Increasing Australia's Future Prosperity
Submission to Five Year Productivity Review

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- The financial and insurance services sector is the largest of the 12 industries that make up the market sector of the Australian economy, with a 10.3% share of industry gross value added.
- Multifactor productivity (MFP) growth in the financial and insurance sector has averaged 2.3% over the 25 years to 2014-15, outperforming every other industry except agriculture and outperforming average market sector MFP growth of 0.9% over the same period.
- This average productivity performance masks considerable cyclical and sub-sector variability.
- The financial and insurance services sector of the economy is difficult to measure. Most of the sector's measured output is imputed rather than measured directly. Considerable caution is therefore required in interpreting both output and productivity measures for the sector.
- The sector's outperformance is in large part due to a significant change in the institutional and policy environment since the early 1980s, from one focussed on financial repression and control to a more deregulated and internationally open policy regime.
- This change in the institutional and policy environment has created an improved set of incentives, not only for the financial sector, but also economy-wide incentives for the efficient allocation of capital.
- This experience suggests a very general model for improving productivity growth based on improving institutional and policy frameworks.
- Productivity growth cannot be targeted directly by public policy. It is the result of institutional frameworks that create the incentives for entrepreneurship, innovation and investment to flourish.
- The financial sector contributes directly to productivity growth through its share of the economy, but also indirectly through its role in determining the quantity and quality of investment.
- The financial sector mobilises saving, while financial markets allocate that saving to its most productive uses in the form of investment.
- The efficiency of this capital allocation process is an important driver of economy-wide productivity growth.
- Policies that impair the efficiency of the financial sector can be expected to have a negative effect on productivity.
- Productivity growth typically slows as economies mature and approach the frontier of global productivity and living standards represented by the United States.
- At the same time, the financial services sector's share of national income and measures of financial depth tend to increase with living standards.
- Failure to adequately control for the long-run relationship between domestic and global productivity and living standards can lead to a slowing in productivity growth being falsely attributed to variables positively correlated with living standards, such as the size of the financial services sector and measures of financial depth.
- This basic error is common to research claiming to find empirical support for the 'too much finance' thesis.
- This submission finds no statistical support for the suggestion that growth in Australia's financial services sector impedes capital formation or productivity.

1. Introduction

The financial and insurance services sector is the largest of the 12 industries that make up the market sector of the Australian economy, with a 10.3% share of all industry gross value added. Multifactor productivity growth in the financial and insurance sector has averaged 2.3% over the 25 years to 2014-15, outperforming every other industry except agriculture and outperforming average market sector MFP growth of 0.9% over the same period.[1] The financial sector's productivity performance has been more than double that of the market sector as a whole. As one international observer has remarked, 'it is impressive that Australia's financial services industry has done so well along the productivity growth dimension while also avoiding the financial crisis.'[2]

This average productivity performance masks considerable cyclical and sub-sector variability. The financial and insurance services sector of the economy is difficult to measure. Most of the sector's measured output is imputed rather than measured directly. Considerable caution is therefore required in interpreting both output and productivity measures for the sector.[3]

The sector's outperformance is in large part due to a significant change in the institutional and policy environment since the early 1980s, from one focussed on financial repression and control to a more deregulated and internationally open environment that has created an improved set of incentives, not only for the financial sector, but also economy-wide incentives for the efficient allocation of capital. This experience suggests a very general model for improving productivity growth based on improving institutional and policy frameworks.

The financial sector contributes directly to productivity growth through its share of the economy, but also indirectly through its role in determining the quantity and quality of investment. The financial sector mobilises saving, while financial markets allocate that saving to its most productive uses in the form of investment. The efficiency of this capital allocation process is an important driver of economy-wide productivity growth, which is the main long-run driver of growth in national income per capita. By the same token, policies that impair the efficiency of the financial sector can be expected to have a negative effect on productivity.

This submission comments on the terms of reference for the inquiry and the Discussion Paper and puts forward a stylised model for thinking about the role of public policy in the determination of productivity. It also makes some comments on the role of the Commission and the Productivity Review in promoting productivity-enhancing reform.

The submission briefly canvasses the relationship between regulation and productivity and suggests a role for the Commission in quantifying the burden of regulation and regulatory accumulation similar to its existing role in quantifying the burden of industry assistance.

[1] Productivity Commission, "PC Productivity Update" (Melbourne: Productivity Commission, April 2016).
[2] Martin Baily, "Policies to Enhance Australia's Growth: A U.S. Perspective" (Washington, DC: Brookings Institution, May 2016), https://www.brookings.edu/research/policies-to-enhance-australias-growth-a-us-perspective/.
[3] These issues are well canvassed in Productivity Commission, "Productivity in Financial and Insurance Services," Staff Research Note (Melbourne: Productivity Commission, February 2016), http://www.pc.gov.au/research/supporting/productivity-financial-insurance-services.

There is an extensive literature demonstrating a positive relationship between financial system development and economic development as proxied by national income per capita. However, questions have also been raised as to whether there can be 'too much finance.' It has been suggested that the financial sector may grow to exceed its optimal or efficient size, subtracting from productivity and national income. This submission tests some of these claims analytically and empirically and finds no support for them.

The submission reviews the literature on the relationship between the financial sector and economic development. Productivity growth typically slows as economies mature and approach the frontier of global productivity and living standards represented by the United States. At the same time, the financial services sector's share of national income and measures of financial depth tend to increase with living standards. Failure to adequately control for the long-run relationship between domestic and global productivity and living standards can lead to a slowing in productivity growth being falsely attributed to variables positively correlated with living standards, such as the size of the financial services sector and measures of financial depth. This basic error is common to research claiming to find empirical support for the 'too much finance' thesis.

The submission examines empirically some of the claims made about the productivity of the Australian financial system in the context of the 2014 Financial System Inquiry. In contrast to these claims, it finds no statistical support for the view that financial sector value-added subtracts from capital formation or labour productivity in Australia.

The central role of the financial system in the determination of the productivity of capital and overall productivity growth should not be taken for granted by policymakers. There is a danger that the financial sector's outperformance in terms of both growth and productivity leads to complacency about its prospects. There is also a danger the sector becomes increasingly burdened by regulation and taxation because of public perceptions that it has become too large or does not perform economically and socially useful functions.

Since the 2008-09 financial crisis, the sector has been the subject of increased regulation globally. It is an open and surprisingly unexamined question whether this increased regulation has yielded greater benefits than costs. Evidence from the US suggests that increased regulation has not resulted in measurable gains in the safety of financial institutions because it has driven declines in franchise values that make those institutions more vulnerable to negative shocks.[4] This argues for a cautious and measured approach to regulating and taxing the financial sector that is more mindful of potential costs and benefits so that the productivity of the sector and its central role in the efficient allocation of capital is not impaired.

[4] Natasha Sarin and Lawrence H. Summers, "Have Big Banks Gotten Safer?," Brookings Papers on Economic Activity (Washington, DC: Brookings Institution, September 15, 2016).

2. Comments on Terms of Reference and Discussion Paper

AFMA welcomes the Government's decision to institute five yearly productivity reviews by the Productivity Commission. AFMA see the reviews as a useful way to focus political attention on public policy measures expected to improve productivity performance. The reviews are complementary to the Commission's work on more specific issues and provide an opportunity to develop an integrated framework of reform proposals that can be adopted by Australian governments.

As the Discussion Paper notes, the slow-down in productivity growth is a global phenomenon and not limited to Australia. This suggests that some of the causes of slower productivity growth may not be country-specific, but reflect global factors that may not be amendable to influence by domestic policy measures, although there may be some common trends in public policy, such as the growth of regulation, influencing global productivity growth.

Productivity growth is the subject of a range of conceptual and measurement issues that are canvassed in the Discussion Paper. Productivity growth is a residual in a measurement sense, but also in a policy sense. Productivity growth cannot be targeted directly by public policy. It is the result of institutional frameworks that create the incentives for entrepreneurship, innovation and investment to flourish. Productivity growth can be located in the following stylised causal chain:

Institutions & Policies → Incentives → Entrepreneurship, Innovation & Investment → Productivity → Living Standards

This stylised model has considerable empirical support from the literature linking the quality of economic and political institutions to investment, productivity and living standards.[5] It suggests a very general approach for public policy in promoting productivity growth. It is difficult to attribute measureable productivity gains to specific institutions, policies or innovations given the dynamic nature of the competitive process. Working backwards from perceived shortcomings in productivity in particular sectors to corrective public policy proposals may not be a very fruitful approach given the limitations in our understanding of what drives productivity. However, this does not preclude the identification of policies that are likely to be conducive to improvements in productivity.

The outperformance of the financial sector in terms of both output and productivity growth since the late 1980s can be attributed in large part to the move away from a set of institutions and policies that actively sought to control and suppress financial markets and financial market prices (sometimes referred to as 'financial repression') to a more deregulated environment that improved economy-wide incentives and productivity, not just those in the financial sector.

The Discussion Paper notes that 'there is already strong awareness of many reform options that parties would like to see implemented,' and states that the Commission 'is particularly interested in

[5] Daron Acemoglu, Simon Johnson, and James Robinson, "Institutions as the Fundamental Cause of Long-Run Growth," Working Paper (National Bureau of Economic Research, May 2004), http://www.nber.org/papers/w10481; John W. Dawson, "Institutions, Investment, and Growth: New Cross-Country and Panel Data Evidence," *Economic Inquiry* 36, no. 4 (October 1, 1998): 603–19; John W. Dawson, "Causality in the Freedom–growth Relationship," *European Journal of Political Economy*, Economic Freedom, 19, no. 3 (September 2003): 479–95.

new and novel ideas.' The Discussion Paper also states that it is wary of ideas that 'use up too much political capital.' At the same time, the review seeks to address 'how reform processes and institutions themselves might be improved and how messages concerning reform can be better communicated to the community.'

The terms of reference require the Commission to take account of previous reviews and AFMA maintain it would be a mistake to neglect the existing stock of reform proposals, especially where these reforms may yield large benefits. In addition to the reviews mentioned on page 19 of the Discussion Paper, AFMA would add the recommendations of the 2009 Johnson Report, 'Australia as a Financial Centre: Building on Our Strengths,' to the stock of previous reviews containing potentially productivity-enhancing recommendations yet to be implemented.

The lack of progress in implementing well-known reform proposals suggests a need to re-state the case for these reforms. New reform proposals, while welcome, may not be any more successful in the political arena than those ideas that have already been politically tested. AFMA suggest the Commission develop a hierarchy of integrated reform proposals ordered by economic importance rather than novelty. The Commission should avoid self-censoring its recommendations by second-guessing political reaction to its proposals. Nor should the Commission settle on second-best or second-order proposals because first-best or first-order options are assumed to be politically unattainable. It is ultimately for politicians and political entrepreneurs to solve the political problems of progressing a reform agenda.

AFMA's experience in arguing for productivity-enhancing reforms in relation to the financial services sector is that many of these proposals have suffered from a lack of political ownership and leadership. In particular, much of the opportunity to develop Australia as a leading regional and international financial centre has been missed because well understood reform proposals that enjoyed bipartisan political support were not adequately prioritised by successive governments. A key lesson from this experience is that it is not the reform proposals or in-principle support that are lacking, but the capacity of governments and cabinet-level processes to prioritise and implement them.

The 2014 Financial System Inquiry explored a wide range of themes and issues relevant to the future development of the financial system and its role in the economy, but struggled to tie these together into a unified approach or framework. AFMA's submissions to the inquiry emphasised the need for a coherent approach to the future development of the financial system that would better position Australian financial institutions and markets to capitalise on the opportunities presented by the emerging regional trade in financial services. Yet the Inquiry's Final Report and the government response were largely housekeeping exercises rather than an integrated set of reform proposals.

The tax reform process is also illustrative of problems with reform processes more generally. The 2010 Henry tax review sits largely unimplemented and the most recent tax reform process initiated by the current government was aborted. Recent Productivity Commission inquiries deferred consideration of tax issues to that process. For example, the inquiry into Barriers to Services Exports deferred consideration of interest withholding tax rates to the tax white paper. The 2014 Financial System Inquiry also largely deferred detailed consideration of tax matters because there was then a tax reform process in place. Given the failure of that process over the last six years, it is arguably incumbent on the Commission to re-visit consideration of tax matters that it previously deferred to the tax white paper in its previous inquiries. In particular, it would be useful for the Commission to

outline in broad terms the potential productivity gains from tax reform and rank their importance alongside other reform proposals. Appendix 1 lists some key tax reform proposals that have been supported in previous government-initiated reviews of the tax and financial system that remain to be implemented.

AFMA see the role of the Commission as building and quantifying the case for reforms that are economically important but that might otherwise lack champions inside and outside government. It should be noted that many of the reforms now seen as central to the long-term success of the Australian economy, including the floating of the exchange rate, the deregulation of interest rates, foreign bank entry and reductions in tariff barriers, would have once been seen as politically impossible, or even technically infeasible. Historically, the Commission and its predecessors played a role in championing some of these reforms, even when its message was not welcomed by government. The Commission's recommendations should not be conditioned on what it assumes to be politically possible.

The Discussion Paper maintains that 'a narrow set of proposals is unlikely to have a significant economy-wide effect, and in any case, it is untenable that the potential for improvements are isolated to pockets of society and the economy.' This approach risks underweighting potentially fruitful reform options. Many productivity-enhancing reforms can be expected to have benefits that are unequally distributed across different sectors of the economy. Gains in one sector can also have significant spillover benefits for other sectors of the economy, as has been shown for the mining industry.[6] Economy-wide productivity growth is an aggregate of many small, sector- or even firm-specific efficiency gains. Opportunities to enhance productivity growth should be pursued even where they have uneven distributional implications. The government has a tax and fiscal transfer system that can be used to address the distributional consequences of reforms, although the design of the tax-transfer system will also have implications for productivity growth.

The financial services sector is dominated by intermediaries and in that role they are well positioned to pass through the benefits of sector-specific reforms, just as they are often also forced to pass on the burden of regulation and taxation to the end-users of financial services. Measures that might be perceived as narrowly benefiting the financial services sector are likely to yield broader economic gains given the centrality of financial services to the efficient allocation of capital that in turn determines the productivity of overall investment.

AFMA has observed an emerging official sector narrative that attributes problems with investment and productivity growth to firm-level decision-making, suggesting that firms don't invest enough, are too risk averse, have poor management, or are excessively short-term in orientation. The literature on firm-level productivity is also inclined to see firm-level decision-making as the source of productivity problems. Even where these observations might have some empirical validity, it raises the question as to what incentives drive these behaviours and the source of these incentives. The institutional and policy environment, particularly policy uncertainty, are likely to be implicated in these incentives.

It should be noted that the time allowed for public submissions following the calling of the inquiry and releasing the Discussion Paper is very short compared to other Commission inquiries. A longer

[6] Hilde C. Bjørnland and Leif A. Thorsrud, "Boom or Gloom? Examining the Dutch Disease in Two-Speed Economies," *The Economic Journal*, May 1, 2016.

period of public consultation would have been more appropriate for this inquiry to allow more evidence to be submitted.

3. Regulation and Productivity

AFMA see a role for the Commission in compiling data on regulation and regulatory accumulation by industry and examining its effects on productivity, in much the same way the Commission currently compiles data on the cost of industry assistance. The Commission's reports on the burden of industry assistance are widely cited in the media and other contexts and have led to a more informed public debate about the costs of industry assistance. The public discussion of the cost and benefits of regulation would benefit from being similarly better informed.

The Mercatus Center at George Mason University has compiled a regulatory database for the US called RegData, which may serve as a useful model. An important finding from this project has been that less regulated industries in the US enjoy stronger productivity performance than more regulated industries by a factor of 1.8 to 1.9 times.[7] The same database has been used to show a relationship between regulation and industry profitability.[8] Reserve Bank of Australia research has also identified a negative cross-country relationship between labour and product market regulation and productivity growth.[9] Quantifying the burden of regulation on productivity growth may lead to a better informed public discussion of the costs and benefits of regulation, better regulatory design and improved productivity performance.

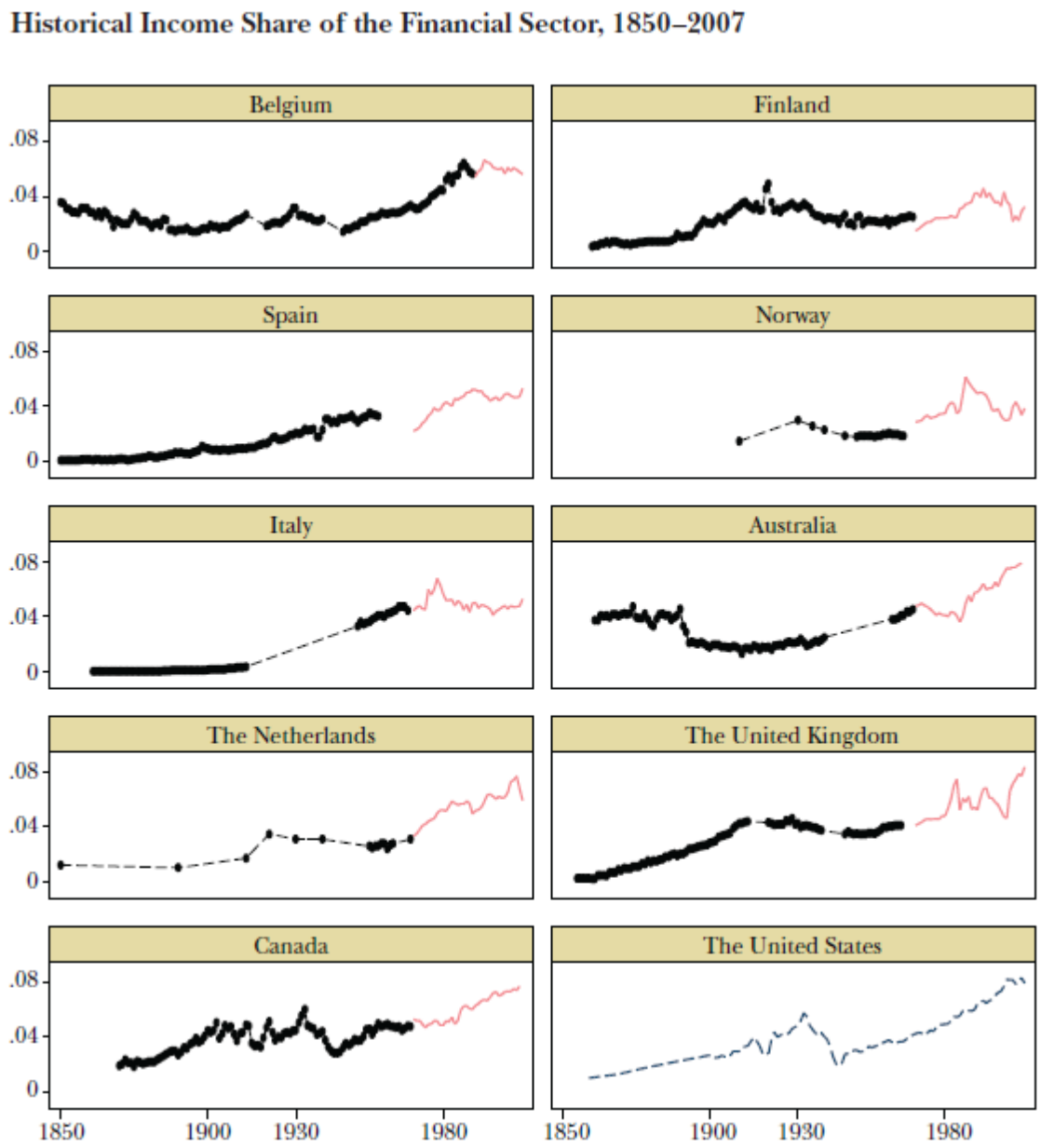
AFMA note that the Commission recently released a draft report on the regulation of Australian agriculture. A similar review of the regulatory burden on the financial sector, perhaps in conjunction with the Council of Financial Regulators, would be a welcome initiative. While individual regulatory measures are subject to an often inadequate Regulation Impact Statement process, there is little evaluation of the overall impact of regulatory accumulation in the financial sector.

4. The Financial System and Productivity

The financial services share of the economy tends to grow over time as living standards rise and consumers and business demand more sophisticated financial services. This is a global phenomenon in which Australia has been a participant. Figure 1 shows the financial sector's share of national income in Australia and other developed economies since 1850.

[7] Antony Davies, "Regulation and Productivity" (Arlington, VA: Mercatus Center, 2014).
[8] Guy Rolnik, "Political Rents and Profits in Regulated Industries," *ProMarket: The Blog of the Stigler Center at the University of Chicago Booth School of Business*, July 21, 2016, https://promarket.org/political-rents-regulated-industries/.
[9] Christopher Kent and John Simon, "Productivity Growth: The Effect of Market Regulations," Research Discussion Paper (Sydney: Reserve Bank of Australia, 2007).

Figure 1



Source: Philippon and Reshef (2013). Black dots represent historical sources, solid lines represent modern sources, dashed lined are combined or interpolated sources.

There is a large body of cross-country empirical evidence establishing a positive relationship between measures of financial depth, financial market activity and the level of economic development and living standards as proxied by national income per capita.[10] More recently, papers

[10] Ross Levine, "Finance and Growth: Theory and Evidence," in *Handbook of Economic Growth Vol 1A*, ed. Philippe Aghion and Steven Durlauf (Elsevier, 2005).

by the International Monetary Fund,[11] the Bank of International Settlements[12] and the OECD[13] have questioned whether the size of the financial sector measured by the credit to GDP ratio and other measures of financial depth may exceed an optimal size and subtract from economic or productivity growth. As William Cline shows, the same non-linear empirical relationship between financial sector depth and economic development can be also be found for the number of doctors, fixed line telephones and R&D technicians. These results are due to a failure to adequately control for the fact that economic growth and productivity typically slow as living standards measured by per capita income rise and approach the productivity frontier represented by leading economies such as the United States. This leads to the slowing in productivity growth due to convergence in living standards across countries being falsely attributed to increases in financial depth.[14]

The financial system plays an important role in mobilising saving and determining the *quantity* of investment. The financial system is also an important determinant of the efficiency of the capital allocation process, which determines the *quality* of investment. It is the quality of investment that determines productivity growth and growth in living standards. The financial sector and financial markets improve the quality of investment through a number of mechanisms:

1. Improving the quality and quantity of information used to evaluate investments and investment risks. This includes the essential role of price discovery in financial markets in allocating capital. Price discovery is a positive externality generated by market participants who do not individually capture the full benefit of more efficient prices, but bear the cost acquiring information.[15] While the efficiency of financial market prices is often called into question, this is an argument for lowering transaction costs and more complete and active markets that improve the informational content of asset prices. The resources devoted to price discovery in markets could be inefficiently low rather than inefficiently high.

2. Providing competitive markets for the ownership and control of equity and other capital, ensuring that assets are owned by those best able to maximise rates of return.

3. Providing risk management and risk-reduction services, including hedging of risks through financial instruments and markets. The ability to hedge risk increases the confidence with which business and the public sector can invest for future growth.

As Cochrane argues, the socially optimal or efficient size of the financial sector is not the right question to ask. It is function that matters, not size per se.[16] The growth in the financial services share of the economy over time does not, in itself, tell us how well it is performing these functions.

[11] Jean-Louis Arcand and Ugo Panizza, "Too Much Finance?," IMF Working Paper (Washington, DC: International Monetary Fund, June 2012).
[12] Stephen Cecchetti and Enisse Kharroubi, "Reassessing the Impact of Finance on Growth," Working Paper No 381 (Basle: Bank for International Settlements, July 2012).
[13] Boris Cournede and Oliver Denk, "Finance and Economic Growth in OECD and G20 Countries," Economics Department Working Paper No. 1223 (Paris: OECD, June 2015).
[14] William Cline, "Too Much Finance, or Statistical Illusion?," Policy Brief (Washington, DC: Peterson Institute for International Economics, June 2015); William Cline, "Further Statistical Debate On 'too Much Finance,'" Working Paper 15-16 (Washington, DC: Peterson Institute for International Economics, October 2015).
[15] Kenneth R. French, "Presidential Address: The Cost of Active Investing," *Journal of Finance* 63, no. 4 (2008).
[16] John Cochrane, "Finance: Function Matters, Not Size," *Journal of Economic Perspectives* 27, no. 3 (Spring 2013).

5. Has the Australian Financial System Become Less Efficient at Capital Formation Over Recent Decades?

In the context of the 2014 Financial System Inquiry, some submissions argued that the Australian financial system has become less efficient at capital formation. For example, Industry Super Australia (ISA) made four claims about the efficiency of the financial system:

1. 'The Australian financial system has become relatively less efficient at capital formation over recent decades.'[17]

2. This decline in efficiency is partly attributed to 'growth in trading or exchanging assets compared to creating new ones.'[18] This leads to a recommendation for 'reforms' to address 'excessive secondary market trading.' Industry Super does not state what form policy changes might take, although suggests that 'some of these reforms undoubtedly will require changes to public policy.'[19]

3. 'The business of banking has increasingly focused on financing the resale of existing housing stock, rather than the creation of new capital.'[20]

4. 'There are positive and negative aspects of secondary market trading. In the case of the Australian capital markets, the expansion of trading activity has not clearly resulted in a capital market that is friendlier to capital raising, and indeed, the opposite appears to have happened.'[21]

Industry Super define the efficiency of the financial system in terms of gross fixed capital formation (adjusted for retained earnings and foreign finance) divided by value-added in financial services. This yields a measure of capital formation per dollar of financial services output.

This 'efficiency ratio' assumes that the main function of the financial sector is to determine the quantity of investment. While this is an important function, a more important function is to improve the efficiency with which saving and investment are allocated in the economy. This in turn determines quality of the capital stock and its contribution to productivity and long-run economic growth and living standards.

As Industry Super note, 'our analysis does not seek to address allocative efficiency or the quality of the capital formation attributable to finance.'[22] This is an important omission. Much of the output of the financial sector is geared to improving the quality rather than increasing the quantity of investment. Indeed, an important function of financial markets is to ensure that the economy is not over-capitalised, investing more in physical and other capital than would be economically efficient.

[17] Industry Super Australia, "Finance and Capital Formation in Australia," November 2013, 3.
[18] Ibid., 6.
[19] Ibid.
[20] Industry Super Australia, "Financial System Efficiency," March 2014, 2.
[21] Ibid., 9.
[22] Industry Super Australia, "Finance and Capital Formation in Australia," 7.

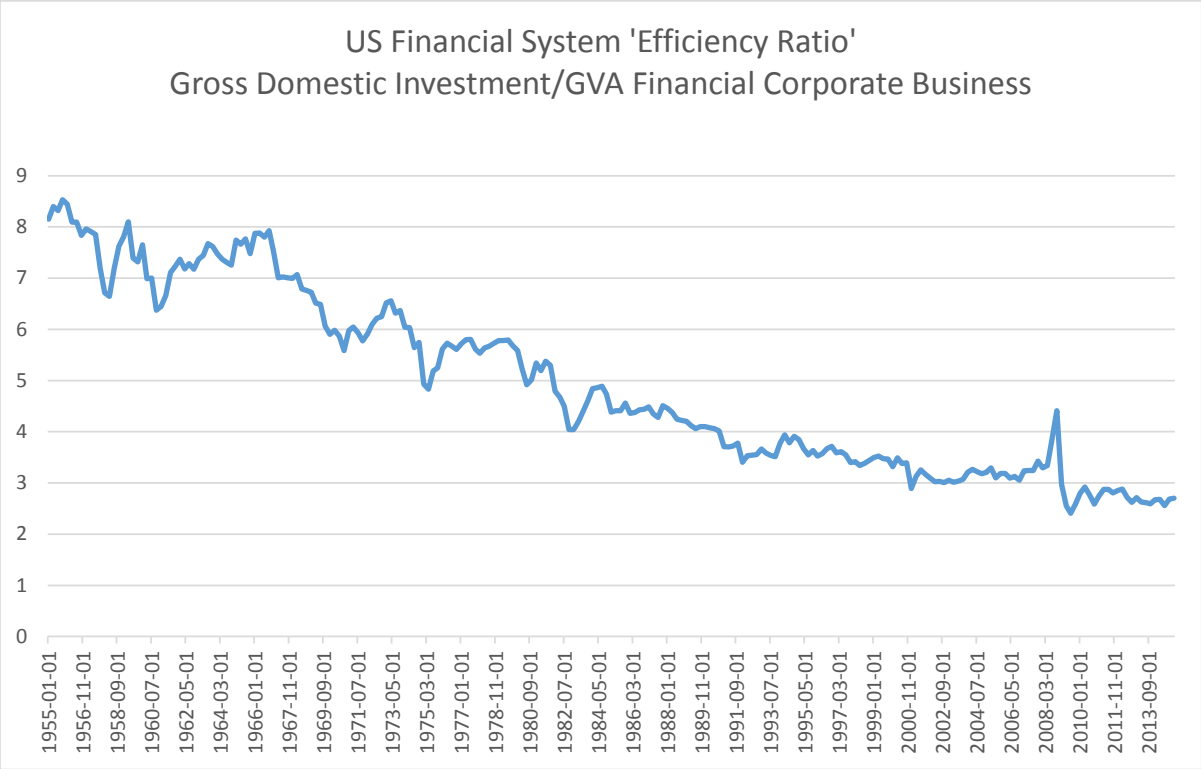
The investment performance reviewed in Figure 8 of the Discussion Paper does not suggest Australia has a problem with capital formation. This is not to claim that the investment share of GDP has been optimal, only to highlight that Australia's investment performance has been strong by historical and international standards. At roughly the same time, the finance and insurance sector's share of gross value-added has trended higher. The relationship between investment and financial sector gross value-added is tested more formally later in this submission.

The decline in the 'efficiency ratio' highlighted by Industry Super is consistent with more of the output of the financial sector being devoted to improving the quality rather than the quantity of investment. This is to be expected in an advanced economy such as Australia's, where the stock of capital per person is already high and gains in productivity are driven primarily through the adoption of new technology, innovation and additions to human rather than physical capital. The financial sector's share of output rises because improving the quality of investment becomes harder as the economy approaches the frontier of productive efficiency. Similarly, when markets are already very efficient in incorporating information into asset prices, further efficiency gains require greater market turnover and expenditure on price discovery. Economic growth that is driven primarily by the quantity rather than the quality of investment is a characteristic of developing rather than developed economies like Australia's.

Industry Super's efficiency ratio can also be calculated for the United States, dividing gross fixed investment by value-added on the part of financial corporate business (Figure 2).[23] These data show a similar 'efficiency ratio' and trend over time to that reported by Industry Super for Australia. Note the perverse implication that the US financial sector became more 'efficient' during the financial crisis in the final quarter of 2008 as gross value-added in the financial sector collapsed relative to investment.

[23] Note Figure 1 is derived from series that are not strictly comparable to those used by Industry Super for Australia, but are a close approximation.

Figure 2



Source: US Bureau of Economic Analysis

Based on this metric, the US financial system has also become increasingly less 'efficient' since the mid-1950s. The correct interpretation of this trend in both economies is that financial sector gross value-added is increasingly devoted to improving the quality of investment.

A more meaningful measure of financial system efficiency is the ratio of the income of financial intermediaries to the quantity of intermediated assets. On this measure, the US financial system has exhibited constant returns to scale for the last 130 years.[24] However, even this measure fails to take account of 'the social value of information production in financial markets. This effect is elusive because it can show up as an improvement in total factor productivity with little impact on the aggregate quantity of assets.'[25] Similarly, we would not necessarily expect the information produced by financial markets to impact the aggregate quantity as opposed to the quality of investment. Internationally, there is no evidence to suggest the unit cost of financial services has risen along with the income share of financial services.[26] While the failure of unit costs to decline in the long-run, whether due to scale economies or the adoption of new technology, is something of a puzzle, such productivity puzzles are not unique to the financial sector. Some measures of transaction costs in financial markets, such as bid-ask spreads on Dow Jones stocks and commissions on NYSE equity

[24] Thomas Philippon, "Has the US Finance Industry Become Less Efficient? On the Theory and Measurement of Financial Intermediation," *American Economic Review* 105, no. 4 (2015).
[25] Ibid., 1435.
[26] Thomas Philippon and Ariell Reshef, "An International Look at the Growth of Modern Finance," *Journal of Economic Perspectives* 27, no. 2 (Spring 2013).

trades do show evidence of long-term decline.[27] The growth in electronic trading has been associated with an improvement in the quality of US equity markets on a broad-range of measures.[28] In Australian equity markets, institutional brokerage and transaction costs have been on a declining trend in recent years, consistent with these overseas trends, pointing to efficiency gains in financial intermediation.[29]

Australia and the US also exhibit a similar long-run trend in relation to the financial services share of the economy.[30] For a small open capital-importing economy like Australia, the financial sector plays an important role in integrating the domestic economy with the world economy. The financial services share of the Australian economy is a reflection of its openness to the rest of the world given its role in the intermediation of the foreign capital inflows that underpin domestic capital formation.

The fact that Australia and the US have seen a similar ratio and trend in the ratio of investment to financial services value-added implies that the causes are common to both economies and not specific to Australia. As already noted, the observed trend on this measure is consistent with an advanced economy in which productivity growth is driven primarily by innovation and the adoption of new technology and financial sector output is largely focused on maximising the efficiency and not the quantity of investment.

A Model of Australian Gross Fixed Capital Formation

The relationship between the financial sector and investment can be tested in the context of a model that explains the growth in gross fixed capital formation in terms of financial sector gross-valued added and other explanatory variables. An error correction model can be used to capture both the short-run effect of financial sector growth on investment growth, as well as long-run effects from the size of the financial sector.[31]

[27] Charles M. Jones, "A Century of Stock Market Liquidity and Trading Costs," SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, May 23, 2002), http://papers.ssrn.com/abstract=313681.
[28] James Angel, Lawrence Harris, and Chester S. Spatt, "Equity Trading in the 21st Century," SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, February 23, 2010), http://papers.ssrn.com/abstract=1584026.
[29] Stephen Kirchner, "High Frequency Trading: Fact and Fiction," *Policy* 31, no. 4 (Summer 2015).
[30] Philippon and Reshef, "An International Look at the Growth of Modern Finance," 74.
[31] A conditional unrestricted error correction model of the type estimated in equation (1) is well-suited to estimating both short and long-run dynamics. The model implicitly assumes that financial sector gross value-added is exogenous with respect to investment. This assumption could be violated in a number of ways. However, the close relationship between Australian and international trends in the financial services share of the economy suggests that the financial services share of the economy is determined in large part by Australia's openness to global influences. The lag structure of the model means that financial sector value-added is pre-determined for investment. The model tests whether financial sector value-added has predictive power for investment.

The following error correction model (equation 1) is estimated by least squares:

$$\Delta gfcf_t = \alpha_0 + \alpha_1 t + \alpha_2 \Delta gfcf_{t-1} + \alpha_3 \Delta gfcf_{t-2} + \alpha_4 \Delta fgva_{t-1} + \alpha_5 \Delta gdp_{t-1} + \alpha_6 \Delta gdp_{t-4} + \alpha_7 GST + \alpha_8 gfcf_{t-1} + \alpha_9 fgva_{t-1} + \varepsilon_t \quad (1)$$

where *gfcf* is the log of gross fixed capital formation,[32] *gdp* is the log of real GDP, *fgva* is the log of gross value-added on the part of the financial and insurance sector, *GST* is a dummy variable that takes a value of 1 in Q3 and Q4 2000 and zero otherwise, *t* is an unrestricted linear time trend, *Δ* is a first difference operator and ε_t is a random error term.

The model assumes that growth in investment is a function of its own lags, lagged growth in GDP, lagged growth in financial sector-value added and a deterministic linear trend. The lagged levels of investment and financial sector value-added seek to capture the long-run relationship, if any, between the these variables. The GST dummy controls for the sharp decline in the contribution of dwelling investment to gross fixed capital formation in the two quarters following the introduction of the GST.

The model is estimated over three sample periods. The first is the full sample period from 1975:Q1 to 2015:Q1, which is determined by the availability of consistent ABS data on value-added by industry at the time of writing[33] and the lag structure of the model. The second sample is 1984:Q1 to 2015:Q1. This is the period since financial deregulation, dated from the float of the Australian dollar at the end of 1983, which could be expected to change the relationship between the financial sector and capital formation. The third sample is from 1990:Q1 to 2015:Q1. This period was chosen as Industry Super identifies the early 1990s as a turning point in the 'efficiency' of the financial sector's role in capital formation, claiming the financial sector has become less efficient in 'recent decades' due to excessive growth over the last 20 years.[34] By comparing the three sample periods, it is possible to determine whether there is a change in the relationship between investment and financial sector value-added.

The estimated model is shown in Table 1 for the full sample and the two sub-samples.

[32] All data sourced from ABS. No adjustment is made to investment for retained earnings or foreign sector financial intermediation. The absence of this adjustment is expected to weaken the relationship between financial sector value-added and total gross fixed capital formation, raising the hurdle to finding an economically and statistically significant relationship between these variables.

[33] This material was first prepared by AFMA in 2015 and published in February 2016.

[34] In fact, Figure A on page 3 of Industry Super's report *Finance and Capital Formation in Australia* implies the main 'efficiency' loss occurred between 1975 and the early 1990s, not in the period since. However, Industry Super is correct in identifying the period since the early 1990s as the period in which growth in the financial sector outperformed other sectors of the economy.

Table 1. Equation 1: Growth in Gross Fixed Capital Formation

Variable	From 1975:Q1	From 1984:Q1	From 1990:Q1
Constant	41.16 (29.20)	36.45 (32.09)	5.81 (39.00)
t	0.04 (0.048)	0.04 (0.05)	-0.02 (0.07)
$\Delta gfcf_{t-1}$	-0.05 (0.08)	-0.08 (0.09)	0.03 (0.10)
$\Delta gfcf_{t-2}$	0.18*** (0.07)	0.20** (0.08)	0.19** (0.08)
$\Delta fgva_{t-1}$	-0.07 (0.10)	-0.07 (0.13)	0.04 (0.18)
Δgdp_{t-1}	0.92*** (0.25)	0.98** (0.44)	0.54 (0.45)
Δgdp_{t-4}	-0.45** (0.21)	-0.51 (0.32)	-0.79** (0.34)
GST	-0.10*** (0.02)	-0.10*** (0.02)	-0.09*** (0.02)
$gfcf_{t-1}$	-0.06** (0.02)	-0.06** (0.03)	-0.18*** (0.04)
$fgva_{t-1}$	0.02 (0.03)	0.03 (0.03)	0.21*** (0.06)
$\theta = -(\alpha_9/\alpha_8)$	0.27	0.39	1.2
F-test of $\alpha_8=\alpha_9 = 0$	3.84	3.01	10.19***
Adj. R^2	0.27	0.26	0.42
S.E	2.37	2.41	2.10
JB-test	{0.60}	{0.64}	{0.39}
LM test			
- 1st order	{0.65}	{0.80}	{0.72}
- 4th order	{0.26}	{0.42}	{0.18}
BPG-test	{0.50}	{0.08}	{0.73}

Notes: Numbers in parentheses () are standard errors, those in braces {} are *p*-values. ***,**,* denote the 1, 5 and 10 per cent significance levels respectively. Significance level for *F*-test based on Pesaran *et al* (2001).

The main coefficients of interest are those on $\Delta fgva_{t-1}$, $gfcf_{t-1}$ and $fgva_{t-1}$. The coefficient on $\Delta fgva_{t-1}$ shows the short-run effect of lagged growth in financial sector value-added on investment. This coefficient is not statistically different from zero across the three sample periods. This implies that

lagged growth in the financial sector does not explain the growth rate of investment. However, it is also inconsistent with the idea that growth in the financial sector is subtracting from capital formation. For this to be true, we would expect to see a statistically significant negative coefficient on this variable.

The long-run relationship between financial sector gross value-added and investment is given by θ =-(α_9/α_8). This coefficient implies that a 1% increase in financial sector gross-value added raises investment by 0.27% based on the full sample, 0.39% based on the sample from 1984:Q1 and 1.2% for the sample from 1990:Q1. However, only the coefficient for the latter sample is statistically significant.

The *F*-test statistic for $\alpha_7=\alpha_8 = 0$ tests whether there is a statistically significant long-run equilibrium relationship between financial sector gross value-added and investment based on the bounds testing methodology proposed by Pesaran *et al* (2001). This test is robust to the order of integration of the two variables and the possibility of cointegration between them. The test statistic of 10.19 exceeds the upper bound of the one percent critical values given by Pesaran *et al* (F_{Upper} = 9.63) for the period from 1990:Q1. A positive and statistically significant long-run equilibrium relationship exists between these two variables over this period, but not the earlier samples.

The estimated coefficient of -0.18% on the lagged level of investment for the period since 1990:Q1 measures how much of the disequilibrium in the long-run relationship between investment and financial sector value-added is corrected each quarter. The *t*-statistic on the lagged level of investment of -4.51 exceeds the upper bound of -3.69 given by Pesaran *et al*'s bounds *t*-test at the one percent significance level for the period since 1990:Q1. The estimated relationship is consistent with causality running from financial sector value-added to investment.

The estimated model is inconsistent with the argument that growth in financial sector value-added has impeded capital formation in recent decades. In fact, the long-run relationship has strengthened both quantitatively and in terms of statistical significance for the period from 1990 through to the first quarter of 2015 relative to earlier sample periods. A straightforward explanation for this result is that the financial sector went through a period of significant growth and structural change in the mid-1980s as a result of financial deregulation. It is only since the financial system matured post-deregulation that a stable long-run relationship with capital formation has emerged. There is no evidence for the proposition that capital formation has been impeded by growth in the financial sector based on this model.

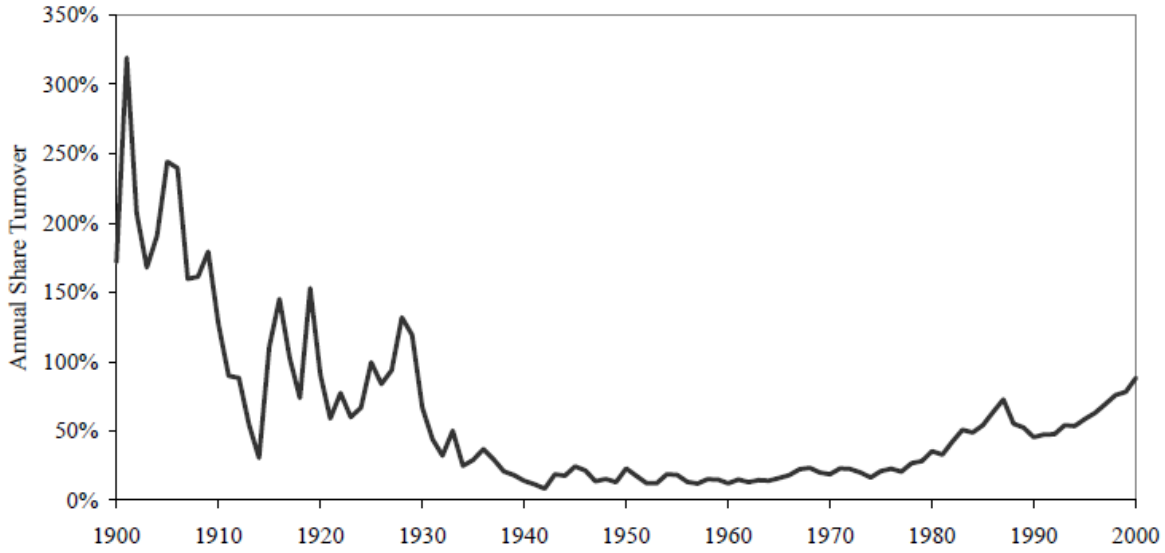
6. Does Secondary Market Activity Impede Capital Formation?

Secondary markets are those in which securities issued in primary markets trade after they have been issued. For example, an initial public offering (IPO) of equity is a capital raising in the primary market. Subsequent trading in the newly issued equity takes place in the secondary market, usually on a stock exchange. Primary and secondary markets both play an important and mutually reinforcing role in the financial system. Secondary markets support primary markets by ensuring that investors can more easily transact in the assets they acquire through primary markets, allowing the issuers of capital to obtain a lower cost of funds.

Liquidity in stock markets is positively related to economic growth, investment and productivity.[35] Stock market liquidity is an important determinant of the cost of firms raising external capital.[36] Liquidity is also an important determinant of equity returns.[37] Recent volatility in equity, fixed income and other markets has been attributed in part to a reduction in secondary market liquidity flowing from regulatory changes to prudential, liquidity, collateral and capital requirements.[38] This in turn may have negative effects on economy-wide productivity given these well-established empirical relationships.

Much has been made of rising equity market turnover ratios in Australia and abroad. Yet historically, equity turnover ratios were much higher in the early part of the 20th century than in the latter part, at least in the United States (Figure 3).

Figure 3: Annual Turnover in NYSE Stocks, 1900-2000



Source: Jones (2002)

Equity market turnover on the NYSE has declined since 2000, with annualised year to date turnover in December 2014 at 57%.[39] Annual turnover in the Australian equity markets has ranged from 78-92% in recent years, according to AFMA's Australian Financial Markets Report.[40]

Growth in secondary market activity is a sign of financial system maturity. Secondary market turnover can be expected to increase over time, notwithstanding the variable long-run trend in the US equity market noted above. This is partly due to the way in which technology has lowered the

[35] G. Caporale, P Howelles, and A Soliman, "Stock Market Development and Economic Growth: The Causal Linkage," *Journal of Economic Development*, 2004; T Beck and R Levine, "Stock Markets, Banks and Growth: Panel Evidence," *Journal of Banking and Finance* 28 (2003).
[36] Alexander Butler, Gustavo Grullon, and James Weston, "Stock Market Liquidity and the Cost of Issuing Equity," *Journal of Financial and Quantitative Analysis* 40, no. 2 (June 2005).
[37] Viral Archarya and Lasse Pedersen, "Asset Pricing with Liquidity Risk," *Journal of Financial Economics* 77 (2005); Jones, "A Century of Stock Market Liquidity and Trading Costs."
[38] PwC, "Global Financial Markets Liquidity Study," August 2015.
[39] http://www.nyxdata.com/nysedata/asp/factbook/viewer_edition.asp?mode=table&key=3149&category=3
[40] http://www.afma.com.au/data/AFMR

cost of trading and facilitated more frequent re-estimation of optimal portfolio strategies.[41] Secondary market turnover in the Australian equity market has been on a rising trend since at least the late 1970s.

The secondary market in equity and other securities facilitates the price discovery that determines the quality of investment. Secondary market liquidity also lowers the cost of raising capital in the primary market by ensuring that investors can buy and sell assets more easily. The growth in secondary market liquidity may help explain the decline in the 'efficiency' ratio referenced above, since more financial sector output is devoted to this activity, but this does not mean that growth in the secondary market comes at the expense of capital formation. Indeed, growth in the secondary market should facilitate capital formation.

It has been suggested that the efficiency of capital formation has been impaired by 'growth in trading or exchanging assets compared to creating new ones.'[42] This proposition can be tested by substituting the ASX turnover ratio[43] (ASX trade value divided by domestic market capitalisation) (*asxtr*) for financial sector gross-value added in the error correction model estimated in equation (1) above, yielding estimated equation (2) shown in Table 2. Turnover ratio data is available for the ASX from December 1979. The entry of the Chi-X exchange into secondary market trading in competition with ASX from November 2011 reduced turnover on the ASX, so the model is estimated using data from 1980:Q2 to 2011:Q3, with the starting point reflecting the lag structure of the model. A shorter sub-sample from 1990:Q1 is also estimated to test the claim that capital formation has been impeded by the growth in secondary market activity in recent decades.

[41] Andrei Kirilenko, and Andrew Lo, "Moore's Law versus Muphy's Law: Algorithmic Trading and Its Discontents," *Journal of Economic Perspectives* 27, no. 2 (Spring 2013): 55.
[42] Industry Super Australia, "Finance and Capital Formation in Australia," 6.
[43] The turnover ratio effectively normalises traded value and obviates the need for inflation adjustment. The author would like to thank the ASX for providing these data. Market turnover has been shown to be correlated with economic growth in other studies, for example, Ross Levine and Yona Rubinstein, "Stock Markets, Banks and Economic Growth," *American Economic Review*, 88 (1998).

Table 2. Equation 2: Growth in Gross Fixed Capital Formation

Variable	From 1980:Q2	From 1990:Q1
Constant	53.14**	156.28***
	(23.3)	(37.22)
t	0.05	0.20***
	(0.04)	(0.07)
$\Delta gfcf_{t-1}$	-0.07	-0.04
	(0.10)	(0.11)
$\Delta gfcf_{t-2}$	0.15*	0.08
	(0.08)	(0.09)
$\Delta asxtr_{t-1}$	-0.03*	-0.01
	(0.02)	(0.03)
Δgdp_{t-1}	0.97***	0.66
	(0.37)	(0.45)
Δgdp_{t-4}	-0.53*	-0.58
	(0.29)	(0.37)
GST	-0.10***	-0.09***
	(0.02)	(0.02)
$gfcf_{t-1}$	-0.06**	-0.18***
	(0.03)	(0.03)
$asxtr_{t-1}$	0.02	0.04
	(0.02)	(0.03)
$\theta = -(\alpha_9/\alpha_8)$	0.28	0.25
F-test of $\alpha_8=\alpha_9 = 0$	2.82	9.20**
Adj. R^2	0.27	0.44
S.E	2.51	2.1
JB-test	{0.81}	{0.28}
LM test		
- 1st order	{0.49}	{0.41}
- 4th order	{0.41}	{0.75}
BPG-test	{0.78}	{0.74}

Notes: Numbers in parentheses () are standard errors, those in braces {} are *p*-values. ***,**,* denote the 1, 5 and 10 per cent significance levels respectively. Significance level for *F*-test based on Pesaran *et al* (2001).

The short-run effect of the ASX turnover ratio on investment is given by the coefficient on $\Delta asxtr_{t-1}$. The coefficient is not economically or statistically significant at conventional significance levels.

The estimated long-run elasticity is given by θ =-(α_9/α_8) and ranges between 0.25% to 0.28% over the two samples, implying that a 1% increase in the ASX turnover ratio yields a close to 0.3% increase in investment. The *F*-test statistic of 9.20 is greater than the upper bound of the five percent critical values given by Pesaran *et al* (F_{Upper} = 7.30) for the period from 1990:Q1, although the test is inconclusive at the 1% level. This is consistent with a long-run equilibrium relationship between these two variables over this period. The *t*-statistic on the lagged level of investment of -4.24 exceeds the 5% critical value of -3.69 given by Pesaran *et al* for the more recent sample, although again is inconclusive at the 1% level. While the long-run relationship between the ASX equity market turnover ratio and the level of investment is not statistically significant for the early sample, the long-run elasticities are quantitatively similar. This does not suggest that there has been a change in the long-run relationship between secondary market activity and investment. The estimated relationship is inconsistent with the view that secondary market activity comes at the expense of capital formation.

7. Does Bank Credit for Established Housing Impede Capital Formation?

One criticism of the Australian financial system is that 'the business of banking has increasingly focused on financing the resale of existing housing stock, rather than the creation of new capital.'[44] By definition, the sale of established homes does not contribute to gross fixed capital formation and only contributes to GDP indirectly through ownership transfer costs. Bank credit is an important source of finance for both new investment and transactions involving existing assets, including housing. Whether there is substitution between credit for established housing and credit for other purposes including investment spending (in the national accounts sense) is not straightforward to test. To the extent that there is a substitution, this could be demand (ie, consumer/business) driven rather than supply (financial sector) driven.

It should also be noted that saving in a national accounts sense can only flow into new rather than existing assets. This is a straightforward implication of the national accounts identity equating saving and investment. The notion that Australians save excessively via established housing is not consistent with the national accounts definition of saving and investment. As intermediaries, banks and other financial institutions allocate credit based on consumer and business demand and regulatory constraints on their capital and loan books.

The supply of new dwellings is small relative to the total housing stock. New dwelling commencements in 2014 were just over 2% of the existing residential housing stock. The supply of new residential land and dwellings is largely determined by regulation. The financial sector cannot finance new dwelling stock that is not built because of these regulations.

The financial sector plays an essential role in financing new dwelling supply (which is a component of gross fixed capital formation in the national accounts) as well as financing turnover in the existing housing stock. Turnover in established dwellings is essential in ensuring that the stock of established

[44] Industry Super Australia, "Financial System Efficiency," 2.

housing is allocated efficiently.[45] Transaction taxes such as stamp duty and capital gains tax (on investment properties) reduce housing market turnover and liquidity, implying that turnover in the housing stock is more likely to be inefficiently low rather than inefficiently high.[46] The prominence of established housing in housing finance is not in itself a sign of inefficiency in financial markets. Rather, it is symptomatic of inefficiencies in the housing market. The financial sector has recently financed a significant increase in the stock of owner-occupied and rental housing to the point where regulators have sought to cap growth in lending for prudential reasons through regulatory guidance. Prudential regulators are in effect seeking to manage the consequences of supply-side policy failures in the housing market.

8. Does Secondary Market Activity Impede the Primary Market?

As noted above, there is a well-established empirical relationship between equity market development and economic development, the cost of raising capital and asset returns. This relationship is a function of the role of equity markets in promoting both capital accumulation and the efficiency of the capital stock. A recent study by Andriansyah and Messinis extends this literature by distinguishing between the roles of the primary and secondary equity market. They find a positive and causal relationship between the secondary market and economic development for a sample of 54 countries, but not for the primary market. The primary market benefits economic growth only indirectly through its role as a supplier of new shares to the secondary market. They conclude that 'capital raised through the primary equity market is not an important determinant of economic growth'[47] based on their results.

Industry Super claim that 'the expansion of trading activity has not clearly resulted in a capital market that is friendlier to capital raising, and indeed, the opposite appears to have happened.' The performance of the primary equity market in Australia may be cause for concern, but there is no reason to believe that secondary market development comes at the expense of the primary market. Policies designed to address 'excessive' secondary market trading are likely to damage both markets and harm living standards through reduced capital formation and productivity.

[45] Cameron Kusher notes that Australia has a shortage of housing, but a glut of bedrooms, because public policy does not support an efficient allocation of the housing stock, see 'Australia has a glut of bedrooms but a dearth of policies in place to make these rooms and homes available to those who need them most,' CoreLogic RP Data Research Blog, 21 April 2015. http://blog.corelogic.com.au/2015/04/australia-has-a-glut-of-bedrooms-but-a-dearth-of-policies-in-place-to-make-these-rooms-and-homes-available-to-those-who-need-them-most/

[46] Subsidies to new home buyers could be expected to offset the under-allocation of resources to housing turnover to some extent.

[47] Andriansyah Andriansyah and George Messinis, "Equity Markets and Economic Development: Does the Primary Market Matter?," *Economic Record* 90, no. Special Issue (June 2014): 139.

9. The Relationship between the Australian Financial System and Productivity

The financial system can affect productivity through a number of channels. The financial sector's own productivity makes a direct contribution to economy-wide productivity through its share of overall output. As noted above, multifactor productivity in the financial sector has outperformed economy-wide multifactor productivity in recent decades. Capital formation and the capital-labour ratio is another channel. As shown in previous sections, there is an economically and statistically significant relationship between financial sector value-added and capital formation in Australia since 1990.

The financial system can also influence productivity through the efficiency of the capital stock or the quality rather than the quantity of investment. This channel is harder to measure, since it is difficult to measure the social value of the information generated by financial markets, most notably, the determination of asset prices. The financial sector's contribution to productivity can nonetheless be proxied by its contribution to value-added in the national accounts, although as already noted, most of the output of the sector is imputed rather than measured directly. Financial sector value-added may capture rents and other market inefficiencies that ideally would be excluded from this measure. However, these inefficiencies will tend to weaken the relationship between financial sector value-added and productivity.

ABS time-series data on productivity is limited. The Conference Board publishes data on labour productivity that dates from 1950. This is available on a purchasing power parity-adjusted basis, which enables estimation of the relationship between Australian and US productivity. Labour productivity is generally thought to be more closely related to changes in living standards, whereas multifactor productivity is more closely related to technological change and production efficiency.[48] If the transmission mechanism from the financial system to productivity is mainly through a qualitative rather than a quantitative channel, then labour productivity may not be the best measure to use to capture this relationship.

Productivity for a small open economy such as Australia's is influenced by changes in global productivity, proxied here by growth in US productivity, as well as long-run convergence with the level of US productivity and the level of US income per capita. These convergence dynamics can be captured by estimating the relationship between Australian labour productivity, US labour productivity and Australian per capita income. While productivity is an important driver of living standards as measured by per capita income, productivity growth can also be expected to slow as the level of per capita income approaches the global frontier (normally associated with US per capita income). This is one explanation for why productivity growth tends to slow over time in mature economies such as Australia's.

As Bill Cline suggests, because the financial services share of output and financial depth increase as per capita incomes grow, failure to control for the level of per capita income would lead to the

[48] Ben Dolman, Dean Parham, and Simon Zheng, "Can Australia Match US Productivity Performance?," Staff Working Paper (Melbourne: Productivity Commission, March 2007), 3.

slowing in productivity growth driven by convergence with global productivity and living standards being falsely attributed to the financial services sector.[49]

While the theoretical and empirical basis for these long-run relationships is generally well established, the available time series data may not capture the true long-run relationship given that adjustment to any disequilibrium in that relationship may take decades and fall outside the range of the sample. The failure of Australian productivity to converge on that of the Unites States in recent decades has been widely noted and has several possible explanations.[50] It should not be entirely surprising if the limited time series data available for Australia reject these long-run relationships. However, this still provides a framework in which to test the contribution financial sector value-added makes to economy-wide labour productivity.

A Model of Australian Labour Productivity Growth

The following error correction model (equation 3) is estimated by least squares:

$$\Delta lp_t = \alpha_0 + \alpha_1 t + \alpha_2 \Delta uslp_t + \alpha_3 \Delta lu_{t-1} + \alpha_4 \Delta lp_{t-1} + \alpha_5 \Delta fgva_{t-1} + \alpha_6 \Delta gdppc_{t-1} + \alpha_7 lp_{t-1} + \alpha_8 uslp_{t-1} + \alpha_9 fgva_{t-1} + \alpha_{10} gdppc_{t-1} + \varepsilon_t \quad (3)$$

where *lp* is Australian labour productivity, *uslp* is US labour productivity, *lu* is labour utilisation (measured as total hours worked divided population), *fgva* is financial sector gross value-added adjusted for purchasing power parity,[51] *gdppc* is Australian real GDP per capita on a purchasing power parity-adjusted basis, *t* is an unrestricted linear time trend, Δ is a first difference operator and ε_t is a random error term.[52]

The model is estimated based on annual data from 1975 to 2015, reflecting the availability of data on financial sector value-added and the lag structure of the model. Sub-samples are also estimated from 1984 and 1990, for reasons discussed earlier in this paper. This results in some small sample sizes that are unlikely to capture the adjustment to long-run relationships that may span many years or decades. However, they are included here as a check on the robustness of the estimated relationships. The results are shown in the Table 4.

[49] Cline, "Too Much Finance, or Statistical Illusion?"
[50] Dolman, Parham, and Zheng, "Can Australia Match US Productivity Performance?"
[51] It is assumed that the financial sector has the same share of purchasing power parity-adjusted GDP as the financial sector's share of gross-value added in real GDP expressed in Australian dollars.
[52] Australian labour productivity, US labour productivity, Australian labour utilisation and Australian real GDP per capita on a purchasing power parity basis are all taken from the Conference Board's Total Economy Database. Australian financial sector gross value-added is taken from the ABS and adjusted for purchasing power parity as noted above.

Table 4. Equation 3: Growth in Labour Productivity

Variable	From 1975	From 1984	From 1990
Constant	204.53***	311.41***	295.76**
	(66.63)	(95.21)	(105.03)
t	0.45***	0.65***	0.80***
	(0.11)	(0.16)	(0.18)
$\Delta uslp_t$	0.55**	0.67	0.43**
	(0.23)	(0.44)	(0.24)
Δlu_{t-1}	-0.50*	-0.60	-0.42**
	(0.28)	(0.36)	(0.20)
Δlp_{t-1}	-0.26	-0.36	-0.14
	(0.24)	(0.38)	(0.19)
$\Delta fgva_{t-1}$	0.02	0.04	0.19***
	(0.05)	(0.06)	(0.05)
$\Delta gdppc_{t-1}$	0.44	0.57	0.20
	(0.33)	(0.51)	(0.31)
lp_{t-1}	-0.24***	-0.16	-0.04
	(0.07)	(0.17)	(0.10)
$uslp_{t-1}$	0.42***	0.24	0.02
	(0.10)	(0.22)	(0.16)
$fgva_{t-1}$	-0.01	0.02	-0.04
	(0.03)	(0.03)	(0.06)
$gdppc_{t-1}$	-0.43***	0.46**	-0.28*
	(0.13)	(0.20)	(0.14)
$\theta_{uslp} = -(\alpha_8/\alpha_7)$	1.72	1.51	0.66
$\theta_{fgva} = -(\alpha_9/\alpha_7)$	0.03	0.10	-1.17
$\theta_{gdppc} = -(\alpha_{10}/\alpha_7)$	-1.79	-2.9	-7.75
F-test of $\alpha_7=\alpha_8=\alpha_9=\alpha_{10}=0$	9.59***	1.46	0.92
Adj. R^2	0.50	0.53	0.65
S.E	0.96	0.90	0.69
JB-test	{0.52}	{0.07}	{0.97}
LM test			
- 1st order	{0.03}	{0.70}	{0.62}
BPG-test	{0.46}	{0.70}	{0.66}

Notes: Numbers in parentheses () are HAC robust standard errors, those in braces {} are *p*-values. ***,**,* denote the 1, 5 and 10 per cent significance levels respectively. Significance level for *F*-test based on Pesaran *et al* (2001).

Australian productivity growth has an elasticity with respect to contemporaneous US productivity growth[53] of around 0.6% for the full sample, with little change across the two sub-samples.

The growth in labour utilisation has the expected negative effect on labour productivity, with an elasticity of -0.5% for the full sample and quantitatively similar results for the two sub-samples

Lagged labour productivity and real GDP per capita growth are not statistically significant, although the signs and magnitudes of the estimated coefficients are plausible.

Lagged growth in financial sector value-added has a positive effect on labour productivity, but this is only quantitatively and statistically significant for the sub-sample from 1990. This is consistent with the earlier results in relation to gross fixed capital formation in suggesting that it is only since the financial system has matured post-deregulation that growth in financial sector value-added has become a statistically significant determinant of measured productivity growth. While these results need to be treated with caution, they are not consistent with the view that growth in financial sector value-added has subtracted from productivity growth in recent decades. The short-run relationship between financial sector value-added and measured labour productivity has if anything strengthened since 1990.

The estimated long-run relationship with US productivity, financial sector value-added and GDP per capita shows considerable instability across the full sample and two sub-samples. For the full sample, the *F*-test is consistent with a long-run relationship between these variables and Australian labour productivity, although financial sector gross value-added is not quantitatively or statistically significant in this relationship. The *t*-statistic on the lagged level of labour productivity for the full sample rejects a long-run relationship at the 5% level. The two sub-samples also reject a long-run equilibrium relationship between labour productivity and the other three variables.

These results imply that the level financial sector value-added is not a significant long-run determinant of overall labour productivity alongside the level of US productivity growth and real GDP per capita. However, it is noteworthy that there is also considerable instability in the estimated long-run relationship with US productivity and Australian real GDP per capita.

These results need to be interpreted with considerable caution for reasons already discussed above. Productivity growth is subject to measurement error and structural change. However, there is little support in these data for the 'too much finance' view that financial sector value-added is subtracting from productivity growth or that the financial sector is making less of a contribution to productivity than in the past.

[53] US productivity growth is assumed to be exogenous with respect to Australian productivity growth, so potential endogeneity in estimating a contemporaneous relationship is not a concern.

10. Conclusion

The financial sector has outperformed other sectors of the economy over the last 25 years, both in terms of its contribution to output and to multifactor productivity growth. This outperformance is in large part due to a significant change in the institutional and policy environment since the early 1980s from one focussed on financial repression and government control to a more deregulated environment that has created improved incentives for the financial sector as well as improved incentives for the efficient allocation of capital on an economy-wide basis.

This suggests a model for promoting productivity growth built around changes to institutional and policy frameworks that generate improved incentives to work, save and invest and that does not take an overly prescriptive or targeted approach to promoting productivity growth. The institutional frameworks and policy measures needed to promote economy-wide productivity growth are already well understood. The role of the Commission should be to formulate an integrated set of reform proposals prioritised by economic significance that can be adopted by governments. The Commission also has a role in quantifying the burden of regulation and regulatory accumulation and its implications for productivity growth similar to the role it currently plays in quantifying the burden of industry assistance.

The financial sector makes an essential contribution to the quantity and quality of capital formation. It contributes directly to productivity growth through its own share of output and indirectly through its contribution to the efficiency of the capital stock and the social value of the information produced by financial markets. Financial markets promote competition in the ownership of the capital stock and allow consumers, business and government to better manage risk, increasing the certainty and confidence required to invest. This submission has tested the 'too much finance' view that the finance sector might have exceeded its optimal or efficient size, finding little empirical support for this view either internationally or domestically.

The financial sector faces two major risks in terms of its contribution to productivity growth. The first risk is that the sector's outperformance leads to its contribution to productivity growth being taken for granted and the sector suffers from public policy neglect or a further increase in the burden of regulation and taxation that impairs productivity growth.

The second risk is that public perceptions that financial sector growth does not contribute to economic or productivity growth may lead to public policies that actively seek to suppress financial activity, impairing the efficient allocation of capital.

The financial services sector is dominated by intermediaries and in that role they are well positioned to pass through the benefits of sector-specific reforms, just as they are often also forced to pass on the burden of regulation and taxation to the end-users of financial services. Measures that might be perceived as narrowly benefiting the financial services sector are likely to yield broader economic gains given the centrality of financial services to the efficient allocation of capital that in turn determines the productivity of investment.

Appendix 1: Tax Reform Priorities

The following table contains 11 proposals for tax reform that have previously been the subject of recommendations by government-sponsored reviews of the tax and financial system. These measures can be expected to enhanced productivity by improving incentives to invest and transact in Australia and/or by lowering compliance and collection costs.

	Recommendation
1	That the Government makes a formal commitment to adopt a "whole of government" approach to tax and regulatory policy by giving priority to the design and implementation of measures that are co-ordinated and promote consistent policy outcomes.
2	That a reduction in the company tax rate be prioritised so as to enhance Australia's competitiveness with other jurisdictions.
3	That the dividend imputation system be retained.
4	That the deductibility of interest incurred to acquire an income producing asset not be disturbed across any asset class.
5	That Division 247 of the 1997 Act be amended to remove the bias against capital protection and to ensure that amounts incurred by investors referable to the cost of funds are generally deductible.
6	That Part IIIB of the 1936 Act be retained as the primary code for taxing foreign bank branches.
7	That the modernisation of Part IIIB be prioritised to ensure that it remains contemporaneous, including the adoption of a more principles-based approach.
8	That the Government proceed with the abolition of the LIBOR cap as a matter of urgency.
9	That the Board of Taxation report into the tax arrangements applying to permanent establishments be released, together with the Government response to the recommendations contained therein.
10	That the phase-down of interest withholding tax for financial institutions again be committed to and implemented.
11	That reform to modernise the Offshore Banking Unit regime be continued such that it enhances Australia's financial service exports.

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