Australian Institute for Business and Economics (AIBE)

Wage Stagnation – Implications for investment and growth in Australia







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1 Introduction

Over the last two decades most western economies¹ have, to a lesser or greater degree experienced slow growth in real wages, however it has been most noticeable in Australia². Since 1997, real wages in Australia have risen annually by approximately 2.75%, roughly equal to the rate of inflation and slowing to an average of 2.16% per annum over the last 5 years. The causes of this are varied but reflect a major change in the mechanisms by which wages are determined and involve a shift from the pre-eminence of localised and national processes to international factors³.

These in turn have resulted directly or indirectly from deliberate choices made by policymakers to remove constraints and artificial income stabilisers in the economy⁴. In times past, economists attempting to model real or nominal wages would have included numerous institutional factors such as union power, the degree of tariff protection, the nature of the industry and spatial location and the level of unemployment as explanatory factors. Their results were used to confirm the stratified nature of local labour markets and how this stratification process shaped the value of human capital and other supply characteristics in determining wages.

This type of analysis helped explain, for example, why wages for persons with similar occupational and human capital characteristics varied significantly across industries. Now, in many cases these localised, institutional factors are much less significant factors, although the level of aggregate unemployment continues to remain a significant, if not, muted factor in real wage growth.

Irrespective of the causes, it is clear that the rate of growth in real wages in most developed countries has slowed significantly and in some cases contracted over the last 15 years⁵. At the same time, executive remuneration and non-wage income such as dividends and returns on assets have risen substantially, resulting in a significant growth in income inequality⁶. Estimates of the distribution of income in Australia have gradually been rising, with a Gini coefficient of 0.27 (1982), 0.30 (1997/98), 0.34 (2008), 0.32(2012) and 0.35 (2015/6)⁷. However, these estimates are based on wage income only, when total personal income is included the coefficient for 2015/16 rises to 0.44 (household) and 0.48 (personnel). This result illustrates both the declining relative importance of wages to total income and the significant impact that slow wages growth is having on total income distribution.



²Jacobs, D and Rush, A, (2016) "Why is Wages Growth So Slow" Reserve Bank of Australia, https://www.rba.gov.au/publications/bulletin/2015/jun/pdf/bu-0615-2.pdf

- ³Mishel. L (2015) "Causes of Wage Stagnation" Economic Policy Institute, www. epi.org/publication.
- ⁴Mishel, L (2015) describes a similar process for the US, See, "Causes of Wage Stagnation" www.epi.org/publication

⁵Gould (2015) argues this is part of a long term trend in the United States using data base of over 800 occupations he traces real wage declines in most , see, Gould, E. (2015b).

Wages Stagnated or Fell Across the Board in 2014 With One Notable Exception.

Washington, D.C.: Economic Policy Institute

⁶https://www.theguardian.com/politics/reality-check-with-polly-curtis/2011/ nov/22/pay. In an extreme case the The UK High Pay Commission reports that the salary for top Bank executives had risen by 4899% since 1979. http://www. telegraph.co.uk/finance/financialcrisis/8906033/High-Pay-Commission-mostpeople-believe-executive-pay-out-of-control.html

⁷See OECD (2015) Income Inequality https://data.oecd.org/inequality/incomeinequality.htm

^{&#}x27;OECD (2016) "Gross Earnings" http://www.oecd-ilibrary.org/employment/data/ earnings/gross-earnings-decile-ratios_data-00302-en



Figure 1: Nominal wage growth in Australia (ABS: 6345.0)

Indeed, Figure 2 illustrates wages as a share of total factor income (the sum of wages, gross surplus and gross mixed income) have been falling consistently in recent decades.

Apart from issues of social equity and political stability, wage stagnation, if prolonged and severe, has widespread, and largely under-investigated, implications for the economy in general. Firstly, direct impacts of wage stagnation affect the



Figure 2: Wages share of total factor income (ABS:5204.0)

size and distribution of aggregate demand and the level and rates of return for asset investment, as well as the role and social significance of the traditional drivers of wages, such as formal human capital. Secondly, the flow-on and indirect effects of wage stagnation arise more progressively, for example, governments that have habitually factored bracket creep into their revenue estimates, are faced with a revenue

8See, Jacobs & Rush (2016) p. 3

shortfall and potential greater demands on funds if schemes such as tax credits are used to boost real wages. The areas of impact and transmission mechanisms through which the economy is affected are explored in Sections 4 and 5, respectively.

The slow growth in wages can also be seen in the declining unit labour costs of output, Figure 3⁸. This in turn should increase competitiveness for export industries, but even if this is the case its affect has been reduced by the exchange rate decline in the Australian dollar following the end of the mining boom, making the "wages effect" difficult to independently isolate. For private sector investors the slow wage growth environment offers both opportunity and risk. The increased competitiveness offers opportunity for investment in exportorientated activities, while the inevitable, if somewhat lagged, constraints on personal consumption and government taxation revenue make investment in domestically orientated activity less attractive and reduce the ability of Government to carry out services.



Figure 3: Falling unit labour costs (ABS: 5204.0)

Globalization reduces the demand for labour in wealthier countries. Elsby, Hobijn and Sahin have shown that it is industries where imports became a more important part of the supply chain between 1993 and 2010 that the labour share fell most sharply⁹. As well as the shift to integrate off-shore production methods into the domestic economy, the value of domestic labour is being skewed. Part of the explanation for these trends is a new economic system of value in which some skills are rewarded (over-rewarded) and those with limited skills are devalued. The elements of the labour force whose skills are in danger of being devalued include those most exposed to the international sector, those engaged in non-standard work and those most susceptible to the rise of automation (see Figure 4). As these areas made up a significant portion of the Australian economy, decaying wages here will not be offset by booming areas such as mining where the reach is not as widespread and less labour-intensive.

^oSee, Elsby, M., Hobijn, B., & Sahin, A. (2013). "The Decline of the U.S. Labor Share". Brookings Papers on Economic Activity, 47(2), 1-63.



In Australia and overseas, there appears to be a decoupling of the link between real wages and productivity (see Figure 5). In most developed countries the two moved in tandem between 1947- 1960 where the OECD average both rose by 51%¹⁰. However, between 1961 and 2014, in the US, for example, productivity rose by 220% while real wages rose by less than 100%. The result is that labour's share of GDP has fallen, and the share that goes to labour more and more has been going to the people that earn high salaries, exacerbating the problem for the rest¹¹. A similar pattern has been happening in Australia and elsewhere.



Figure 5: Productivity and real wage divergence (ABS: 5204.0 and 5260.0)

The 2017 OECD Productivity Indicators survey takes a more sanguine approach, arguing that post-2015, labour income shares have stabilised with most decoupling between real wages and productivity occurring in the post-crisis period. They argue that this suggests that any stabilisation in labour income shares may not necessarily arrest concerns about rising inequalities¹².

For economists the blurring of the relationship between productivity and real wages also raises the questions of the value of labour to an extent not seen since the emergence of marginal productivity theory within neo-classical economics almost a century ago. If the price of labour is not closely related to the value of the product or service produced, what then determines it? In Australia, wages stagnation has been matched by a squeeze on hours worked. About three quarters of the modest 1.4% growth in the number of people in employment over the past year in Australia has been achieved by sharing the available hours, which only rose by 0.3%¹³.

Another puzzling issue about the current bout of wage stagnation across the developed world is the apparent reduced impact of changes in unemployment rates on wage growth. It has been widely believed that if the unemployment rate falls below the non-accelerating rate of inflation (NAIRU) then inflationary pressure will be exerted through the labour market. This theory drove the OECD prediction that wage-driven inflation would kick-in in Britain if unemployment fell below 6.9%. The unemployment rate in that country has since fallen well below this without the accompanying wage inflation and in some instances, a real wage reduction¹⁴.

Similarly the US Federal Reserve predicted in 2013 that for every 1% drop in the unemployment rate there would be a corresponding 0.3% rise in real wages, however this has not been realised. In Japan in 2014, unemployment fell to 3.6%, while at the same time real pay on average fell by 2.5%. In Australia, the unemployment rate has trended down (with minor fluctuations) since 2014 but without corresponding real wage increases of the type historically seen (see Figure 6). An explanation for these events may be that the NAIRU has moved downwards and that the wage-inflation will only kick-in with very low levels of unemployment. However, The Economist (2015) took a different view:

"It may be that the damage this recession did to the labour market- the loss of skills and the mismatch between industries where workers have experience and those where there are vacancies is being expressed, not in long term unemployment but as lasting low pay. If that is true and the low pay locks in – sustained inflation might not return even with low rates of unemployment."

¹⁰See, ""When What Goes Down , Doesn't Come up" *The Economist* 2015 p. 34 "See, *The Economist*, March 13-20th 2015 p. 34

¹²Organisation of Cultural and Economic Development(OECD, 2017)

"Compendium of Productivity Indicators 2017" Geneva 2017

¹³See, " Australia Stuck in Wage Stagnation" Soureable.net.Australia.au ¹⁴See, The Economist (2015) p.



Figure 6: Unemployment and wage growth 2014-2017 (ABS: 6345.0 and 6202.0)

Irrespective of which view is correct, and they need not be mutually exclusive, one of the fundamental drivers of labour market theory, the strong inverse relationship between real wage growth and levels of aggregate demand (as measured by labour market pressure), is a significantly weaker indicator than has been previously found, as can be seen in Figure 7. One contributing factor to this is that the institutions that once translated labour market pressure into real wage increases, such as unions, are now less influential.

Historically wages in Australia were set by quasi-judicial officers on an industrial tribunal through centralised wage fixing, and the pay gains through the strong union representations and would flow through the award system. However, the union landscape in Australia and across other countries has drastically changed with the declining union density. In 1992 around 40 per cent of the workforce was unionised, now there is fewer than 15 per cent of workers who belong to a union and this figure is declining.



Figure 7: Unemployment and wage growth 2000-2014 (RBA: Kent, 2006)

Household consumption makes up a large part of Gross National Product in most OECD countries, ranging from 53.5% in Germany to 68% in the US, with Australia in 2016 at 57.8%¹⁵. Faced with constrained earnings, individuals and families are forced to choose whether to reduce consumption or increase debt. As can be seen in Figure 8, the data strongly indicates that the latter has occurred, with rising debt to income ratios and expenditure, in the wage stagnation environment. Debt to income ratios for those whose only source of income is wages rose by 48% between 2003/04 and 2015/16 compared to the all person's average of 34% and 23% for those who were self-employed or whose income came primarily from the operation of a business¹⁶. Moreover the composition of debt was different, with the former acquiring debt to fund current consumption and the latter groups borrowing for speculative, principally real estate purposes.



And expenditure (ABS: 6253.0 and 6350.0)

The Australian Bureau of Statistics Household Income, Wealth and Expenditure Survey has found the average amount of debt for Australian households has almost doubled in the past 12 years — from \$94,100 in 2003-04 to \$168,600 in 2015-16. Most of this is accounted for by property debt,¹⁷ however, the increased debt capacity for Australian families has been underwritten by new financial packages that allowed home mortgages to become a source for financing general consumption and, in effect, represented a guasi-wage increase, albeit based upon inter-temporal time differences¹⁸. In 2005/06 almost 25% of households with a mortgage on their home, had money owing on it for non-housing purposes (excluding business or investment purposes)¹⁹. In the 1990s, this phenomenon of mortgage financing consumption began in the United States where it was encouraged for households to build up a credit line without the immediate obligation to provide repayments. However, reliance on these forms of alternative sources of finance is both short term and subject to fluctuations in asset valuations.

¹⁵See, World Bank (2017) "Household Final Consumption as a percentage of GDP" https://data.worldbank.org/indicator/NE.CON.PETC.ZS ¹⁶Australian Bureau of Statistics (ABS) Cat 65230 Household Income and Wealth, Australia: Summary of Results, 2015–16



In summary, while wage stagnation in Australia is not a new phenomenon, having occurring (briefly) in 1945-1947 and again in the 1980's and 1990's, the present situation is unique both for the length of the wages slow-down and the circumstances in which it is occurring. These include a decoupling of wages growth from productivity growth, a shift in national income shares away from labour, a structural shift in the relationship between aggregate unemployment and wage growth, and a dichotomy in the labour market. While sections of the labour market have experienced rapid and unprecedented wage growth, this has co-existed with large sections of the workforce experiencing slow or negative real income growth. Overlaying all of these factors is a record period of continuous growth and an entrenched regime of low inflation.

This paper explores these issues on wage stagnation but concentrates on the short and medium term impacts for investment and portfolio management in Australia. Specifically, the report proceeds in the following way; the remainder of Section 1 examines the background of the current slowdown in wages in Australia, examines empirical models and demographic trends in order to explain underlying causes of wage stagnation. In Section 2, an examination of the relationship between wages, consumer expenditure and behaviour is undertaken. Section 3 expands upon this and indicates the areas of the economy that may be impacted. Finally, two scenarios of wage stagnation are presented in Section 4 and the resulting implications for asset management and investment.

1.1 The Background to the Current Slow-Down in Wages Growth in Australia

Figure 9 traces movements in the Wage price index (WPI) in Australia since 2000. Jacobs and Owen (2016) argue that the present restraint on wages has been the longest period of low wage growth in Australia since the early 1990s²⁰. The Australian Bureau of Statistics (ABS) publishes a number of wage measures, including the average weekly ordinary time earnings (AWOTE), and the wage price index (WPI). The WPI is now the Treasury preferred indicator over its main rival AWOTE, to trace long term movements in wages. However, there are contrasting views over which series provides the best measure of wage behaviour.



Figure 9: Wage Price Index Growth (total pay excluding bonuses) (RBA)

Some economists prefer AWOTE as it represents a comprehensive wage series and includes base rates of pay, penalty rates, bonuses and incentive payments, amongst other things, and is therefore likely to reflect the actual labour costs faced by a company at any point in time. Yet, the Australian Treasury and other Government agencies, has issues with the AWOTE, principally over the issue of short term volatility.

¹⁷ABS (2016) "Household Debt and over-indebtedness in Australia" catalogue 6523.0 - Household Income and Wealth, Australia, 2015-16

¹⁸ABS (2016) Summary p.1

¹⁹ABS (2009) Australian Social Trends: Household Debt

²⁰There have been two other recent – in the 1980s and the 1990s – when annual growth in real wages dipped lower

than it is now. See, "Is Wage growth at Record Lows?" http://the conversation. com/factcheck-is-wage-growth-at-record-lows-66552

The WPI series excludes the impact of changes in the quality and quantity of work and changes in the composition of the workforce (including the proportions of skilled and unskilled workers) and therefore provides a measure of underlying price movements rather than actual labour costs. To maintain compatibility with Australian Government research, wage behaviour in this paper will be measured using the WPI.

The data in Figure 9 shows a noticeable and accelerating slowdown in WPI growth to just below 2% in 2017. Figure 10 demonstrates the close, simultaneous, relationship between wages and inflation (as measured by the consumer price index, CPI).



Figure 10: Changes in Wages and Inflation

Wages are the single most important component of household income and the largest single item in business costs. Consequently they are a major influence on cost of living calculations. Not surprisingly since 2000, wages and inflation have moved in close correlation, demonstrating the simultaneous relationship that exists between the two. For most of that period nominal wages growth have exceeded inflation, but not by much and in the latter periods, wages growth fell below inflation, briefly in 2014 and then for longer over 2015/16.

There is nothing surprising in brief periods of wage restraint occurring, however the pattern that has been established over a 15-year period is more significant and suggests underlying or systemic changes are occurring in the operation of the Australian Labour Market. Moreover, there has been a capital deepening and a movement away from labour in terms of relative importance to production. The capital-labour ratio has risen substantially (see Figure 11) and the capital output ratio, after dropping in 2002/03, has risen steadily into 2016/17.



Figure 11: Capital Labour and Capital Output Ratios (RBA)

According to Parham (2013), the mining boom was overwhelmingly responsible for the fall in labour share in Australia because the development of mining and associated capacity added to the economy's capital stock, leading to more capital-intensive production overall. In addition, the higher output prices for minerals reduced the real cost of labour so that growth in real wages fell behind labour productivity growth²¹. Similarly, the industrial composition of the economy has undergone significant change. These changes have moved against strong wages growth. In particular, the continuing decline in manufacturing has reduced an important driver of wages growth – unionised full time male workers, in Australia.

This industry has declined from a value add of 13% of GDP in 1999 to 6.6% in 2017. Mining, as an employer of labour has also been in decline since 2010. The growth industries have been in Finance and Insurance and Other Business Services. Both of these industries are largely non-unionised, subject to considerable overseas competition and display wide variations in wage rates among higher and lower skill workers. Both of these factors tend to moderate wages growth.

Consequently there was a large fall in the labour income share in Australia over the first decade of the 2000s. According to one Australian Bureau of Statistics (ABS) measure, the share fell by 4 percentage points from 57 per cent to 53 per cent over the first decade of the 2000s. Parham offer three partial explanations:

- 1. relative rates of factor income growth
- 2. changes in the relative quantities and prices of capital and labour
- 3. changes in real wage rates relative to labour productivity.

1.2 Empirical models of wage stagnation

Reserve Bank economists Jacobs and Rush (2015) modelled wage change in Australia (from 1989 to 2015) using what they called a Phillips Curve Equation. Their estimating equations and variable list used are shown below, in Equation 1. Strictly speaking, their work represents a departure from the original Phillips curve, which examines the inverse relationship between the rates of unemployment and of change in money wages.



** Includes: information media and telecommunications; rental, hiring and real estate services; professional, scientific and technical services; administrative and support services

Figure 12: Industry Share of Output (RBA)

However, the notion behind the Phillips curve relation was the stimulus effect that rising prices may have upon employment/ unemployment levels, due principally to money illusion and lags in wage/price adjustments. In the spirit of these relationships Jacobs and Rush use a variety of aggregate demand variables to explain the determinants of wage change in Australia and in so doing offer an explanation for the prolonged slow-down in wage growth. Their estimating equation is set out below.

Equation 1:

$WPI growth = \% \Delta WPI^{Private}$

- $= \alpha + \beta 1 NAIRUgapt 1$
- + $\beta 2NAIRUgapt-2 + \beta 3\Delta URt-1$
- + β 4BondInfXt-1
- + β 5BondInfXt-2
- + $\beta 6BondInfXt-3$
- + $\beta 7\% \Delta GDP deft 1 + et (1)$

Where:

- WPIPrivate is the private sector WPI
- NAIRUgap is the difference between the quarter average unemployment rate and the NAIRU, and enters the model with up to a two quarter lag
- ΔUR is the change in the quarter-average unemployment rate
- BondInfX is a measure of consumer price index (CPI) inflation expectations implied by 10-year indexed bonds and enters the model with up to a three quarter lag
- %
 \u03c4GDPdef is the year-ended growth rate of the non-farm GDP deflator.

The authors claim to have identified "a range of related factors which appear to explain much of the decline in wage growth in Australia in recent years". This includes;

- Spare capacity in the labour market
- · Decline in inflation expectations
- A lower terms of trade
- An appreciated real exchange rate

Unpacking these specified factors further highlights in more detail the underlying causes of the wage stagnation.

Below-average growth in economic activity has translated into subdued growth in labour demand, which has resulted in an increase in spare capacity in the labour market. The connection between increased supply of labour and decreasing wages is further exemplified in that workers dampen their wage demands as their perceived job security lessens as job market competition increases. What is particularly distinct about the current period is that while the current wages downturn is as significant as those in the past, the rise of the unemployment rate is significantly less pronounced (Figure 13).

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²⁴See, Phillips, W (1958) The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957, Economica New Series, Vol. 25, No. 100 pp. 283-299

²²Australian Bureau of Statistics " Household Income and Income Distribution in Australia, 2011-12" Catalogue 6523.0 Canberra
²³Parham, D (2013) "Labour's Share of Growth in Income and Prosperity,



Figure 13: Unemployment and Wages in Downturns (ABS; RBA)

As with many economic models these findings relate to the mechanisms of wage adjustment rather than the underlying causes. In particular they fail to take account of the institutional environment within the Australian economy and how structural changes in the economy have modified the avenues for wage adjustment as well as the quasi-spare capacity that has been building up in the labour market.

Since 2014, the labour market has been loosening. Figure 14 shows underemployment increasing at a time at which the unemployment rate was steady or decreasing. Underemployment, by definition, is demand driven and coexists with casual and contingent employment conditions, both of which work against strong wages growth. At the same time, as Figure 15 shows, both the participation rate and the employment rate fell at the same time. The final example of surplus capacity is shown in Figure 16, where average hours worked decline throughout the period 2010-2016, with a slight pickup into 2017.

In such circumstances, it is unsurprising that wages growth was muted. An examination of Figure 1 shows that wage growth in Australia has been low (below 5%) since 1999, interrupted briefly by the Mining boom wage increases in 2010/11 and 2013/14 and this is suggestive of a continuing pattern. During the same time, Australia has had continuous economic growth.



Figure 14: Labour Market (ABS)

This is indicative of a failure of mechanisms that worked in the past, such as strong unionism and wage leadership from the Manufacturing and Mining sectors that served to leverage part of economic growth into wages. The failure of these traditional stabilising mechanisms to protect relative income shares and





Figure 15: Employment and Participation Rate (ABS)

the continuing expectations of low inflation, does not suggest a return to past levels of wage growth.

Below average expectations for consumer price inflation and their moderating effect on wage demands have been cited as a partial explanation of the declining wage growth. The claim hinges on employees focusing more on their real, rather than nominal wages. Thus, as inflation expectations decrease, consumers would be more willing to accept lower wages.

While there has been sporadic evidence of households and unions having conservative estimates of inflation (see Figure 17) which lead to weakened bargaining power whilst negotiating wage, this can be somewhat discounted. This is largely because even after accounting for inflation expectations, real wage growth has decreased.

Further, inflation expectations are positively correlated with rising unemployment, thus accurately isolating the precise effects of inflation expectations can render the estimates somewhat dubious.

Declining terms of trade and falls in mining investment have placed pressure on firms to contain costs. These two factors combined appear to be playing a crucial role in pressuring firms to contain costs. Figure 18 depicts that historically, unemployment, inflation expectations and terms of trade have played a significant role (approximately two thirds) in declining wage growth. Parkham (2015) argues that, as the terms of trade decline over the next few years, the labour income share will rise but within a more capital-intensive economy and at a quasi-permanently lower labour share than in previous levels. However, Parkham (2015) cautions against institutional means to restore 'lost' income share through wage rises which he argues would have adverse consequences for employment and inflation particularly for industries already facing adjustment pressures.

A relatively depreciated real exchange rate, cetaris parabis, generally leads to increased competitiveness of an economy. However, in Australia, the situation is reversed, as between



Figure 16: Employment and Hours Worked (RBA; ABS)





Figure 17: Consumer Price Inflation Expectations (RBA)

2002 and 2012, the real exchange appreciated rapidly (see Figure 19), while the nominal exchange rate rose by almost double compared to our trading partners (50% compared to 30%). Although it can be argued this rise was necessary in ensuring the domestic economy's stability during the mining boom, the ULC measure of real exchange does remain roughly 20 percent higher contrasted to 2006 when terms of trade were at a similar level.

Although as it has been discussed that the model indicates that these factors do not fully explain the extent of decline in wage growth, they are a good basis in understanding much of the issue. It can be suggested that other factors, such as an increase in the flexibility of wages to market conditions, may also have contributed to declining wage growth.

In short, the wages share of the Australian economy slowed for numerous, purely economic reasons. Some were international reasons such as the terms of trade, growth in international trade and internationalisation and inadvertently, and somewhat paradoxically, from increased capital deepening, during and prior to the mining boom. At the same time, the institutional stabiliser mechanisms of institutional wage setting, wage leadership and union power, were not able to moderate these impacts on wage share. Finally, shifts in the industrial distribution of the workforce, the job status characteristics of the work force and the growth of surplus capacity in the labour market transferred considerable bargaining power to the demand side. For these reasons, further slow growth in wages is to be expected for the short to medium term in Australia. Consequently, while the current period of slow wage growth is not the worst in Australian history, it is set to be the longest.



Figure 18: Private Sector WPI Growth (ABS; RBA)



Figure 19: Real Effective Exchange Rate (RBA)

This is generally because of the necessity for wage growth to wane, as otherwise unemployment would have likely increased, thus leading to more severe adverse effects. Thus, the stagnation of wage growth effect on aggregate demand has been mitigated by the persistent employment in the economy, resulting in a prolonged, yet substantially more manageable economic problem. To this point, its effects on consumption in general have been underwritten and masked by extended credit and growing indebtedness, but this is not sustainable in the long run. Consequently, the erosion of the personal credit base may be the more serious outcome of the current situation, meaning that when wages do start to pick up, the extra income will be used to service debt, rather than fund consumption and/or investment.

1.3 Demographic trends leading to wage stagnation

An important explanatory factor in Australia's wage stagnation is the demographic shift towards an older population. Working life cycles are an important contributory factor towards wages, as can be seen in Figure 20. Most significantly, on average, an individual between 35 and 44 earns 34% more than an individual between 25 and 34; and an individual over 55 can expect to earn 12% less than someone between 45 and 54. Therefore, the most significant wage growth can be expected for under-20 years and those between 25 and 34. However, as can be seen from Australia's age pyramid, Figure 21, the proportion of the population between 14 and 20, 20 and 34, and 35 and 44, has declined by approximately 0.7%, 1.6% and 1.8%, respectively. This has been offset by a 3.5% growth in persons between 55 and 65. As the proportion



Figure 20: Average weekly cash earnings by age (ABS: 6306.0)



Figure 21: Australia's age-sex pyramid, 2016 and 1996 (ABS: 3101.0)

of the working force is decreasingly made up of age groups that experience the highest wage growth rates, it is expected that the aggregate wage growth figures are under historical expectations. Further, in addition to the higher proportion of Australians above 55, ABS data indicates that this group is working for longer. The average age of retirees in Australia is 53.8-58.5 for men, however 61.5 to 63.3 for men who have retired in the past 5 years. While this has an effect of suppressing wage growth statistics, it may be contributing to a lack of decline in consumer spending.

2 Wages Stagnation and Consumer Expenditure

Estimating the effect wage stagnation is likely to have on sectors of the Australian economy and on wages on Australian consumption patterns is explored in this section. Household final consumption expenditure is the net expenditure on goods and services by persons and expenditure by private non-profit institutions serving households. This item includes: personal expenditure on motor vehicles and other durable goods; the imputed rent of owner-occupied dwellings; the value of 'backyard' production (including food producedand consumed on farms); and the payment of wages and salaries in kind.

Despite the slow-down in wages growth, Australian consumer spending has held up well, rising by 15.3% since 2009, which is an acceptable rate of growth for a mature economy. As can be seen in Figure 22, the level of consumer spending slightly exceeded trend growth in a several consecutive of quarters since 2009, and did not fall below trend in any quarter, in this period.



Figure 22: Growth in Consumer Spending, 1984 to 2015-16 (ABS: 6530.0)



Section 2.1 examines two theories for why consumer spending has not stagnated, despite falling wages. Following this, Section 2.2 examines the rising role of debt in financing Australian consumer spending and the important function it has played in sustaining household consumption. Thirdly, Section 2.3 examines the effects of wage stagnation on consumption from an backward and forward linkages established from input-output tables. Lastly, Section 2.4 examines the drivers of consumption patterns from a behavioural economics perspective and this is applied to extrapolate, given the Australian data, which sectors are likely to be adversely impacted by wage stagnation. This section forms the framework for Section 3, which examines the areas of transmission future wage stagnation would have on individual industries.

2.1 Why has consumer expenditure held up?

2.1.1 Marginal Propensity to Consume Approach

Keynes introduced the concept of the marginal propensity (the percentage of new income that is consumed) to consume in his General Theory of Employment Interest and Money. Mathematically, the function is expressed as the derivative of the consumption function with respect to disposable income, i.e., the instantaneous slope of the C-Y curve:

$MPC = \frac{dC}{dY} \text{ or approximately } \Delta C_{\Delta Y}$

Where ΔC the change in consumption and ΔY is the change in income that produced the change in consumption. The aggregate MPC has important implications for the macroeconomy. Specifically:

If Y = *C* + *I* (where *I* = the level of investment)

The new income can be marginally expressed as:

$$dY = dC + dI$$

Similarly:

$$\Delta Y = \Delta C + \Delta I$$
$$\Delta Y = Cc \ \Delta Y + \Delta I$$
$$\Delta Y - C \ \Delta Y = \Delta I$$
$$\Delta Y = \Delta I/(1-C)$$
$$K = 1/(1-C)$$

Where K is the Keynesian multiplier:

K = dY/dI

While the size of the MPC will vary across ages and income groups, Carroll, Slacalek, Tokuka and White²⁵ have found that at the macro level the MPC is relatively constant across the cycle. According to these authors, credible estimates of the aggregate MPC range from 0.2 to 0.6²⁶, however, they also find that the stability of the MPC may be impacted by growth inequality in the distribution of wealth. For example, they cite recent findings of U.S. Survey of Consumer Finances which show that the top 1% of households hold about a third of total wealth, with the bottom 60% owning essentially no net wealth²⁷. In the presence of microeconomic heterogeneity, such inequality matters for macroeconomics because households with different amounts of wealth respond differently to the same aggregate shock.

"Empirical studies have often found that the annual marginal propensity to consume out of one-time income shocks is substantially larger for low-wealth than for high-wealth households. Therefore, in the presence of such microeconomic heterogeneity, the aggregate size of, say, a fiscal shock is not sufficient to compute the shock's effect on spending; that effect will depend on how the shock is distributed across categories of households with different MPC." - (Caroll et al, 2017)

To test the implications of this they ask two related questions:

- How does the aggregate MPC differ in a recession compared to an expansion?
- What are the respective magnitudes of change in the MPC for poor households compared to rich households over the business cycle?

In investigating these, the authors have two models of consumption which are then subject to economic shocks. In the first version, aggregate shocks follow the Friedman (permanent income) structure in which all shocks are either fully permanent or fully transitory. In the second version, the aggregate economy alternates between periods of boom and bust, as in Krusell and Smith (1998) resident agent model. This model assumes that consumer expenditure rapidly adjusts to changed circumstances. The authors find that there is a degree of consistency in estimates of aggregate MPC over the cycle, suggesting that consumers attempt to maintain consumption patterns during a downturn and that microeconomic empirical evidence about the MPC obtained during normal, non-recessionary times may still provide a good guide to the effects of stimulus programs for policymakers in recessionary times and that the Friedman Permanent Income Hypothesis provides the better fit of actual consumption behaviour.

These estimates considerably exceed the low values implied by representative agent models or the standard framework of Krussell and Smith (1997, 1998). More importantly, they find strong support for the conventional wisdom that the effects of an economic stimulus are particularly strong if it is targeted to poor individuals and to the unemployed. For example, they find that a tax-or-transfer stimulus targeted on the bottom half of the wealth distribution or the unemployed is 2–3 times more effective in increasing aggregate spending than a stimulus of the same size concentrated on the rest of the population. This finding is in line with the recent estimates of Blundell, Pistaferri, and Preston (2008), Broda and Parker (2014) and Jappelli and Pistaferri²⁸. Finally, and importantly, they find that the MPC is higher for low-net-worth households than for medium or

²⁷See, US Consumer Expenditure Survey https://www.bls.gov/cex

²⁵See, Carroll, Slacalek, Tokuka and White (2017)' The Distribution of Wealth and the Marginal Propensity to Consume' Quantitative Economics. 9 (3) pp. ²⁶See, Berger-Thompson, L., Chung, E. and McKibbin, R. (2015) "Estimating Marginal Propensities to Consume in Australia Using Micro Data" Economic Record, 42 (3) 123-134, in which they have estimated the aggregate MPC using HILDA survey and report estimates of 0.64.

high-wealth households. As well the MPC, across households of a given age, will vary strongly with the degree to which a household's assets are held in liquid versus illiquid forms, but the relationship of the MPC to the household's total net worth is less clear.

2.1.2 Permanent Income Approach

A permanent income hypothesis is a theory of consumer spending which states that people will spend money at a level consistent with their expected long term average income. The level of expected long term income then becomes thought of as the level of "permanent" income that can be safely spent. A worker will save only if his or her current income is higher than the anticipated level of permanent income, in order to guard against future declines in income. Under this hypothesis the consumer units measured income for some time period. Say a year is treated the sum of two factors, a permanent component (Y_p), corresponding to the permanent income and a transitory component (Y_t).

The permanent component is to be interpreted as reflecting the affect of those factors that the unit regards as determining its capital value or wealth: the non-human wealth it owns; the personal attributes of the earners in the unit, such as their training, ability, personality; the attributes of the economic activity of the earners, such as the occupation followed, the location of the economic activity etc. It is analogous to the "expected" value of a probability distribution. The transitory component is to be interpreted as reflecting all "other" factors such as windfall income or loss, unexpected over time. Specifically:

Cp = k (I,w,u) Yp	(1)
Y=Yp+Yt	(2)
C = Cp + Ct	(3)
PYtYp = P Ct Cp = PYtCt = 0	(4)

Equation 1 defines a relation between permanent income and permanent consumption. It specifies that the ratio between them is independent of the size of permanent income but does depend on other variables, in particular:

- the rate of interest or sets of rates of interest at which the consumer unit can borrow or lend;
- the relative importance of property and non-property income symbolised by the ratio of non-human wealth to income (w);
- the factors symbolised by the portmanteau variable u determining the consumer, unit's tastes and preferences for, consumption versus additions to wealth. The most significant of the latter factors probably are the number of members of the consumer unit and their characteristics, particularly their ages the importance of transitory factors affecting income and consumption, measured, for example, by the "spread" or standard deviation of the probability distributions of the transitory components

relative to the size of the corresponding permanent components.

Equations 2 and 3 define the connection between the permanent components and the measured magnitudes. In this most general form the hypothesis is purely definitional; they add two equations but also two additional unknowns, the transitory components. There are a variety of ways to specialise the hypothesis so that it is capable of being contradicted by observed data.

Wage stagnation has several aspects which impact on consumption expenditure. Firstly, wage stagnation impacting on income inequality may shift the distribution and incidence of consumption and the inter-temporal pattern of consumer spending, as consumers change the timing of their purchases but does it impact on notions of the permanent consumption coefficient?²⁹ Using US data from 1960-2015, Sacerote found that despite the large increase in U.S. income inequality, consumption for families at the 25th and 50th percentiles of income has grown steadily over the time period 1960-2015." (p. 1)

Sacerdote explains the consistent growth in consumer expenditure despite rising in equality in several ways: firstly, that estimates of zero real wage growth over this period were misleading in that the use of the CPIU price deflator biased results downwards and that in fact small but positive growth had occurred in real wages sufficient to sustain about a 1% annual growth in consumption. Secondly, finding that:

"Meaningful growth in consumption for below median income families has occurred even in a prolonged period of increasing income inequality, increasing consumption inequality and a decreasing share of national income accruing to labor"

This would tend to suggest that wage stagnation, even if prolonged, is perceived by consumers as part of a transitory income loss that will correct itself and allow consumers to return to the permanent income long run path or as a structural shift downwards in income. In a similar finding, Wiseman (2013), during investigating the effects of the Global Financial Crisis in 2008 on consumption in Britain, identifies what is known as "consumption externalities".³⁰ These relate to seemingly paradoxical consumer behaviour in which consumers impacted by wage stagnation have attempted to maintain and even expand consumption in line with their perceived social status.

"The second dynamic resulting from wage stagnation and rising inequality is traced to consumption externalities created by the consumption of the rich, requiring families with stagnant wages and smaller relative shares to struggle harder to maintain the basic welfare of their families and their social standing" – Wiseman, 2013; p. 23

³⁰Wiseman, J (2013) "Wage Stagnation, Rising inequality and the financial crisis of 2008" Cambridge Journal of Economics 37 (1) 921-945

²⁹See, Wilmers, N (2017) "How reliance on high-income consumers increases wage inequality in the U.S. economy", Harvard University Press, SNN Scholar"s strategy network- Harvard.

There are three basic requirements for consumption externalities to exist; an entrenched middle class anxious to maintain living standards, growing income inequality and wage stagnation. As the existence wage stagnation has been established in Section 1, the prevalence of income inequality and the struggles of the middle class will now be discussed.

For at least the last 20 years, income inequality has been steadily increasing, based on the Gini Coefficient, of which is widely accepted as one of the leading indicators for inequality. The latest data shows that it was recently at its highest (most unequal) level ever at 0.446 compared to 0.417 in the mid 1990's. Although from latest figures it has dropped to approximately 0.434, this is likely an outlier from the general trend. In the 20 years since, average household gross incomes have increased 60% from \$66,196 to \$107,276 today while over the same period, incomes of the top 1 in 5 households (highest quintile) have increased by 74% from \$149,552 to \$260,104.

Since 2005-06, most of the household categories have seen income increases of 18-19% with an average increase of 24% (\$20,956 increase from \$86,320 to the current \$107,276). By contrast the highest quintile has seen income increases of 30% from \$199,576 to \$260,104.

However, the largest change has come in net wealth (accumulated earnings). While the average Australian household has net wealth of \$809,900, the highest quintile household on average has a net wealth more than three times this (\$2,514,400) while the lowest quintile household wealth is just a fraction of this (4% of the average wealth, or \$35,500). The lowest 20% of Australian households own less than 1% (0.9%) of the national private wealth while the highest 20% own 62% of the national private wealth. Taken collectively, the wealth of the highest quintile households on average is 71 times that of the lowest quintile households. Average increases in net wealth over the years 2013-2015 were 6%, but most of this has been through house price inflation, which by itself should not affect consumption materially.

With inequality rising, among other adverse effects, this leads the middle class attempting to maintain their previous standards of living. This attempt of the middle class to maintain their relative welfare and social status can be seen in Figure 23. Specifically, consumption levels in the low quintiles are disproportionately high for their amount of wealth.

Annual Household Income		Household Net Wealth				
	Top 20% of households earn 49% of all income		The highest 20% own 62% of Australia's private wealth			
	Highest Quintile \$260,104			Highest Quintile \$2,514,400		
	Fourth Quintile \$124,956	The average		Fourth Quintile \$830,600	The wealth of the average household in the top 20% is 71x the average	
Average Household Annual Gross	Third Quintile \$80,704	earnings of the top 20% are 12x the average	National Average Household	Third Quintile \$462,500		
Income \$107,276	Second Quintile \$47,944	earnings of the bottom 20%	rnings of the Net Wealth ottom 20% \$809,900	Second Quintile \$206,100	wealth of those in the bottom 20%	
	Lowest Quintile \$22,620	•		Lowest Quintile \$35,500	•	
	The lowest 20% earn 4% of all income			The lowest 20% earn 0.9% of Australia's private wealth		

Table 1: Summary of Australian Net Income and Wealth distribution (ABS: 6523.0)



Currently this expenditure is likely being maintained through decreased saving or growing indebtedness, and as both strategies are only viable in the short-term, there will likely be a change in consumption patterns in the absence of future wage growth. The strategy elected by most Australian households to maintain consumption levels in the face of stagnant wages and rising inequality appears to be a willingness to take on increasing amounts of debt, of which will be explored in the following section.

2.2 Growing indebtedness of households in response to wage stagnation

The increase in consumer expenditure despite wage stagnation is indicative of a growing eagerness of Australian households to maintain their consumption levels in the face of wage stagnation through debt financing. Figure 24, 25 and 26 highlight growing prevalence of debt, while comparing debt with income or assets, it is clear it has been significantly rising. Although, as previously stated much of this growing debt stems from the purchasing of real estate, which is a relatively recent phenomenon, that such a high portion of property purchasing was done so through debt (ABS: 6530.0).

As well as property being the major driving force behind the growing indebtedness of households, it can also be argued that this reliance on this form of debt is the driving force behind keeping consumption stable. By using the house as collateral, consumers can further borrow against it, to maintain consumption in the face of stagnating wages. Assessing how reliant Australian households are on debt, relative to similar economies is the next step in understanding the problem. Figure 27 contrasts the levels of debt domestic households hold and relative to major Australian trading partners of Japan and United States. It indicates Australians are less averse to debt financing of consumption and investment.



Figure 24: Real Household Debt per person (ABS: 4102.0)



SIZE OF HOUSEHOLD DEBT COMPARED WITH ANNUAL INCOME(a)(b)



Figure 26: Size of Household Debt Compared with Annual Income (ABS: 4102.0)





It is also postulated that this trend translates also to the use of credit to fund purchases. Use of credit cards, although a proxy indicator of debt financing, has been steadily rising since 2007. The use of this often short to medium term method now funds more than half (52 percent) of consumer daily transactions.³¹ A recent survey conducted by the Reserve Bank of Australia sheds more light on the use of credit cards as it claims there is substantial growth in credit card payments as opposed to debit cards. It also claims that demographically, as age increases, so too does susceptibility to the use of credit cards or debit cards (RBA, 2014).

With the rise of debt finance consumption increasing, so too has the prevalence and stature of emergency lenders (payday lenders). Due to the paucity of industry data, it is difficult to get a complete understanding of the gross growth of the industry. Although, information on Cash Converters is readily available, and offers a relatively informative insight into the industry. Figure 28, although indicative, likely understates the true growth of the industry, as the definition for high-cost short term loans only encompasses loans up to \$2000.

The prevalence of debt also has further adverse effects on the future prosperity of the Australian economy. For example, the more a household spends on debt, the less the household saves. This, along with the sheer cost involved in servicing the debt will further increase the inequality, of which has further negative ripple effects throughout the economy (RBA, 2014).



Figure 28: Cash Converters High-Cost Short Term Lending (Gillam, 2010)

2.3 Backward and Forward Linkage effect of Wage Stagnation on Consumption

The primary means of tracing likely dispersion of wage-related consumption falls is through the use of backward and forward linkages. Input-Output (IO) tables are often used to identify relationships between sectors within an economy through the use of backward and forward linkages. This analysis was first used by Rasmussen (1956) and Hirschman (1958)³² and has since been widely used.³³ A backward linkage measures the economic activity between one sector and those other sectors supplying inputs either directly to the sector in question, or indirectly by supplying inputs to another supplier.

For example, an increase in output of exploration services will require additional inputs such as fuel and accommodation. A forward linkage measures the relative importance of the sector as supplier to the other sectors in the economy. Linkages are reported as an index value commencing at 0. A linkage greater than 1 is considered strong, a linkage greater than 0.5 and less than 1 is considered average, and a linkage less than 0.5 is considered small. The backward and forward linkages for the Australian economy are shown in Table 1.

There are two broad dimensions to "backward" effects. Backward linkage examines the intensity or strength of the relationship between a sector and its suppliers and backward spread examines the coverage of suppliers throughout the economy; for example how many of the other sectors form part of the supply chain. Forward relationships work in the same way but measure the strength and coverage of sales from a sector to other parts of the economy. Backward linkages are calculated using the formula:



Where, the numerator of the ratio P_j denotes the average increase in output of a sector induced by a unit increase of the final demand for products of sector j. And \mathbf{r}_{ij} is represents the supply of inputs from other sectors. Similarly, forward linkages are calculated using formula:



Where, r_{ij} relates to purchasing sectors.

³²See, Rasmussen P (1956) Studies in Intersectoral Relations, Amsterdam, North Holland and Hirshman A (1958) The Study of Economic Development", Yale University Press

³³Andersso-O'Callaghan, B and Yue (2003) , Op cit, p.7

Table 1- Backward and Forward Linkages (ABS: 5209.0)

INDUSTRY	BACKWARD LINKAGE	FORWARD LINKAGE
Agriculture Forestry and Fishing	1	2.7
Mining	1.4	3.7
Manufacturing	1.47	2.4
Electricity Gas, Water and Waste Services	0.9	1.5
Construction	2.5	2.9
Wholesale Trade	1.73	1.5
Retail Trade	1.92	1.98
Accommodation and Food Services	1.65	1.87
Transport, Storage and Warehousing	1.4	3.3
Information, Media and Telecommunications	1.13	2.1
Finance And Insurance Services	1.54	2.3
Rental, Hiring and Real Estate	2.2	1.9
Professional Scientific and Technical	1.84	2.4
Administration and Support Services	1.23	1.13
Public Administration and Safety	2.5	1.8
Education and Training	1.3	1.9
Health and Social Assistance	1.7	2.1
Arts and Recreation	1.13	0.8
Personal and Other Services	1.2	1.7

2.3.1 Analysis of the likely path of consumption shift

Table 1 allows consideration of likely diffusion paths of a drop in consumption in one or more initial or first hit sectors. For example, if the initial impacts are seen in Retail Trade, backward linkage coefficient and forward linkage (1.92, 1.97) the impacts are both high (linkages above 1) and spread relatively evenly between suppliers and customers. The combined flow-on impact would be distributed as shown in Table 2.

While Table 2 does not provide insight into the speed of diffusion, it does indicate that wage decline in retail consumption would be concentrated in Agriculture, Forestry and Fishing. Manufacturing, Wholesale Trade and Transport Storage and Warehousing, which together with the original shock in Retail Trade would account for 57% of the total impact. In contrast a decline in Real Estate activity would produce percentage flow-ons as they appear in Table 3.Outputs presented in this section are separately derived via a behavioural approach in the following sections, deriving results which are more rooted in the consumer perspective and presenting results differing from the standard economic approach of this section.

Table 2: Shifts in Retail Trade Consumption - Sector Flow

INDUSTRY	PERCENTAGE FLOW ON
Manufacturing	14.5%
Wholesale Trade	12.8%
Retail Trade	11.9%
Transport, Storage and Warehousing	10.3%
Agriculture Forestry and Fishing	7.5%
Electricity Gas, Water and Waste Services	6.8%
Public Administration and Safety	5.8%
Finance And Insurance Services	4.8%
Construction	3.4%
Accommodation and Food Services	3.1%
Professional Scientific and Technical	3.1%
Health and Social Assistance	2.6%
Arts and Recreation	2.5%
Information, Media and Telecommunications	2.4%
Personal and Other Services	2.3%
Rental, Hiring and Real Estate	1.9%
Administration and Support Services	1.6%
Education and Training	1.5%
Mining	1.2%
TOTAL	100%

Table 3- Consumption flow on from decline in real-estate activity

	PERCENTAGE FLOW ON
Construction	12.5%
Wholesale Trade	9.7%
Finance And Insurance Services	8.9%
Rental, Hiring and Real Estate	8.9%
Transport, Storage and Warehousing	7.5%
Electricity Gas, Water and Waste Services	7.4%
Manufacturing	6.9%
Retail Trade	6.5%
Accommodation and Food Services	5.6%
Public Administration and Safety	5.2%
Administration and Support Services	4.3%
Professional Scientific and Technical	4.1%
Agriculture Forestry and Fishing	2.8%
Arts and Recreation	1.9%
Information, Media and Telecommunications	1.8%
Mining	1.7%
Health and Social Assistance	1.6%
Personal and Other Services	1.4%
Education and Training	1.3%
TOTAL	100%

2.4 Behavioural-Psychological Dynamics in Australian Consumption Patterns and Wage Stagnation

2.4.1 Behavioural theory of hierarchies in consumption

Behavioural economics departures from standard microeconomic theory, which supposes people approach the question of how to allocate consumption by considering the whole range of possibilities and maximising utility over them. Rather, behavioural economics approaches the question by supposing individuals apply simple rules to their environment so as to satisfy needs and wants as they arise. One particularly strong idea within behavioural-psychological economics is that these rules establish hierarchies of consumption. Spending is successively allocated to consumption categories based on a list of priorities, not necessarily as a set principle but more as a general rule of thumb.

As income rises and the money allocated for consumption with it, there is progressively greater spending on new categories of consumption, not merely within existing categories; and vice



versa as the money allocated for consumption declines overall it is discovered that the categories of consumption decreasing in approximately reverse order.

This process was first theorised by Duncan Ironmonger who proposed that demand was driven by the desire to satiate needs which were organised into a hierarchy based on their priority.³⁴ Once one higher-priority need was satisfied, one might move to satiating the next. In his early empirical studies he found that this theory aligned well with consumption data. Later work developed this hierarchical view of consumption patterns making use of the microfoundations of psychological science, specifically Maslow's concept of the hierarchy of needs³⁵. Earl³⁶ and Drakopoulos³⁷ developed the notion of hierarchical choice in which individuals order their objectives by their priority, and then sequentially seek to meet each of those objectives in turn. One of the results demonstrated in Markey-Towler³⁸ formalises this theory and shows that if hierarchies of needs exist, then consumption will only be extended to new categories of goods which satisfy new wants or needs if all higher-priority needs are satisfied.

Andreas Chai³⁹, studying Engel curves at some length (the relation between income and consumption) across consumption categories has discovered significant evidence that such hierarchies exist. As close to an economic law as can be discovered is that consumption patterns begin to diverge significantly as income and thus overall consumption grow. As consumption grows and basic needs have been met, people begin to diverge from each other and consume more differentiated categories of products. This theory suggests that in order to predict which categories of consumption and corresponding sectors will begin to decline and in what order as wage stagnation curtails consumption growth, past patterns should be examined. If the order in which consumption categories began to grow significantly is discovered, this will indicate a priority-like ordering for consumption categories, and reversing the order leads to discovery of the order of categories of consumption and corresponding sectors which will likely decline.

2.4.2 Patterns in Australian consumption

As could be seen from Figure 22, there has been a prolonged period of increasing consumption. In principle, the theory of hierarchical consumption can be applied to understanding changing allocations of consumption expenditure within this trend and discover any potential relevant confounding factors. It is necessary to observe, in such instances, that while all consumption categories grow, but those which are "higher order" priorities are expected to grow less strongly than those consumption categories which are "lower order". In the absence of any confounding factors, a stable growth of spending on "necessities" should be observed and thus a steady decline in the proportion of overall consumption they occupy, and a strong growth of spending on "luxuries" should be observed, and a growth in the proportion of overall consumption they occupy.

Now assessing the average weekly expenditures for Australian households over the period 1984-2016, it is indeed observed that expenditure on all categories has grown in line with overall consumption. But it is apparent that they have grown at differential rates, and as a result a divergence of expenditure on particular categories is observed. There is now a greater "spread" of expenditures than in 1984 (see Figure 29), with some categories being allocated a great deal of consumption relative to others.

³⁹Chai, Andreas and Moneta, Alessio. 2014. "The Saturation of Engel Curves and its Implications for Structural Change Theory", Cambridge Journal of Economics 38(4), 895-923.

Chai, Andreas 2012, "Consumer specialization and the demand for novelty: A reconsideration of the links and implications for studying fashion cycles in tourism", Journal of Economics and Statistics, 232(6), 678-701 Chai, Andreas and Moneta, Alessio (2011), "Some Empirical Evidence on the Hierarchy of Wants", Journal of Evolutionary Economics, 22, 649-676 Chai, Andreas and Moneta, Alessio (2010), "Retrospectives: Engle Curves", Journal of Economic Perspectives 24(1), 225-240.

³⁴Ironmonger, Duncan S., (1972) *New Commodities and Consumer Behaviour,* Cambridge University Press, Cambridge

³⁵Maslow, Abraham, (1943) "A theory of human motivation". *Psychological Review*, 50(4), pp.370-396

³⁶Earl, Peter, (1986a) Lifestyle Economics, Harvester Wheatsheaf, Brighton

Earl, Peter, (1986b) "A Behavioural Analysis of Demand Elasticities", *Journal of Economic Studies*, 13(3), pp.20-37

³⁷Drakopoulos, Stavros, (1994) "Hierarchical choice in economics", Journal of Economic Surveys, 8(2), 133-153

³⁸Markey-Towler, Brendan (forthcoming) A*n Architecture of the Mind*, Routledge, London



Figure 29: Average weekly household expenditure by consumption category (nominal), 1984 to 2016 (ABS: 6530.0)

From Figure 29, it can be immediately seen that current housing costs have surged quite radically since 1998-1999, and approximately between 2003-2004 and 2009-2010 this consumption outgrew food and non-alcoholic drink expenditure to become the single largest consumption category. Similarly, medical care and health expenditures have

surged quite extensively, to overtake expenditures on food and clothing and furniture and household equipment. In order to observe the growth in consumption allocated to any given category relative to its level in 1984, the consumption data is indexed in Figure 30:



Figure 30: Average weekly household expenditure by consumption category (indexed to 1984) (ABS: 6530.0)

From Figure 30, it can be observed that there have indeed been strongly differential rates at which consumption has been allocated to different categories. In particular, there has been an especially strong growth in the expenditure allocated to education. There has also been substantial growth in expenditure allocated to communication, as might be expected as ICT has penetrated the economy to an ever-greater extent.

Nevertheless, expenditure growth in both of these categories in 1984 began from a relatively low base, which amplifies the extent to which they have grown. Most significantly, there has been notable growth in expenditure on current housing costs, medical care and health expenses. These categories began from substantial levels in 1984 and have surged since, which has caused these categories to overtake traditionally more significant categories in overall consumption.

There is a noticeable gap between their growth in expenditure and the categories of expenditures which have experienced the next highest levels of growth; the only other consumption categories that have significantly outpaced the growth of all categories of consumption, we can see, are household services and operations expenditure, miscellaneous expenditure and personal care categories. However, these categories have not outpaced the general increase in consumption expenditure by a great deal, indicating that though certain categories of expenditure have grown strongly and expenditures on "essentials" have not grown quite as fast as the overall increase of expenditure, a significant increase in expenditure on more discretionary categories, such as recreation, could be expected.

This indicates the possibility of a confounding factor present in the dynamics of consumption. This potential confounding factor, which is preventing Australian households from moving from the satiation of "lower", "high priority" needs to the satiation of "higher", "low priority" needs, could result from differential inflation rates across consumption categories, as can be seen in Figure 31. Figure 31 suggests that the strong growth in the price of housing and health has contributed markedly to the surge in expenditures on current housing costs and medical care and health expenditures and that this is confounding the dynamics expected in a period of sustained consumption growth. This is supported by examining the proportions in which consumption expenditure is allocated to the various categories, which provides a clearer picture of the underlying dynamics of consumption.



Figure 31: Consumer price index by consumption category (indexed to 1984) (ABS: 6401.0)

Figure 32 indicates that Australian households are behaving as hierarchical consumption theory would predict they would in a period of sustained consumption growth, and that the extent to which this does not hold is indicative of confounded by surging housing and health costs. There is a decrease in proportions of expenditure allocated to "necessities", "high priority" goods and services – the proportion of expenditure allocated to food and non-alcoholic beverages, clothing and footwear, transport (since 1998-1999), furniture and household equipment has declined fairly substantially.

However, where a coeval increase in the proportions of expenditure allocated to recreation and miscellaneous goods and services would be expected, as people become more able to satisfy heterogeneous, individual-specific "higherorder" tastes, this has not been seen. Rather, an increase in expenditure on other necessities, current housing costs and medical care and health expenditures, also to some extent communication (which can be argued to be a "necessity" category, to an extent) can be observed.

2.4.3 Implications of stagnating wages for hierarchical consumption

Under hierarchical consumption theory, the insights from Sections 2.3.2 above allow for prediction about which sectors may be differentially impacted by a slowdown or even reversal of overall consumption growth made necessary by ongoing wage stagnation. Hierarchical consumption theory indicates that households will arrange their expenditure in a hierarchical fashion, allocating expenditure to satisfying "high-priority" needs first to the greatest extent possible and allocating anything left over to "low-priority" needs. If consumption overall declines of necessity in the face of wage stagnation, the most likely outcome will be to observe households maintaining their expenditure on consumption categories which correlate with "high-priority" needs as much as is possible, while significantly decreasing their expenditure on those categories which correlate with "low-priority" needs.

Consumption figures from 1984-2016 indicate it will be feasible to reduce only very few categories of consumption expenditure which are not to be classified as "necessities". The only categories as of 2016 which can be said to comprise expenditure on "lowest priority" needs, on (relative) "luxuries" are recreation and miscellaneous expenditure. While Australian households are allocating most of their consumption expenditure to food and drink, transport, as well as surging housing and health costs, there is 12.5% and 7.5% to recreation and miscellaneous goods and services respectively.

If consumption must decrease in the face of wage stagnation, due to inability to maintain current consumption patterns, it is likely these sectors are expected to see the most significant reductions in expenditure, as well as more discretionary spending within other sectors (for example, transport related to recreational travel).



Figure 32: Average weekly household expenditure by consumption category (% total consumption) (ABS: 6530.0)

3 Areas of Exposure to Household Consumption

This section makes use of such data as exists to project which sectors of the economy are most exposed to a reduction of consumption in the face of wage stagnation, using the perspective of complex systems theory (Potts, 2001; Markey-Towler, 2017) to map the Australian economy as a network. This approach has the advantage of revealing the structure of economic interaction, such intersectional exposures, and to trace-out these exposures to household consumption in particular. Firstly, a network "deep structure" of the Australian economy is constructed using available data, in order to understand the place of household consumption within the broader context of the Australian economy. Then a metric of exposure is constructed to display the effect of any downturn

in household consumption, which may be necessitated by wage stagnation and the likely implications of this for Australian industries is discussed in Section 4.

The network "deep structure" of the Australian economy is formed via input-output tables, which track intersectional flows of goods and services by value. The most recent of these is the 2013-2014 input-output tables. In order to recover the deep structure of the Australian economy, all Input-Output product groups (IOPGs), roughly corresponding to industries, are aggregated to the 1-digit classification level (from the 4-digit level), and then any intersectional flows below \$10billion in value are eliminated. While a rough method, this nevertheless provides valuable insight into affected industries.



Figure 33: Deep Structure of the Australian Economy (2013-2014) from Input-Output Data (IOPG1, >\$10billion) (ABS: 5209.0)

In the network above, nodes represent industries (IOPGs) aggregated to the 1-Digit level of classification, or final expenditure categories. A connection between two nodes represents the flows of goods and services between those two industries weighted by the dollar value of those goods and services. The thicker and darker the connection, the greater is that flow of value. Immediately noticeable is the large position the Australian government occupies within the Australian economy, and the nature of that occupation. As of 2013-2014, Australian government consumption occupies a position in the Australian economy comparable to private fixed capital formation. Government consumption overwhelms public fixed capital formation substantially as a consumer of value in the Australian government. However, despite this, household consumption occupies an overwhelmingly dominant position over all other final expenditure categories within the deep structure of the Australian economy. It draws especially heavily on finance, residential property and information services especially, but also transport and hospitality; light manufacture; heavy manufacture and utilities (likely more the latter than former); construction; and health, and education and cultural services. Household consumption also draws, but to a lesser extent on sport and miscellaneous services, communications and creative industries, and even, surprisingly, on primary industries. Each of these industry groupings are, on the face of it, heavily exposed to any downturns in Australian household consumption necessitated by wage stagnation. Other industries are (by and large) exposed to downturns in Australian household consumption to a relatively secondary degree via their contribution to those industries which are immediately exposed.

It is clear that the Australian economy overall is highly vulnerable to a reduction in household consumption as might be necessitated by wage stagnation. It occupies an overwhelmingly dominant position in the structure of the Australian economy. Industries above appear to be especially exposed to downturns in household consumption necessitated by wage stagnation in the "deep structure" of the Australian economy. This might be misleading, however, for household consumption drawing heavily on some sectors is not the same as that sector being heavily exposed to household consumption relative to all other sectors of the economy. Industry sectors are more or less exposed to consumption relative to the proportion of the total value produced by that sector consumed by households.

The "degree" of the exposure of Australian industries to consumption is calculated and ranked using a rough, but insightful metric of this degree of exposure by taking IOPG groups aggregated to the 1-digit level and calculating the proportion of their outflows of value (i.e. sales) to household consumption out of all outflows (see Table 4). As of 2013-2014 this ranking is as follows, and it can be seen that the levels of exposure exist in a reasonably discrete relationship to one another, therefore there is reason to expect that this structure of exposure has been maintained to the present.

Table 4: Exposure to Household Consumption (2013-2014) from Input-Output Data (IOPG1, >\$10billion) (ABS: 5209.0)	

INPUT-OUTPUT PRODUCT GROUP (IOPG) – 1 DIGIT	IMMEDIATE EXPOSURE TO HOUSEHOLD CONSUMPTION
SPORT AND MISCELLANEOUS SERVICES	51.3%
TRANSPORT AND HOSPITALITY	45.5%
HEALTH, EDUCATION AND CULTURAL SERVICES	38.4%
FINANCE, RESIDENTIAL PROPERTY AND INFORMATION SERVICES	35.8%
LIGHT MANUFACTURE	27.4%
COMMUNICATIONS AND CREATIVE INDUSTRIES	19.5%
CONSTRUCTION	18.9%
HEAVY MANUFACTURE AND UTILITIES	16.7%
PRIMARY INDUSTRIES	3.7%
IT, ORGANISATION AND PUBLIC SERVICES	1.7%

Note: These considerations have all been of industries at the 1-Digit level of classification. A full list of 4-Digit industry classifications ranked by exposure to household consumption is provided in Appendix A and the aggregation schema in Appendix B.



4 Implications for Asset Management and Investment

4.1 Scenario 1 – Wages grow ending wage stagnation

Thus far the behavioural dynamics of Australian household consumption has been analysed assuming that wages will continue to stagnate, and overall consumption will necessarily have to decrease. However, even if it is allowed that wage stagnation might end, and wages begin to increase, it cannot be said that the prognosis for Australian consumption will improve greatly. For two reasons, it is unlikely to see an increased allocation of expenditure on "low priority" necessities, on recreation and miscellaneous goods and services as people become more able to satisfy heterogeneous, individual-specific "higher-order" tastes.

Firstly, it has been established that consumption dynamics in Australian household consumption are likely being confounded significantly by surging housing and health costs. The strength of these trends does not suggest that they will slow or even reverse soon to a sufficient degree that they will no longer confound any tendency to diversify consumption patterns. So even if wages were to not stagnate, it seems likely that any increase in consumption made possible would simply be "swallowed up" by, allocated to meeting, ever rising housing and health costs.

Secondly, it appears that the increases in consumption which have nonetheless corresponded with wage stagnation hitherto have been financed by the running down of savings and accumulation of debts (see Section 2.2). Even if wage growth was apparent and a drastic slowing in the growth of the cost of housing and health, it is unlikely it would correlate with increased consumption in an environment where substantial erosion of savings and run-up of debts has occurred for a long period. Low savings and high debts are unsustainable in the long run, thus it is far more likely to observe any gains to wages being allocated not to overall expenditure on consumption but to re-accumulating savings and paying down debt.

4.2 Scenario 2 - Wages Remain Stagnant

Aside from the significant secondary effects of stagnating consumption in response to wage stagnation, discussed above, the direct impact of wage stagnation is the fall in unit labour



Table 5. Input cost share by industry (Department of industry, innovation and Selence, Australian industry Report 2010)							
INDUSTRY	RENT	INTEREST	LABOUR	ТАХ	TRANSPORT	UTILITIES	
HEALTH CARE AND SOCIAL ASSISTANCE	2%	1%	92%	2%	2%	1%	
EDUCATION AND TRAINING	3%	1%	91%	1%	3%	1%	
FINANCIAL AND INSURANCE SERVICES	7%	0%	82%	7%	4%	1%	
PUBLIC ADMINISTRATION AND SAFETY	5%	1%	80%	2%	5%	7%	
OTHER SERVICES	7%	5%	76%	4%	6%	2%	
ADMINISTRATIVE AND SUPPORT SERVICES	13%	3%	72%	4%	6%	2%	
PROFESSIONAL, SCIENTIFIC AND TECHNICAL	9%	9%	70%	3%	6%	3%	
RETAIL TRADE	16%	2%	69%	4%	5%	5%	
ARTS AND RECREATION SERVICES	14%	4%	68%	1%	9%	4%	
CONSTRUCTION	9%	8%	62%	3%	16%	3%	
ACCOMODATION AND FOOD SERVICES	16%	6%	60%	4%	6%	7%	
WHOLESALE TRADE	17%	4%	58%	3%	16%	2%	
INFORMATION MEDIA AND TELECOMMS	14%	14%	56%	2%	9%	7%	
TRANSPORT, POSTAL AND WAREHOUSING	11%	10%	50%	4%	23%	3%	
MINING	14%	13%	47%	4%	12%	11%	
MANUFACTURING	5%	6%	43%	2%	31%	14%	
RENTAL, HIRING AND REAL ESTATE	31%	18%	34%	8%	2%	8%	
AGRICULTURE, FORESTRY AND FISHING	13%	30%	32%	3%	15%	7%	
ELECTRICITY, GAS, WATER AND WASTE	1%	14%	21%	14%	3%	47%	

Table 5: Input cost share by industry (Department of Industry, Innovation and Science, Australian Industry Report 2016)

input costs for Australian industries, as discussed in Section 1. The industries most benefitting from falling unit labour costs are those with highest input cost share by industry, see Table 5 above:

These beneficial effects would be offset by falling/stagnating consumption if wage stagnation necessitates this, due to the inability of households to maintain current expenditure. Table 2 has indicated that sport and miscellaneous services are the most heavily exposed to downturns in household consumption necessitated by wage stagnation.

Despite their connections to household consumption being relatively weak in the overall structure of the economy, over 50% of value outflows from these industries accrue to household consumption. It can be seen that transport and hospitality industries are the next industries most exposed to downturns in Australian household consumption, with almost half of their value created being consumed by households. These industries would be expected to likely experience the greatest immediate downturn in the event of any general decline of consumption necessitated by wage stagnation.

Health, education and cultural services are also heavily exposed to household consumption. It can be seen from the deep structure of the Australian economy, however, that they are strongly connected to Australian governments' consumption, even more so than they are to household consumption. This somewhat mitigates their liability to household consumption – Australian governments are not known for their tendency to decrease consumption.

Further, it can be observed that finance, residential property and information services, as well as light manufacturing are relatively exposed to household consumption, with around a third of their value created accruing to consumption (of course, residential property will be more exposed than the other industries within this grouping if disaggregated). Therefore, it can be expected that these sectors would experience a fairly significant immediate downturn in the event that wage stagnation necessitates decreases in overall consumption.

The sectors of: communications and creative industries; construction; heavy manufacture and utilities; primary industries; and IT, organisation and public services are relatively less exposed to a downturn of consumption with less than a fifth to little more than a hundredth of their value created respectively accruing to household consumption.

These final two industry groupings are particularly inoculated against downturns in household consumption. Observing the deep structure of the Australian economy reveals that not only are IT, organisation and public services hardly not greatly exposed to household consumption, but government consumption draws heavily on it, more so than any other industry grouping. Again, as Australian governments are not known for their tendency to reduce consumption, it can be expected that IT, organisation and public services will be relatively inoculated against any downturns in household consumption.

Further, primary industries are also inoculated against any downturns in household consumption, for a relatively well-known reason: the production of goods for immediate export, therefore bypassing almost any exposure to the overall structure of the Australian economy. This provides somewhat of a "counterweight" to household consumption in the Australian economy, drawing value from a range of other sectors, and the export-orientated primary sector is exposed "downstream" far more to global economic conditions than Australian economic conditions.

Whilst less exposed industries such as, construction and communication and creative industries, may not be immediately heavily exposed, it does not mean that these sectors are not exposed to a downturn in consumption necessitated by wage stagnation, nor that they would be inoculated against any major downturn in activity. They are integrated within the densely interconnected network that is the Australian economy. Their relative distance from immediate exposure means that they are somewhat better integrated with other sectors and thus distanced from the immediate effects of any downturn in consumption, and might, if those other sectors to which they are connected can maintain growth, maintain some degree of strength.

The low inflation/low interest regime also favours investment in financial assets over real assets. As a result, business investment is skewed towards financial transactions and profit margins in the real economy are squeezed. Labour costs assume added importance in such a regime and downward pressure is exerted upon wage growth. On the supply side this is aided and abetted by inward migration and unemployment, the threat of manufacturing jobs being taken off shore and a decline in union coverage.



5 Summary and Conclusions

This report establishes that Australian households are currently suffering a prolonged period of wage stagnation, although, the various causes, and consequences is something that has been widely unexamined. While wage stagnation is not a new phenomenon in Australia, and there are various similar economies experiencing similar phenomena, the current bout is unique in both its longevity and cause.

The various explanatory factors include a decoupling of wages and productivity, mismatch of skills and a degradation of employee bargaining power. In addition to this, empirical models suggest factors may also include spare capacityin the labour market, decline in inflation expectations, lower terms of trade and an appreciated real exchange rate. Further, Australia's changing demographic, namely, the aging population is a significant factor in slowing wage growth.

While wages have been stagnant, consumer expenditure has held steady. Economic theory on the Marginal Propensity to Consume theorises that a cause for this could be rising inequality, leading to a higher propensity to consume for lower income groups. This can further be explained by the Permanent Income approach, under which even prolonged periods of low wage growth are assumed to be temporary, and households spend at a consistent rate, based upon their expected long-run wage. In the interim, to finance this shortfall in household liquidity, consumers have two options: to reduce savings and/or use debt to finance consumption. There is evidence this has been occurring, with rising levels of household debt. The report then considers consumption hierarchies and discusses how in the face of limited ability to satisfy wants, Australian households would prioritise consumption 'necessities' and using complex network theory ranks the vulnerability of industries to reductions in household consumption.

Drawing from the theory, two scenarios are presented of wage stagnation in order to ascertain the implications for asset management and investment: wage growth and continued wage stagnation. In the former, it is postulated that the majority of the gains will be allocated to financing the debt obligations, increasing savings, and maintaining their Permanent Income level of consumption (as was seen during wage stagnation).

With regards to the latter, industries with the highest labour input costs have and will be the most direct beneficiaries of wage stagnation, however if consumption falls due to the inability to maintain current expenditure, these gains will be tempered or reversed. The sectors which would likely be most affected by this secondary impact have been identified and investors should consider their portfolios against both the direct and indirect forces arising from wage stagnation.



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