the near future.

7. Conclusion

China is going through a large structural change. Part of the process includes reforming the oligopolistic banking sector and other aspects of the financial system. While the reform agenda is ambitious, relatively slow progress has been made on this list.

In this paper, we have modeled China's current GDP and potential GDP contribution of the financial sector, as well as its potential GDP, given planned reforms. We find that, given even conservative estimates, the value added of the financial intermediation sector could double, as labor, capital, technology, and elasticity respond to liberalization policies. Whether potential GDP under reforms is reached is another question; therefore, we recommend that China both increase the pace of implementation, focusing in particular on reducing the oligopoly in the banking sector, increasing investment options by reforming its bond and equity markets, and enhancing innovation in the financial sphere while controlling for risk.

Further study may include analysis of ways in which the manufacturing sector can benefit from financial sector liberalization, and analyses of the potential impacts of other service subsector liberalization on potential GDP.

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