Endeavour Equity Strategy

January 2019 Report

CONTENTS

We are downgrading our outlook for residential property slump in 2019 with peak to trough falls of 25-30% - the worst since 1890. We expect -10% to -15% in 2019 in addition to falls of of -15% in 2018. This means vintages from 2014 will experience significant losses while vintages from 2015, 2016 and 2017 will experience negative equity.

The key driver of the property price downgrade is the recent revelation that the ASX banks did not input actual expenses in serviceability calculators. Instead they applied their own downwardly biased HEM expenses of $32k at all income levels as the default.

Reliance on the HEM, compounded by a failure to amortize Interest Only Loans over the non IO period has led to the property price setter loan to double in comparison to normal levels. Normalization to prudent and Prime DSTI levels is expected to caused a major credit crunch through 2019.

Update: Credit Crunch to roll on in 2019 as HEM/ Non-Prime bubble busts

1. Downgrading our outlook for residential property in 2019; expecting peak to trough falls of 25-30% - the worst since 1890.

i) We are downgrading our outlook for residential property in 2019 with peak to trough falls of 25-30% - the worst since 1890. We expect -10 to -15% % in 2019 in addition to falls of -15% in 2018.This means 2014 vintages will see significant losses while many from 2015, 2016 and 2017 will experience negative equity.

ii) Key insights from **Endeavour's 2018 Report "Credit Crunch 2018 as HEM/ Non-Prime Bubble Busts"** of June 2018 are driving credit and property prices into a major slump. The key revelation that emerged late 2018; all (or almost all) mortgages were based on the HEM as a default from 2012 to 2016, and this has driven a Non-Prime bubble in terms of DSTI ratios.

iii) The key driver of our current property price downgrade is the late 2018 revelation (ASIC vs Westpac) that Westpac and likely other ASX banks did not collect, or certainly did not input, actual borrower expenses into loan serviceability calculators. Instead they applied their own downwardly biased HEM expenses of $32k at all income levels as the default or policy driven input. This upwardly biased Debt Service to Income ratios by 10-15%+. We note ASIC has alleged that this has made all such loans irresponsible lending (all 260,000 mortgages written to 2016 in Westpac's case).

iv) We expect a continuation of the 2018 Credit Crunch well into 2019 as the HEM/ non-prime bubble busts due to the combined impact of i) real expenses shifting sharply towards a ABS HES Survey reality and ii) amortization of Interest Only loans. Together these impacts are expected to hit loan borrow sizes for aggressively geared borrowers by 46%+, savaging borrowing capacity for the marginal price setter of housing in the boom to 2016 – the highly IO borrower using HEM expenses. The last phrase of this doesn't make sense in the sentence

2. The size of the Credit Crunch will be directly proportional to the unreasonable of the HEM – very large!

i) The Size of the Credit Crunch is directly proportional to the unreasonableness of the HEM expenses benchmark. Since HEM expense estimates are unreasonably low, the credit crunch will be significant and ongoing as it is increasingly replaced with reasonable expenses that are consistent with Responsible Lending Laws.

ii) The Median Borrower on a HH income of $144k HEM understated expenses by $48k p.a. leading to loan sizes 30%+ or $380k larger than if HES based survey expenses were used. For the median debt which is owned by households on $180k+, the understatement of expenses is considerably larger – up to a total of $80k. This led to loan sizes $640k larger than if HES expenses had been used.

iii) Failure to amortize Interest Only Loans over the non IO periods in serviceability calculators has also inflated loan sizes 20-30%+

3. Challenging environment for Banks as Credit Slump hits volumes and Arrears rise

In 2019 we expect a further sharp curtailment of loan volume growth as well as increases in arrears due to the HEM/ non-prime credit crunch in. We expect further interest only resets to hit over 2019 and the sharp normalization of credit to hit refinance capacity exposing overleverage in the system

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1. Downgrading outlook for residential property slump in 2019 with peak to trough falls of 25-30% - the worst since 1890. Credit crunch further to run due to HEM/Non-Prime bubble bust

i) Endeavour is downgrading our 2019 residential property outlook to a further slump of 10%, with peak to trough falls of 25-30% now as a base case- the worst since 1890. We expect -10 to -15% in 2019 on top of -15% falls in 2018. This means mortgage vintages from 2014 will experience significant losses with many in 2015, 2016 and 2017 in negative equity.
ii) We see 2019 as a continuation of the 2018 Credit Crunch as the HEM/ non-prime bubble busts due to the combined impact of i) real expenses shifting significantly towards a ABS HES Survey & ii) amortization of Interest Only loans. Together these impacts are expected to hit loan borrow sizes for aggressively geared borrowers by 46%+, savaging borrowing capacity for the marginal price of housing in the boom to 2016 – highly geared to IO borrowers using HEM expense.

Building on key insights from **Endeavour's 2018 Report "Credit Crunch 2018 as HEM/ Non-Prime Bubble Busts"** we draw attention to the factt that most of the points we made in that 30 page report have been substantiated. In our view the situation is worse than we dared highlight at the time, when we forecasted 15-20% drops in property prices. In late 2018 a key new revelation emerged; it appears all (or 80-90% at a minimum) mortgage loans were written with the downwardly biased HEM index as the default for expenses in the 4-5 years to 2016 (ASIC vs Westpac in the Federal Court).

1) Our base case is an ongoing property slump in 2019 with peak to trough falls of 25-30% - the worst since 1890. Grassroots research indicates that bidding is currently 20-30% below 2016 peaks, while 2014 prices are failing to be achieved and the real auction clearance rate is only 20-40%, after non-reports and withdrawals are included.
2) We expect a fall of **-10% to -15% in 2019 on top of -15% in 2018** – which will mean vintages from 2014 will experience significant losses with many in 2015, 2016 and 2017 vintages experiencing negative equity. While the average size of falls is as large as the US Sub-Prime bust of 2007-11, and we believe there exists twice the proportion of Non=Prime than the US (DSTI loans > 40% are 40% of total Australian mortgages), the relative positive is the more stable structure of Australia's 4 pillars banking structure.
3) **Arrears & Default risk** is much higher this property slump due to very widespread prevalence of high DSTI ratios in Non-Prime territory (i.e. DSTI of 40-55%+). With around 40%+ of the mortgage pool now Non-Prime based, on DSTI measures the risk is, in a downturn international studies (from the UK & Ireland) suggest these loans will we experience a default/arrears rates 3-5 times higher than that of previous cycles.
4) **50-60% of flow of mortgage loans in 2015-16 were Non-Prime** in nature with a DSTI ratio of greater than 40-55%+. This was a direct result of almost all mortgages written at them time relying on the Bank HEM index for expenses (ref. "Endeavour Report: Credit Crunch as Non-Prime Bubble Busts," based on the 420 loans released by the Hayne Royal Commission).
5) **Banks have used HEM expenses as the input into serviceability calculation instead of actual verified expenses up until 2018.**

In support of this we highlight:
i) **ASIC vs Westpac evidence which illustrates that in 2012- 2016 all mortgage loans** written used the Bank HEM index, irrespective of whether disclosed expenses were higher or lower. This has led ASIC to allege that all Westpac mortgage loans written over the period were in of breach of responsible lending laws. These laws require verification of a borrower's financial situation. The issue is we don't believe an informed analysis of HEM would conclude HEM use meets that standard. In addition we note APRA guidelines highlight benchmarks may be used as a guide but should not be solely relied on.
ii) **Westpac 420 Loan Sample data released by the Hayne Royal Commission highlighted that 87%+ of loans used the HEM as input in 2016 (100% of Mortgage Choice loans).**
iii) **HEM marketing material which highlights** that use of the HEM will ensure that "legislative and responsible lending requirements are met."
iv) Endeavour's grassroots research suggests mortgage broking businesses were not required to report expenses information on borrowers until early 2018 (i.e. data collection from mortgage brokers was limited to income, household size and balance sheet/ assets). This was a surprise – Endeavour was of the view that expenses collection lacked rigor and thoroughness until recently, however it appears that it simply wasn't requested or collected until 2018. This highlights that banks have relied solely on the HEM for expenses. This poses the question – "Where does the disclosed expenses data provided as evidence in ASIC vs Westpac originate from since the Banks appear from our enquiry to have only required (and provided input fields for) collection of actual borrower expense data from 2018?"

We expect a 25-30% fall in House Prices as Credit gets Crunched 25-45%+ of loan size due to use of actual, not HEM, expenses & Amortisation of Interest Only loans

The key implication of the Credit Crunch is likely to be larger than anticipated since:

i) **HEM is very artificially low** and has been used on a systematic basis as a policy decision of the bank. Since the median loan of $180k on average has expenses of $90k, not $32k, the average drop in DSTI of $58k would be expected to lead to a $420k smaller loan for the median borrower.

ii) **The practice of treating Interest Only (IO) loans as if they were IO** for the whole term (instead of P+I) has been widespread. Failure to amortize IO loans appears to have been default bank policy (ie preset or mortgage serviceability calculators) in when calculating borrower serviceability (ASIC vs Westpac).

Loan size of the most leveraged borrower (i.e. the marginal price setter) has dropped 46%.

The crux is that the marginal price setter of Australian housing over the past 5-7 years has been the Non-Prime HEM expense driven Interest Only borrower, on around $180k of income. Endeavour's view is that the borrowing capacity of this marginal price setter has dropped 46% in the past 24 months. This credit crunch is the result of two major serviceability calculation drivers:

i) **The use of real not HEM expenses in serviceability** calculations,

ii) **Treating IO as IO only in the initial IO periods**, and amortizing thereafter. It appears bank mortgage serviceability calculators previously didn't include principle payment when calculating loan serviceability.

Endeavour's calculations highlight both these changes crunch credit affordability by around 20-25%. The average loan size drops 46%: from $1.155m to $620k.

As the table below highlights for a borrower on $180k (income for median mortgage debt):

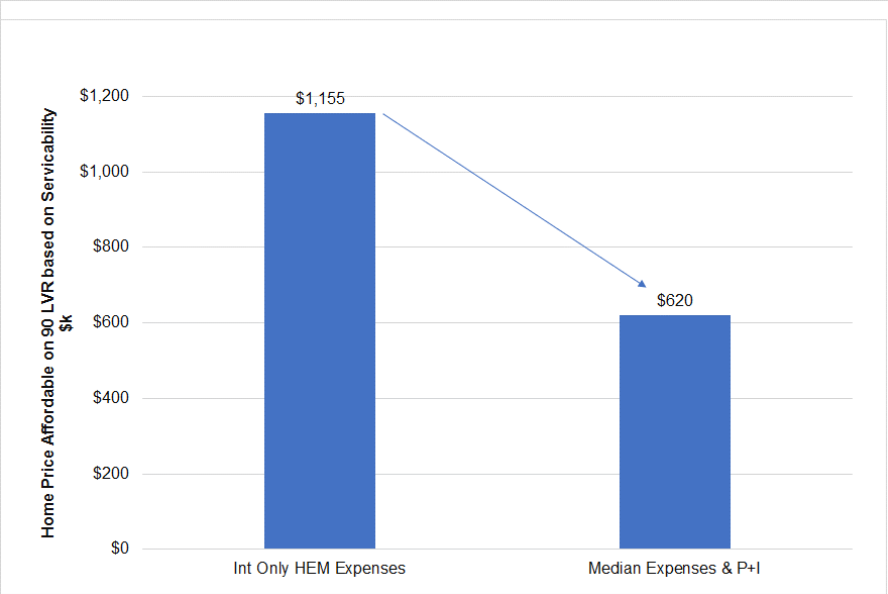
i) **2016 loan size was $1.155m**: using HEM expenses/ DSTI ratio 50% and IO over full term of loan

ii) **2019 loan size is $620k**: using Real expenses/ DSTI 40% and IO over IO period then amortizing

Chart 1: Reduction in Loan size for median debt borrower on $180k for household: use of Real not HEM expenses and Amortizing Interest Only loans cuts Loan size of geared 90% LVR borrowers by 46%. Loan size drops from $1,155k to $620k

		INTEREST ONLY -NON AMORT	AMORTIZING	
HEM EXPENSES	DSTI 50%	$1,155	$838	
REAL EXPENSES	DSTI 40%	$913	$620	
			-26%	-46%

Figures in '000s $A



In addition, a real ongoing risk is that if ASIC's allegations are right, 100% of Westpac's loans over the period were irresponsible (i.e. predatory) and are at risk of large fines or questions on enforceability of debt. Westpac have admitted problems with only 10k of the 260k loans.

A key revelation has been that overuse of an unrealistically low Expenses benchmark (the HEM) in mortgage service calculations has led to very extensive non-prime lending in the past 7-8 years. Expenses ratios used in serviceability calculations are rising sharply. This is occurring as realistic expense ratios of 30-40% of gross income replace the HEM benchmark, which was on average as low as 12-15% (APRA surverys).The difference of 15-25% is how much

DSTI ratios or serviceability will drop from an average of 50-55% (non-prime DSTI range) to around 35-45% (prime DSTI range).

A crunch in loan sizes from a minimum of 25% and up to 50% means price falls of 25%+ should be considered base case – with negative equity from 2014+ vintages

Endeavour is downgrading our outlook for the residential property slump in 2019 by 10% with peak to trough falls of 25-30% now as a base case- the worst since 1890. We expect -10% in 2019 on top of -15% in 2018 – which will mean vintages from 2014 will experience significant losses with many in 2015, 2016 and 2017 in negative equity.

Our estimates of Finance Approvals suggest a further 15% drop, back to the 10 year range that existed in 2012 before the HEM/ Interest Only Bubble. A total fall of a further 20% matches Endeavour's DDM Australian House prices fundamental model – which again highlights that the bubble that started in 2012 is likely to unwind.

Chart 2: Sydney House Prices – Endeavour expects 25-30% reductions in House Prices which means vintages from 2014 will experience significant losses with many in 2015, 2016 and 2017 in negative equity

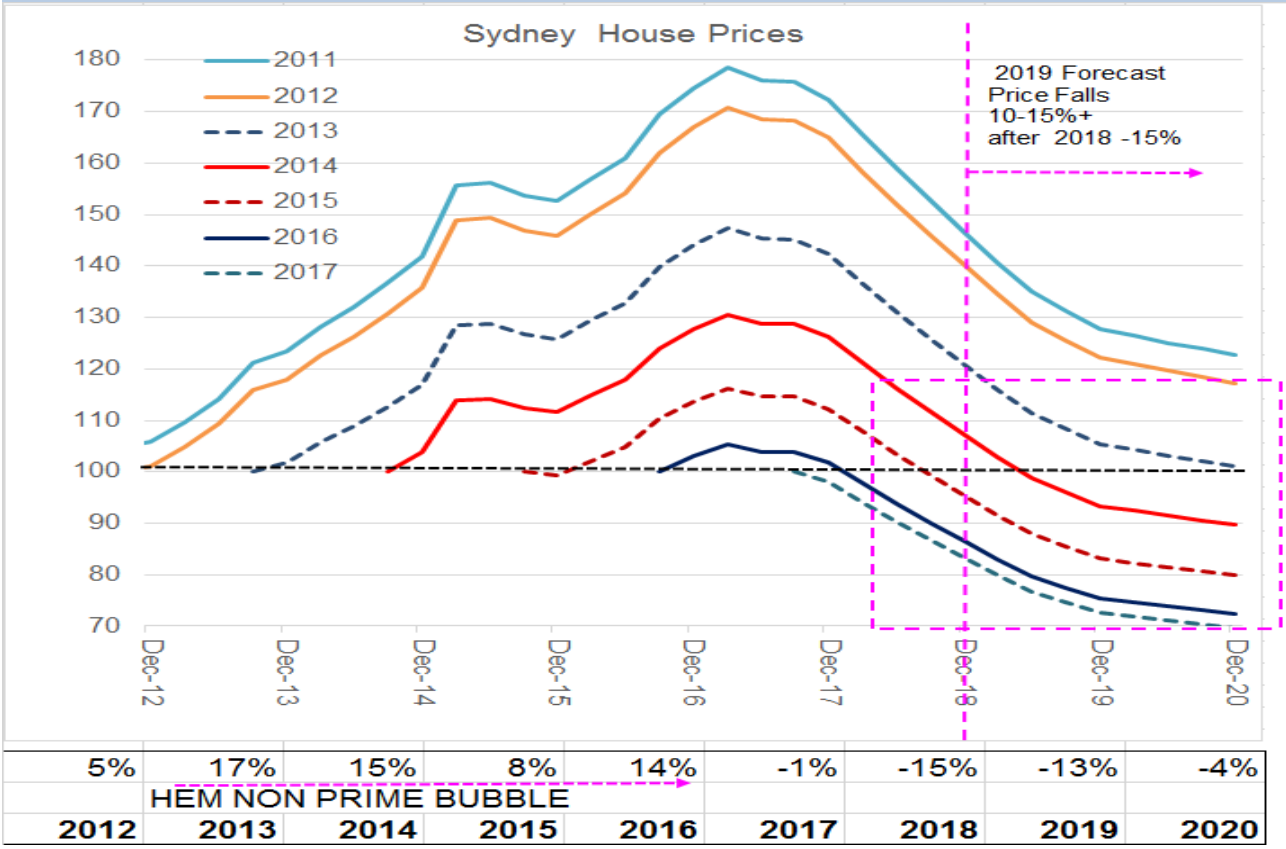


Chart 3: House Prices remain 30% Expensive

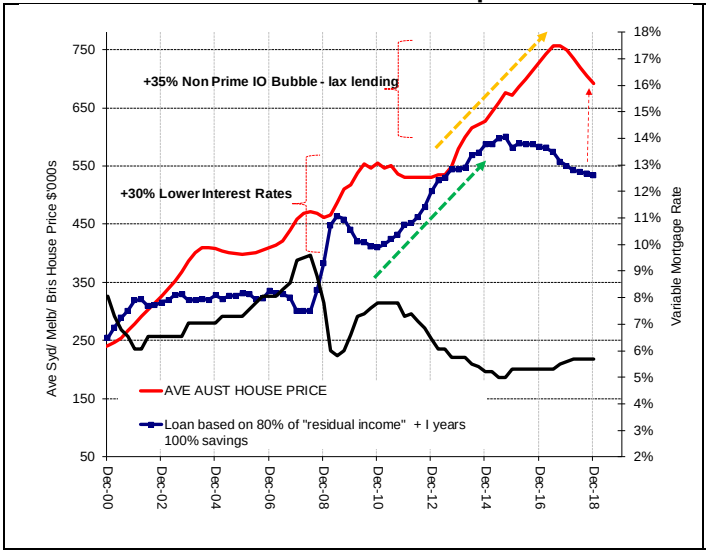
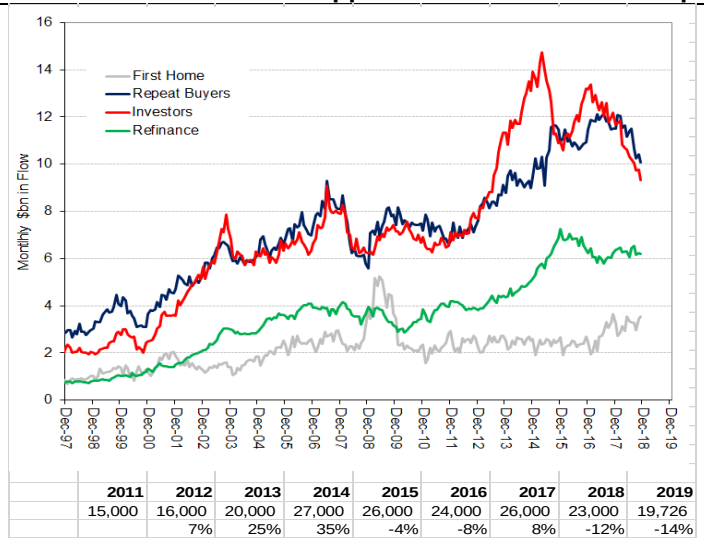


Chart 4: Finance Approvals 15% further to drop



2011	2012	2013	2014	2015	2016	2017	2018	2019
15,000	16,000	20,000	27,000	26,000	24,000	26,000	23,000	19,776
	7%	25%	35%	-4%	-8%	8%	-12%	-14%

Chart 5 Finance Approvals 15% further to drop

	PEAK MONTHLY		IO SPLIT	Credit Crunch	2018	2019	
Investors	14,000	70%	9,800	56%		5,488	
	Dec-14	30%	4,200	75%		3,150	
			14,000		9,300	8,638	-38%
Owner Occ	12,000	40%	4,800	56%		2,688	
	Dec-16	60%	7,200	75%		5,400	
			12,000		10,000	8,088	-33%
1ST HOME	2,000		2,000		3,000	3,000	
			28,000		22,300	19,726	-30%

Chart 6: 50-60% WBC lending Non- Prime: 2016

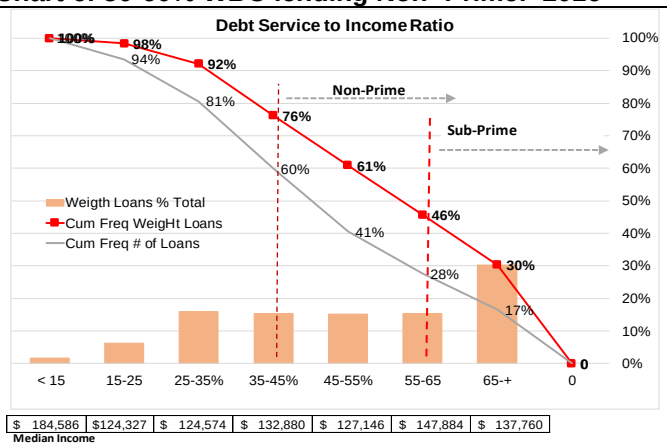
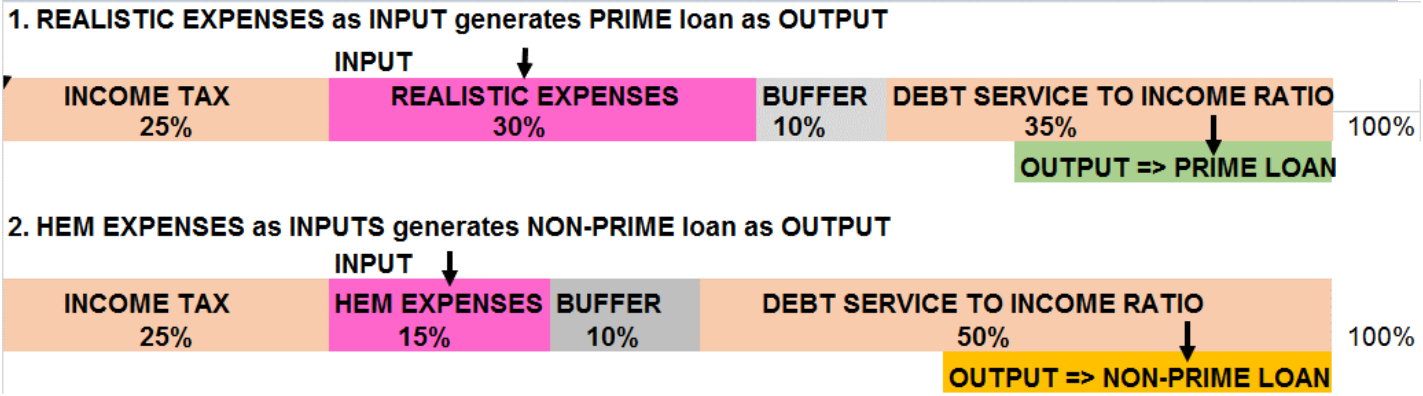


Chart 7: unreasonably low HEM expenses (2) generate unreasonably high DSTI ratio Loans of around 40% larger than realistic expenses in (1). High DSTI ratio loans are Non-Prime on standard definitions in the range of 40-55%



The Credit Crunch is directly proportional to:

• **Unreasonableness of the Bank HEM Expense benchmark**	**Large Positive impact:** Our research shows the Bank HEM expense benchmark understates the median borrower's expenses by $50-$80k and hence inflates DSTI ratios and median loans by approx. 15-25%.
• **Extent of Interest Only loans treated as IO vs P+I** over full term of loan, not just IO period, when calculating affordability	Large Positive impact: The recent Federal Court case of ASIC vs Westpac
• **Curtailment of the use of the HEM post Royal Commission**	Large Positive impact: we expect the use of the HEM to be greatly reduced after the Royal Commission's findings are handed down. As shown below the HEM is much more unreasonable than commonly understood, and has led to significantly high portions of Non-Prime loans, 25% higher than prime lending would have allowed. We note significant adjustments/ increases to HEM have been made over recent years, such as income adjusting the 50th & 25th percentile inputs. However the largest understatement of Transport remains unreasonably low as does Child Care for example.

2. The size of the Credit Crunch will be directly proportional to the unreasonable of the HEM – very large!

i) The Size of the Credit Crunch is directly proportional to the unreasonableness if the HEM Expenses benchmark. Since HEM expense estimates are unreasonably low the credit crunch will be significant and ongoing as it is increasingly replaced with reasonable expenses.
ii) For the Median Borrower on HH income of $144k HEM expenses understated expenses by $48k pa leading to loan sizes 30%+ or $380k larger than if HES based survey expenses were used. For the median debt which is owned by households on $180k+, the understatement of expenses is considerably larger – up to a total of $80k leading to loan sizes $640k larger than if HES expenses had been used.
iii) Failure to Amortize Interest Only Loans over the non-IO periods in serviceability calculators has also inflated loan sizes by 20-30%+.

The size of the Credit Crunch will be directly proportional to the unreasonableness of the HEM

This will continue to drive credit tightening in Australia – most likely evolving into a credit crunch. The extent of the credit crunch is a direct factor of the unreasonableness of the HEM expenses. Endeavour's research has highlighted that the HEM is greatly downwardly biased, which means normalization of expenses to real will very significantly cut DSTI ratios. This will result in a major ongoing credit crunch in 2019

For Median Borrower on HH income of $144k HEM expenses understated expenses by $48k pa leading to loan sizes 30%+ or $380k larger than if more realistic (HES based) survey expenses were used.

For the median debt which is owned by households on $180k+, the understatement of expenses is considerably larger – up to a total of $80k leading to loan sizes $640k larger than if HES expenses had been used. Understate expenses materially and you write loans that are much deeper in non-prime territory than they would have been otherwise (Charts 6 & 7). For example, while more recent modifications to the HEM have reduced the downward bias to some degree (e.g. income adjustment), our analysis shows continued use of the budget measures approach continues to lead to large understatement of expenses.

The tables below highlight differences in expenses between 2016 based HEM and realistic ABS HES expenses. As a significant part of this crunch has already occurred (as income adjusted HEM has been introduced for example),this table effectively shows the impact for peak HEM to real expenses crunch. This anticipates focus on actual, not HEM, expenses as required by the Responsible Lending laws as interpreted by ASIC.

Chart 8: Bank HEM expenses 2012-16 of $32k vs Median Mortgage Borrower Expenses (ABS HES survey). HEM understates Transport, Food and Recreation by $9-11k each. For example it suggests family of 4+ on $180k could survive on $120pw for all transport, $150pw for food and nothing for Childcare**.**

	30th	75th	90th	75th	90th
Income	**49,608**	**144,922**	**217,048**		
	HEM Expenses	**ABS HES SURVEY 75th**	**ABS HES SURVEY 90th**	**Difference: HEM Expenses vs**	**Difference: HEM Expenses vs Median Debt's**
Transport	6,200	15,078	21,373	-8,878	-15,173
Food and non-alcoholic beverages	7,100	16,372	20,344	-9,272	-13,244
Recreation	4,130	12,161	17,793	-8,031	-13,663
Miscellaneous goods and services	2,230	7,180	11,078	-4,950	-8,848
Education	726	5,363	7,482	-4,637	-6,755
Medical care and health expenses	2,400	4,008	5,755	-1,608	-3,355
Clothing and footwear	985	3,551	5,636	-2,566	-4,651
Household furnishings and equipme	1,671	3,292	4,591	-1,621	-2,920
Household services and operation	1,133	3,221	4,564	-2,088	-3,431
Communication	1,595	3,055	3,584	-1,460	-1,989
Personal care	761	2,137	3,255	-1,376	-2,494
Alcoholic beverages	855	2,467	2,878	-1,613	-2,023
Domestic fuel and power	1,650	2,165	2,727	-515	-1,077
Tobacco products	564	729	670	-164	-106
Ex Housing Costs Expenses	**32,000**	80,551	111,673	**-48,779**	**-79,729**
		75th	**90th**	**HEM- 75th**	**HEM- 90th**

Source ABS HES Data and Endeavour Estimates of $32k HEM breakdown. NB Endeavour does not subscribe to HEM because subscription agreements prohibit any republication or criticism of HEM or Risk Managers Round Table (ie the Banks). $32k total was the HEM expenses figure before income adjusted HEM was made around 2015/6.

Chart 9: Bank HEM expenses 2012-16 of $32k vs Median Mortgage Borrower Expenses (ABS HES survey). Difference between HEM expenses and ABS expenses at $48k, due to HEM understating Transport, Food and Recreation by $8-10k each.

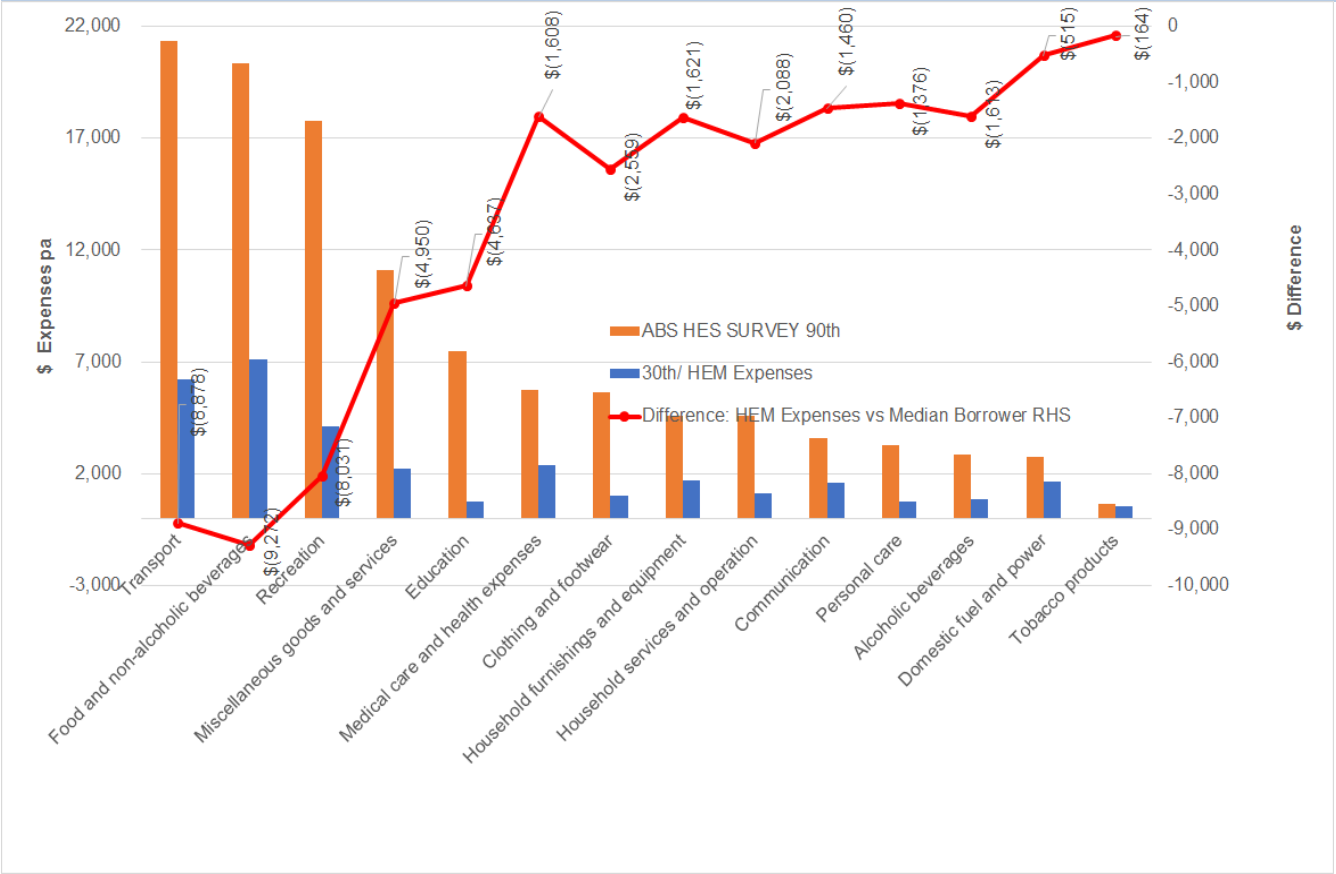
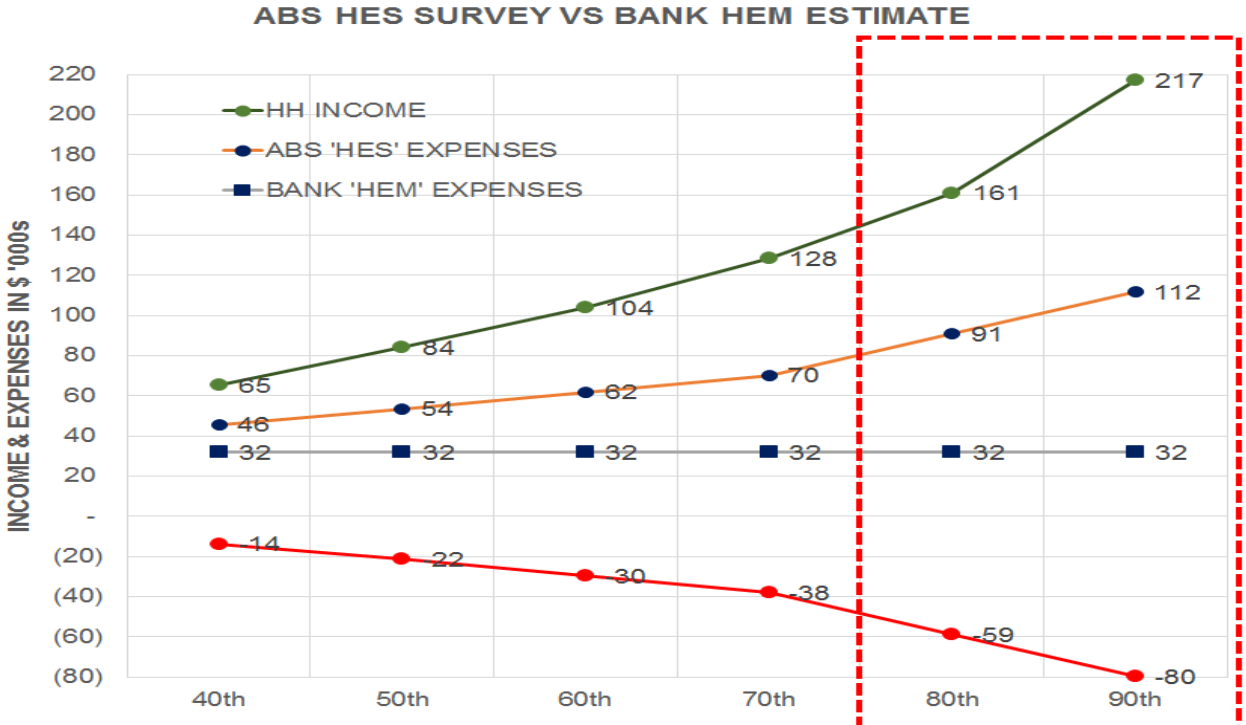


Chart 10: The extent of underestimation of HEM vs Average ABS Survey expenses is displayed in the Chart below. As this credibility gap closes a Credit Crunch will ensue. 50-70%+ of mortgage debt is written to top 75th percentile, additionally where HEM understates expenses by $40-70k+, leading to loan sizes $300-$600k higher than Real expenses as indicated by ABS HES survey. The normalization of this process will lead to the continuation of a large credit slump in 2019



					MEDIAN INCOME	MEDIAN DEBT
% OF MORTGAGE DEBT TO 90th						55%
% OF MORTGAGE DEBT TO 80th					71%	
% OF MORTGAGE DEBT TO 70th				87%		
% OF MORTAGE DEBT TO 60th			93%			
INCOME DEC	**40th**	**50th**	**60th**	**70th**	**80th**	**90th**
INCOME	**65**	**84**	**104**	**128**	**161**	**217**
EXPENSES	46	54	62	70	91	112
HEM 2016	32	32	32	32	32	32
POTENTIAL UNDERSTIMATE of EXPENS			30	38	59	80
BOOST TO LOAN SIZE ON 8X: $K			**240**	**304**	**472**	**640**

Source of Income & Expenses data: ABS Household Expenditure Survey

HEM Definition is frequently misunderstood and misquoted making it look more reasonable than it is in reality

Indeed, the very name**, Household Expenditure *Measure* is** misleading in our view. HEM is a bank commissioned *estimate (not measure)* which is frequently portrayed as a rigorous statistical measure – however it remains a very downwards biased estimate. We note that every time we have seen the HEM defined, step iii) the "Budget Standards Approach" is omitted from the definition. This omission has the impact of very materially understating the downward bias of the HEM and hence additionally understating the impact for the credit crunch when HEM expenses are normalized towards real expenses.

The HEM is estimated using the following 3 step process:

i) 50th percentile for Basic Expenditure (e.g. Food), plus
ii) 25th percentile for Discretionary Expenditures (e.g. Recreation, Childcare & Domestic Holiday)
iii) Application of the "Budget Standards Approach". The HEM relies on a Budget Standards Approach for items that are only brought once a year or less often, such as a fridge/ washing machine and transport costs and for items that in small amounts may be considered necessities but in large amounts would need to be categorized as luxury expenditure.

HEM has massively understated real expenses. For the first 5 years of operation the HEM understated median borrower expenses by approximately $48k p.a. on our analysis (i.e. $32k not $90k for $180k income) since:

i) **Until 2017 the HEM was not income adjusted** which means that while 80% of the borrow owing was done by households on the 80th percentile income or more – they were assumed to have expenses based on the 50th percentile household from the HES,
ii) **Transport Costs (a Basic Expenditure item)** is treated under the "Budget Standards Approach". This means a median borrower with approx. $15-20k p.a. in transport expenses (sourced from HES) is allowed only $6.5k for transport costs under the HEM, since the HEMs design allows for only one small/budget car. Inherent to this assumption is that even a dual-income earning household could continue commuting to work with only one budget car.

For Discretionary Basics which HEM estimates at 25th percentile the key issues are as follows:

iii) **Childcare**: assuming this at the 25th percentile the key issues are – in 30% of households the housewife/ househusband would perform the childcare. But how many working couples who both work and earn income could get to work without childcare?
iv) **Domestic Holidays at the 25th Percentile** – this implies no holidays or a camping trip only.

In summary we see that HEM is a very downwardly biased estimate of expenses and its default/ industrial scale usage, combined with failure to amortize interest only loans (out of IO period) in serviceability calculations, has led to very extensive Non-Prime lending based on DSTI ratios. While income adjustment of HEM in recent years has reduced the downwards bias we see the continued use of the Budget Standards Approach (particularly for Transport Costs) as a key risk. This standard is a fantasy number which is not based in the economic reality that we believe the responsible lending laws (and ASIC) require. What family of four in Sydney or Melbourne can survive on $120 per week for transport? As Charts 8 & 9 show, these and other adjustments of the HEM to real expenses are very likely to lead to a substantial ongoing credit crunch in 2019 and pose significant downwards pressure on house prices.

Double Trigger Default Theory will likely play out as risk pricing and Resets cause DSTI arrears while the HEM/ non-prime credit crunch hits valuations 25-30%

Double Trigger Default theory highlights that the key driver of property slumps and arrears is a rise in DSTI, followed by price falls. This highlights the common misconception that unemployment is the cause of property downturns, rather unemployment is usually the result or outcome of property downturns. This cycle is likely to be different to the 1990s in that we are not experiencing a sharp hike in interest rates. However it must be noted that DSTI ratios are clearly rising nonetheless due to the use of HEM as the default expense input (boosting DSTI ratios over the five years to 2016) and risk pricing of IO combined with resets. The Credit Crunch due to a shift away from HEM to real expenses is hitting prices hard (i.e. we predict 25-30%) and this will clearly limit access to refinancing. Additionally, it has potential to cause defaults amongst multi investors in particular.

The latest global research[1] describes **"Double Trigger Default Theory"** to explain arrears and defaults in the UK and Ireland. Defaults are a combination of "Can't Pay – DSTI" and "Won't Pay – negative equity" which together cause mortgage defaults. Once that process begins, unemployment rises, causing further decreases in house prices and exacerbating the initial triggers.

In summary, "Serviceability" or Ability to Pay and "Equity" are both important in driving arrears:

1) **"Serviceability" /Ability to Pay** measured by **DSTI** – arrears are a function of either income or payment shocks. Payment shocks can arise due to changes in *interest rate or some changes in the mortgage contract. Changes*

[1] Aron & Muelbauer, 2010, **Modelling and Forecasting UK Mortage Arrears and Possesions**, SERC Discussion Paper 52. Lyndon & McCarthy 2013, **What Lies Beneath? Understanding Recent Trends in Irish Mortgage Arrears**, The Economic and Social Review, Vol 44, No 1, Spring,2013, pp 117-150

in the contract is relevent in 2018 since a large number of Interest Only Investors are at risk of being converted to P+I and as a consequence will endure 30-40% higher monthly payments,

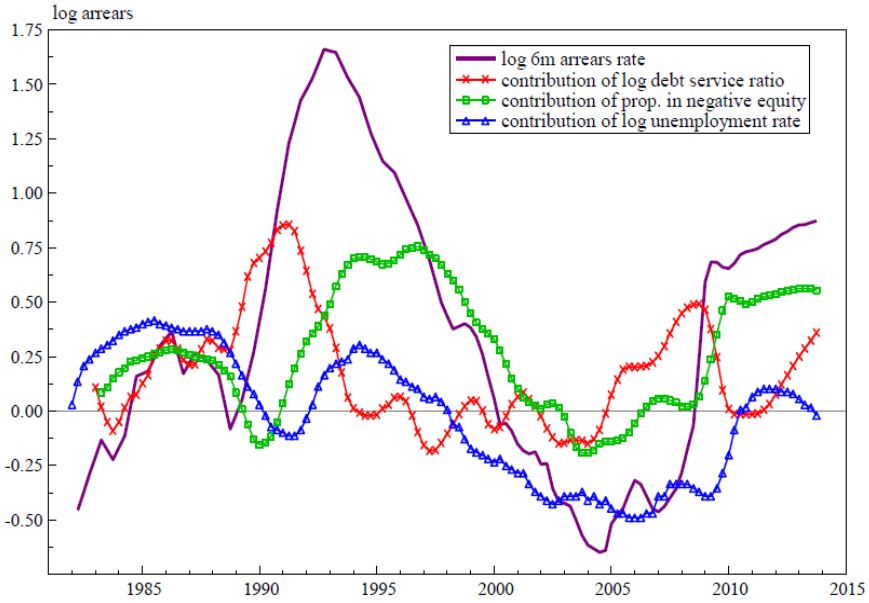
2) **Equity Theory** posits negative equity as the key driver of default or arrears (measured by **LTV**). Falling house prices have two effects:
   i) Preventing borrowers who have experienced income shocks from trading out of their difficulties by re-mortgaging or trading down,
   ii) Borrowers with negative equity may be incentivised to default when the financial gains of defaulting outweigh the costs of continuing to service the mortgage, thus treating the mortgage as an option.

Recent historic studies from Ireland highlight borrowers most at risk of arrears and default in downturns in high debt environments such as the GFC were (in order of riskiness):

i) **Next Time Buyers** (upgraders) on high DSTI ratios,
ii) **Investors** particularly those with lower investment yields, high payments and high LVRs
iii) **First time Buyers** with high DSTI.

The relevance of this is that categories i) & ii) use of Interest Only loans have been the huge growth area over the past 5 years – and constitute well over half the 50% of the book that was lent in the past 5 years (i.e. 25%+ of outstanding loans).

Chart 1.1: UK Evidence: Double Trigger Default Theory: arrears are mainly driven by DSTI rises leading to Negative Equity



Source: Modelling and Forecasting UK Mortage Arrears and Possesions, Aron & Muelbauer, 2010
This cycle DSTI ratios have increased markedly due to the HEM/ Non-Prime Bubble to 2016, and more recently due to IO risk pricing, resets and the rise in wholesale funding costs. With house price falls of 25-30% expected – negative equity is expected to be a problem as far back as 2014 mortgage vintages.

Challenging environment for ASX Banks as Credit Slump hits volumes and Arrears rise

The key implications of this for ASX Banks are clearly bearish though 2019. We expect:

i) Further sharp curtailment of loan volume growth in 2019 due to HEM expenses moving to real expenses.
ii) Increases in arrears due to the high starting point of DSTI (i.e. 40%+ of the book is non-prime in terms of DSTI) as a result of the HEM/ non-prime bubble, risk pricing and interest only resets.
iii) Increases in defaults as prices fall and negative equity is widespread in vintages from 2014 onwards. This will savage refinancing options and will change incentives towards default for very geared investors and repeat buyers.

Appendix 1: Endeavour's Fair Value Property Price model says 35% expensive. It suggests a 18-25% price drop to get to average valuations of the past 30 years. This would be much more problematic than our base case.

The starting point for how bad this downturn will be essentially revolves around far property prices fall. What determines how far property prices fall is surely a function of intrinsic value. Endeavour's model looks at median house prices in Sydney, Melbourne, & Brisbane compared to fair value based on a 25 year P+I loan based using 80% the households 'residual income' (income after tax and basic expenditure). Endeavour's intrinsic value model is in Appendix 2 Chart 1 below, and it highlights

i) **Australian property prices are a presently 35% expensive** – the same level as expensiveness and 2007 & 2010 & 10% less expensive than 1989. The current premium of 35% is 18-25% above the 20-25 year average premium, highlighting scope for falls

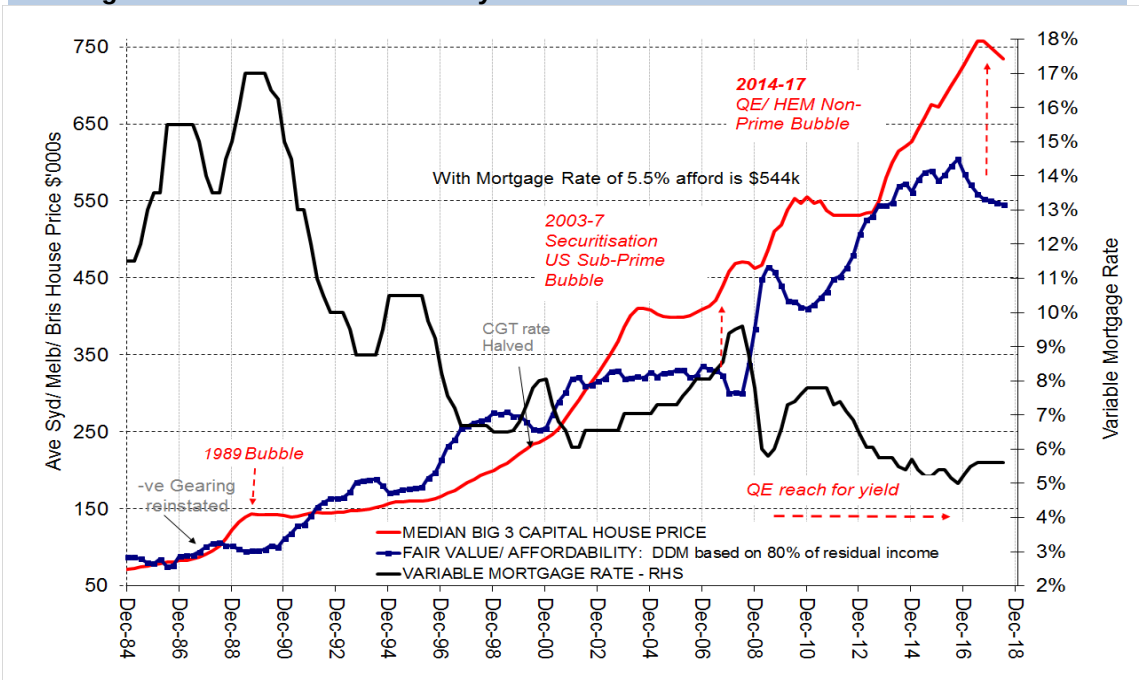
ii) **Underlying Affordability/ Fair Value has remained unchanged since 2013** since real incomes have been flat and rates relatively stable.

iii) How do you explain that prices are up 35%+ with affordability unchanged since 2013? Our answer is a **bubble in very lenient Non-prime lending of the order of 60-70% of flow**. How else to you explain Bus & Truck drivers with 4-5 investment properties?

Endeavours view is not only do the property bulls have limited/flawed counteracts to the obvious Non-prime bubble, they are in denial with respect to the problem. No Bank economist of the RBA publishes a DDM based intrinsic value model that we are aware of. They prefer to rely on Price to Income models that suggest a multiple of 4-5X. Since the median Sydney house price is approx. $1m – that means they assume median income is $200-$250k pa (around 50% higher than any estimate we have seen). As we highlight in Section 6 of "Credit Crunch as HEM/ Non-Prime Bubble Busts" IMF standard methodology suggest around 10X for Sydney and Melbourne.

Endeavour's key concern now house prices have started falling – due to the 'normalisation" of very lax lending standards over the past 5-7 years, what policy options are realistically available? In 1990, 2008 & 2010 the RBA cut rates sharply, boosting affordability 40-60%. The RBA's potency in the current environment is likely to be greatly reduced – they didn't create this problem (APRA's negligence did in our view) and the RBA are unlikely to fix the problem via a rate induced affordability boost.

Appendix 2: Chart 1: House prices are 35% from fair value. Current premium is 18-25% above the 20-25 year average premium. This has been driven by lax Non-prime lending not fundamental affordability



	% Expensive	Move to Average
Premium Now	**35**	
Ave Prem: 1983+	7	*-28*
Ave Prem: 1995+	10	*-25*
Ave Prem: 2000+	17	*-18*

Appendix 2: Dec-17 Endeavour Report: Basle 4, Breaking Breadline Investors Analysis

This appendix reiterates the key points from Endeavour's Dec-17 Report (updated from May-17 original analysis). The word was prompted by Bank Investor Relations departments insisting in presentations that:

i) Investor Loans are no riskier than Owner Occupier Loans – this prompted Endeavour's research highlighting that Non-Prime Loans are in fact 3-5x riskier in a downturn

ii) ASX Banks have no Non-Prime or Sub-Prime loans, that it's a category that doesn't exist in Australia and that newspaper stories about Truck Drivers with 4 investment properties simply could not have been financed by an ASX Bank.

The key takeout of 2017 meetings was while it was accepted that Non-prime/ "Breadline Investor" lending existed at the margins – it was unclear how extensive the problem and hence risk is. Section 5 highlights in detail that the Westpac data highlight 33% of all lending has been to Non-prime, Interest Only borrowers with a DSTI>60%, demonstrating "Breadline Investors" like the Takes have represented 25-33% of the flow of all lending in recent years.

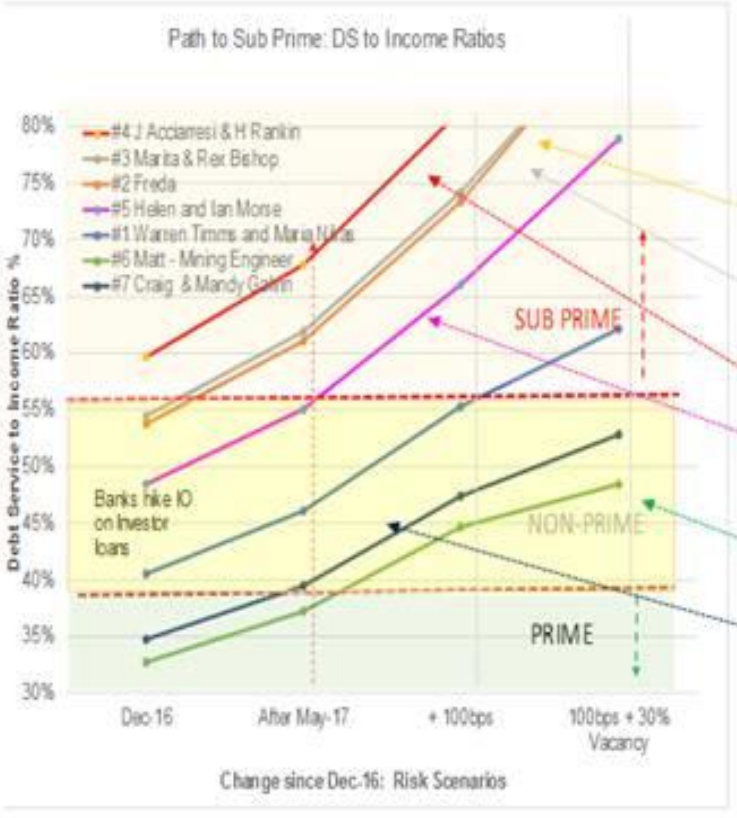
Key Points from Dec-17 Endeavour Report: Basle 4, Breaking Breadline Investors

1. **Special Topic: Credit Tightening Breaking Breadline investors**

- Endeavour's shows over 60% of the flow of investor loans since 2010 has been to Investors purchasing their 2nd+ investment property.
- Our 10 Case Studies of Individual Investors (from Property Investor Magazine) who have recently been taken into Sub-Prime Territory as a result of the Credit Tightening in May-17. The majority are now paying more than 55% of DSTI Ratio on their suite of mortgages. This highlights the likelihood that arrears will rise sharply in coming months
- This is in addition to our analysis that shows **40% of Australian Mortgages are Non-Prime due to i) High DSTI & ii) High LVR** &/or iii) Investor Status.
- This is the largest regulatory lending crunch in 30 years, a triple blow for Australian households: i) Out of cycle rate hikes, ii) reduced availability of Interest Only loans and iii) Large Reset impact for IO loans.

Case Studies in Breadline Investing

7 Case Studies from Aust Property Magazine of 5-10 properties purchased in past 4 years



1) **Warren & Maria**: early 40s, FIFO jobs of $230k pa; purchased 9 properties in 4 years. $2.4m Debt, $3m equity. Look OK but in W and outer Bris.

2) **Freda**: mid 30's former Property Investor Young Gun. 6 properti in 4 years. Bleeding – sold 1 property $1m Debt; Income of $70 pa

3) **Marita & Rex**: Tas. Bus Driver on $90k, **5 properties in 5 years**; $1.5m in Debt

4) **Johnny & Hanna**: 23 & 24, 10 properties in 5 years all in Nth Suburbs of Adelaide, $2.5m valuation, $100k joint income

5) **Helen & Ian Morse**: early 50s lost almost everything in GFC, 4 investment properties in 4 years, $1.4m on $70k

6) **Matt**: Mining Engineer works in Tanzinia; 4 properties in WA in 4 years, Approx $2m Debt on $250k income

7) **Craig and Mandy Galvin**: Brisbane Ambo & Pub Service Wife on $100k with $2.6m portfolio.

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