

Is College Worth the Cost?

A Data-Driven Analysis of the Student Loan Bubble

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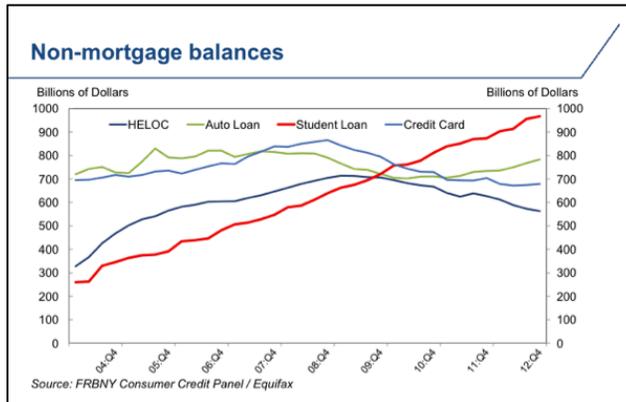
Is College Worth the Cost?: A Data-Driven Analysis of the Student Loan Bubble

Introduction

As of July 2013, total student loan debt reached \$1.2 trillion, surpassing credit cards and auto loans as the largest non-mortgage form of household debt in the United States.ⁱⁱⁱ Given the rise of student loan debt, there has been much concern as to whether the value of a college education is worth the costs in tuition, fees and interest paid on loans. This has led many individuals and media outlets to raise the possibility of the existence of a student loan bubble.

Ever since student loan debt surpassed the amount of credit card debt in the nation to the tune of \$830 billion in June 2010, professional and consumer publications have

speculated about the possibility of a student loan bubble. In August 2010, a *Wall Street Journal* article quoted one source as saying, “The growth in education debt outstanding is like a lobster... The increase in total student debt occurs slowly but steadily, so by the time you notice that the water is boiling, you’re already cooked.”ⁱⁱⁱ In March 2012, the



Washington Post reported that

more than 80% of bankruptcy lawyers have seen a substantial increase in the number of students seeking relief for student loans.^{iv} The topic has recently come to light in professional publications. In July 2013, Professor Mitchell Franklin of Syracuse University wrote in *The CPA Journal* that, “the student loan industry will be the next area of failure that will cost taxpayers significantly.”^v Lastly, in a scathing editorial in *Rolling Stone* magazine, Matt Taibbi criticizes the federal government for making it easy to borrow money for higher education “saddling a generation with crushing debts and inflating a bubble that could bring down the economy.”^{vi}

Before going into the intricacies of the student loan bubble, we must first develop a definition. Ivana Kubicova and Lubos Komarek define a bubble as an “explosive and asymmetric deviation of the market price of an asset from its fundamental value, with the possibility of a sudden and significant reverse correction.”^{vii} While this definition is good in its description, it is too specific in its explanation of the bubble’s correction. A bubble does not necessarily need to “pop” as Kubicova and Komarek imply when they talk about a “sudden and significant reverse correction.” Bubbles may also deflate slowly and softly so as to garner little attention. Additionally, Kubicova and Komarek include bubbles that do not collapse in their definition by opening up the “possibility” of a correction. Since a significant number of asset-price bubbles are truly discovered only *after* the correction sets in, we will only include bubbles that collapse in our definition. An alternate definition can be found in the work of Hans Lind, who writes, “There is a bubble if the (real) price of an asset first increases dramatically over a period of several months or years and then almost immediately falls dramatically.”^{viii} He goes on to give specific measurements to what quantifies a “dramatic” change in prices. However, including “dramatic” in the definition widens a bubble to include such things as a country’s

national debt, which can increase gradually but exponentially over a long period of time. For the purposes of this paper, we can combine Kubicova and Komarek's and Lind's definitions to create our own frame through which to see the student loan bubble. Thus, an asset-price bubble will be defined as *an asymmetric deviation of the market price of an asset from its fundamental value over a period of several months or years, that inevitably leads to a significant reverse correction as seen by a fall in prices.*

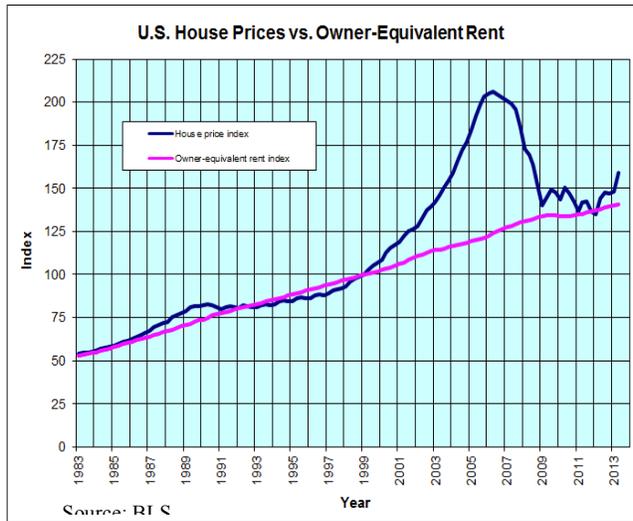
Historical Bubbles

The two most recent bubbles in US history include the Dot-Com boom of the late 1990's and the Housing Crisis of 2008-2009. The Dot-Com bubble was launched by the increasing popularity of the Internet and advent of start-up software companies that produced their products at a relatively low cost. Economists envisioned a "New Economy" in which inflation was virtually nonexistent. This is because the "Old Economy" was made of brick-and-mortar businesses in which the traditional rules of economics applied. The "New Economy," which would consist mainly of virtual businesses and financial institutions, made economic data irrelevant to the success of these companies. IPO "squatters" bought names of typical addresses (www.business.com; www.loans.com) and trademarks (say, the World Wrestling Federation) for \$50 to \$100 dollars and waited for owners and investors to purchase them for exorbitant amounts.^{ix} Venture capitalists saw claims for IPO addresses to be the wave of the future and invested heavily in start-ups with little experience and minimal business plans. The NASDAQ stock index exploded from 600 to 5000 points between 1996 and 2000 as dot-com companies raised billions of dollars overnight.^x

By early 2000, investors realized that the dot-com dream had devolved into a speculative bubble. The NASDAQ plunged from 5000 to 600 by 2002. Former start-ups such as Microstrategy went from \$3500 to \$4 per share. The "New Economy" concept became a fallacy. Investors were pouring money into the stock market and ignoring warning signs that the economy was going to head into a recession, losing millions of dollars as a result. Concurrently, accounting scandals erupted, adulterating consumers' confidence in big businesses and the US stock market. While the Federal Reserve slashed interest rates in an attempt to stop the bleeding, the NASDAQ has never recovered to its 1996 level since.^{xi}

The crisis in the US housing market has been seen as one of the largest speculative bubbles in economic history. Between 2000 and 2006 home prices rose dramatically (about 12% per year), fueling a home construction boom. The perceived value of houses can be measured in housing prices, while the fundamental value can be seen in the rental value of a home. The fundamental value of an asset equals the sum of its future payoffs. Rent can be used as the fundamental value of a house, because the payoff a house yields is in the form of the roof over the head of the occupant. Therefore, the present value of rentals in the future can be approximately measured by the rental





Price-to-Value Ratio	
Year	Ratio
1983	1.02
1984	1.02
1985	1.02
1986	1.02
1987	1.05
1988	1.07
1989	1.12
1990	1.11
1991	1.03
1992	1.00
1993	0.97
1994	0.97
1995	0.96
1996	0.95
1997	0.94
1998	0.96
1999	1.00
2000	1.06
2001	1.12
2002	1.16
2003	1.24
2004	1.36
2005	1.54
2006	1.67
2007	1.57
2008	1.32
2009	1.05
2010	1.07
2011	1.01
2012	0.98
2013	1.06

value of the house.^{xii} The “U.S. House Prices vs. Owner-Equivalent Rent” graph shows the deviation of housing prices from their fundamental value. The data was collected using the S&P/Case-Shiller measures for House Price Index and Owner-Equivalent Rent. 1999 was used as the base year to adjust home and rent prices to the Consumer Price Index.

Dividing the house price index by the rent index, you would obtain a price-to-value ratio (see table).^{xiii} This ratio shows the overvaluation of housing prices compared to the fundamental value. If the price-to-value ratio is high, this means that housing is severely overvalued. The table indicates that the ratio peaked between 2006 and 2007, which was right before the bursting of the housing bubble. This eventually led to a correction in which housing prices became closer to rents, causing the ratio to drop and ultimately resulting in the “popping” of the bubble.

The crisis originated when credit for home loans became easier to come by, especially for low-income families. Between 2004 and 2005, the share of subprime (or risky) mortgages jumped from around 2% to 14% of all mortgage originations.^{xiv} Lenders eventually discovered that they could bundle up these subprime mortgages and sell them off to investors in a process known as securitization. Banks would gather thousands of these loans into a “pool,” divide this pool into shares and sell the shares as securities. Buyers of these securities would then gain the right to collect mortgage payments made by these homeowners whose mortgages have been pooled. These specific securities were called “mortgage-backed securities.”^{xv} Investors underestimated the riskiness of these loans, believing that the value of these mortgage-backed securities was much higher than what it actually was.^{xvi} These beliefs were propelled by rating agencies such as Standard & Poor’s, Moody’s, and Fitch, which gave many of these sub-prime mortgages a triple-A rating of very secure, causing investors to overlook how risky the loans actually were.^{xvii}

Eventually, the supply of houses exceeded demand. Defaults on mortgages began to increase due to a general decline in economic activity, pushing supply forward and causing prices to drop. As housing prices began to fall in 2007, a vicious cycle, or feedback loop, was created. Delinquencies increased as more people realized they could not pay back the loans they took out on their homes. As the default rate increased, the value of mortgage-backed securities fell, causing major losses for the banks that provided these loans. Banks tightened credit as a result, reducing household and business spending, which further caused housing prices to decline. Between October 2007 and April 2009, the financial sector’s mortgage-related losses went from \$240 billion to \$1.4 trillion as estimated by the International Monetary Fund.^{xviii} Confidence in the international banking

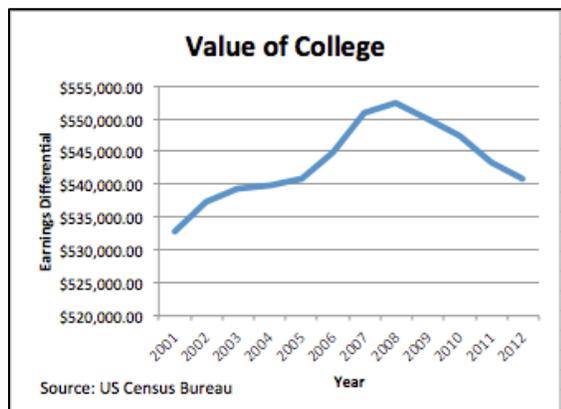
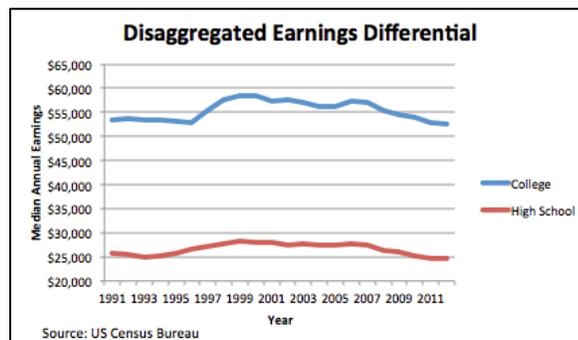
system eroded as investors were fearful that what happened in the United States would happen at home. By the end of 2009, the Federal Reserve slashed the federal funds rate from 5% to nearly 0% in a last-ditch attempt to stimulate the economy. A global recession ensued nonetheless, bringing the unemployment rate over 10% by mid-2009.^{xix}

Detecting a Bubble: Analyzing Potential Sources

The Cost-Earnings Differential

If a bubble in student loans were to exist, then the price of college would significantly exceed its fundamental value. Tuition prices would have to be growing past the earnings one obtains from receiving a degree. My analysis is the inverse of this phenomenon. I compare the price of college to the earnings and track its progress over the past decade. The price, or investment, in the context of student loans would be the cost of college. The “fundamental value” of college can be measured through an earnings differential between high school graduates and college graduates (bachelors and higher). This is because the economic benefit of college is the higher income you receive over a high school diploma. The earnings differential data was obtained from the US Census Bureau’s inflation-adjusted annual median earnings for both high school and college graduates. Because it is difficult to predict earnings over the average working life of a person, the weighted median annual earnings must be smoothed to account for volatility. This aids in forecasting by ensuring that changes in the earnings differential were not impacted by recent economic conditions. While some may argue that the value of college has only recently been considerably high, smoothing tells us that this has been a long-term trend rather than a short-term phenomenon. Forecasting forty years into the future can be extremely difficult with only ten years of data, but the moving average takes into account past trends as well as present ones. To smooth the earnings, the moving average for the years beginning in 1991 was used to forecast the median earnings between 2001 and 2012. For example, the average of median annual earnings between 1991 and 2001 was calculated to find earnings for 2001. Then, the average of median annual earnings between 1992 and 2002 was calculated to find earnings for 2002 etc. The present value of the smoothed earnings was then projected out 40 years (the anticipated working time in a human life) with a discount rate of 4.4% (equivalent to the current interest rate on a 30-year treasury bond). From this, the value of going to college could be determined. The graph “Value of College” shows the projected earnings differential

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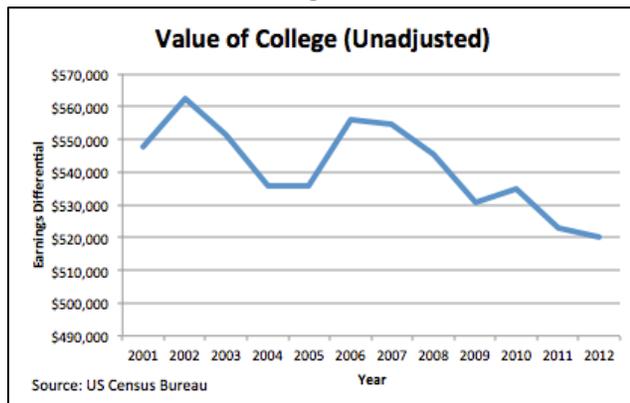


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between 2001 and 2012. The diagram shows that the value of college increased from 2001 to 2007 and declined since the onset of the Great Recession in 2007. Despite this, the value of college has hovered around \$545,000 in the past ten years, indicating a large difference between lifetime earnings for college graduates and high school graduates.

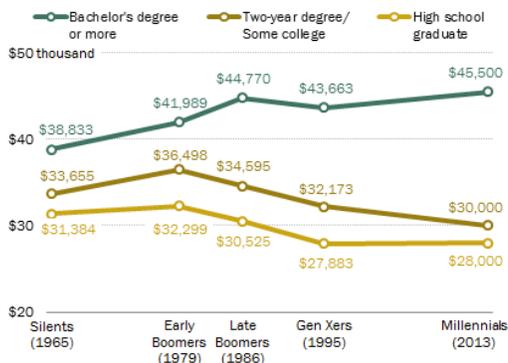
The “Value of College (Unadjusted)” shows the earnings differential over the last ten years without the moving average. While the unadjusted values show a drop in the value of college between 2002 and 2005, the moving average values show an increasing trend. Despite this, both graphs show the overall trend of the value of college dropping beginning in 2007 while still projecting the value of college to hover around \$545,000. The variations in the two valuations of college are rather small given the overall scale of this value. The unadjusted graph retains the overall shape of the moving average graph, peaking in 2006-2007 and declining after the onset of the housing crisis.

It is worth noting that the earnings differential is a result of a combination of both changes in the earnings of high school graduates and those of college graduates, rather than a particular trend in one or the other. A potential criticism of the measure of the value of college is that earnings for high school graduates have simply declined faster than earnings for college graduates, resulting in a rising value of college. As can be seen by the graph, this is true, but of minor significance, as median earnings for both categories have fallen relatively in line with each other as a result of prevailing economic trends. Between 2007 and 2012, median earnings fell 8% for those with college degrees and 9.89% for those with high school diplomas.



Rising Earnings Disparity Between Young Adults with And Without a College Degree

Median annual earnings among full-time workers ages 25 to 32, in 2012 dollars



Notes: Median annual earnings are based on earnings and work status during the calendar year prior to interview and limited to 25- to 32-year-olds who worked full time during the previous calendar year and reported positive earnings. "Full time" refers to those who usually worked at least 35 hours a week last year.

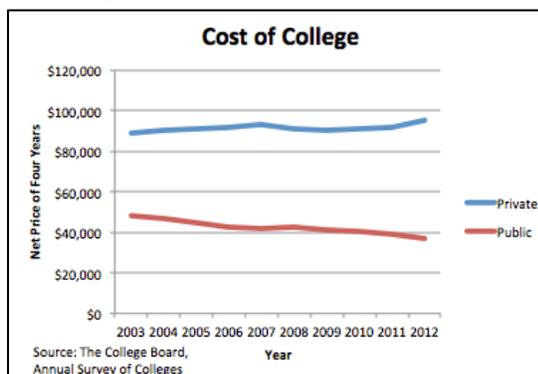
Source: Pew Research Center tabulations of the 2013, 1995, 1986, 1979 and 1965 March Current Population Survey (CPS) Integrated Public Use Micro Samples

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Although these results only measure the earnings differential from 1991 to 2012, a cross-generational study conducted by the Pew Research Center notes that the difference in earnings between high school-educated and college-educated workers has increased since 1965. The study measures the median annual earnings among full-time workers ages 25 to 32. As seen in the chart titled “Earnings Disparity Between Young Adults Without a College Degree,” the Silents of 1965 who have a Bachelor’s degree or more were earning \$38,833 per year, while Millennials of 2013 who have a Bachelor’s degree or more are earning \$45,500. Those with only a high school diploma in 1965 earned \$31,384. These earnings have decreased to \$28,000 for those with only a high school diploma in 2013. The Pew study shows that the value of going to college and the cost

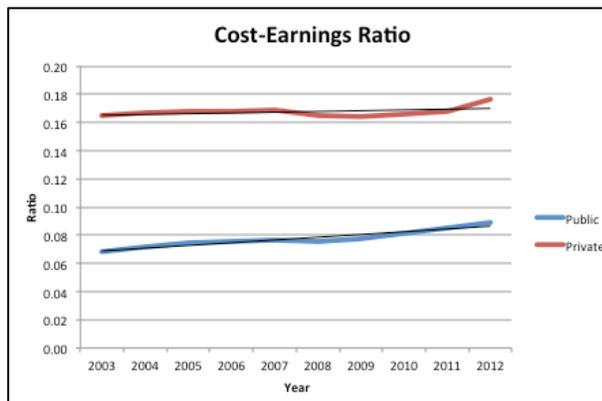
of not going to college have both increased over the past 50 years.^{xx}

Next, the “net price” of college for the years 2003-2012 was taken from College Board. The net price represents the average tuition price of colleges, taking into account fees, room and board, grant aid and tax benefits. This value was extracted for both private and public undergraduate institutions and multiplied by four years to represent the overall cost of college. As seen in the diagram below, net prices have remained relatively constant over the past ten years.



A ratio of college costs to college value needs to be taken in order to analyze whether the market price (costs) are deviating from the fundamental value (earnings) over time. This ratio helps to determine the risk of attending college. If the ratio gets larger, then the risk of attending college (thus, the risk of having paid more for college than it is worth) increases, as the cost of attending college gets closer to the earnings obtained from doing so. A value of one would indicate that lifetime earnings are equal to the cost of college. If a bubble were to occur, the ratio would be getting larger, as costs come closer to earnings. To obtain this ratio, costs simply need to be divided by earnings. This ratio tells us the amount of spending on the cost of college compared to the value of college. For example, if we ballpark the cost-earnings ratio for attending private college between 2003 and 2012 to be about 0.17, this tells us that the cost of college is only 17% of the earnings obtained from receiving a college degree. As seen below, the ratio has slightly increased over time for private and public colleges, indicating that college costs have been getting higher compared to the present value of future earnings from a college degree. This ratio begins to increase at a higher rate between 2009 and 2012 for both public and private colleges. This seems to reflect a drop in earnings relative to the cost of college due to lag from the recession of 2007-2009. The ratio has increased by 31% for public colleges and 7% for private colleges between 2003 and 2012.

While this may seem like a large increase, it is not as significant of a climb compared to a 67% increase in the price-to-rent ratio between 1999 and 2006 during the housing crisis. In short, this ratio appears to suggest that a bubble is not going to occur in the near future, due to how small the ratio actually is. If a ratio that goes above one tells us that the value of college is not worth the amount one pays for it, these ratios show little indication that they have or ever will go above one, making college a safe and worthwhile investment.



For-Profit Education Speculation

While the data may show that there is no bubble in private and public education, there may be evidence suggesting a bubble in for-profit education. These institutions, which tend to focus on more technical and vocational education, are subsidiaries of private corporations that are expected to generate revenue for the company's shareholders. Many choose for-profit universities for their flexible schedules that sometimes allow students to finish faster. Most for-profit colleges have extensive online degree programs that are popular in an age that places a large emphasis on convenience and adaptability.^{xxi}

Statistically speaking, students who graduate from for-profit institutions are more indebted than those from private and public colleges. According to the US Department of Education, 75% of students at four-year for-profit colleges took out loans to finance their education, compared to 62% at private four-year colleges and 50% at public four-year colleges. For two-year schools, 64% of students at for-profit institutions borrow money, while only 17% of those at public colleges do the same. An incredible 90% of those attending four-year for-profit institutions received some form of financial aid, compared to 72% at public schools.^{xxii} A report by the Education Trust estimates the median debt of for-profit graduates to be \$31,190, which far outstrips private colleges (\$17,040) and public colleges (\$7,960). The report also states graduation rates at for-profit colleges to be merely 22%, compared to 55% for public and 65% for private institutions.^{xxiii}

The University of Phoenix is the prime example of a for-profit institution. With over 300,000 students enrolled in its online program alone, the University of Phoenix boasts a moderate tuition rate of \$9,216 per year, but is criticized for accepting applicants who cannot afford to pay for their education while giving them large promises of the earnings they will receive from the degree. 97% of University of Phoenix students receive some form of financial aid, receiving a total of \$25.7 million in total grant aid. While the University does not publish its acceptance rate figures, its retention rate is a mere 36% compared to a national average of 77%.^{xxivxxv} Its six-year graduation rate comes in at a measly 5%.^{xxvi}

If such a bubble were to exist in for-profit colleges, there is evidence to suggest that it has already popped. In October 2012, the Apollo Group Inc., the parent company of the University of Phoenix reported that its fourth-quarter profits had fallen 60% from the previous year. New student enrollment slumped 13%, causing the stock to dive 22% the day following the announcement. In 2011, when overall college enrollment dropped 0.2%, for-profit colleges saw a dip of 3%.^{xxvii} Undergraduate enrollment dropped 21.5% at Corinthian Colleges, 25.6% at DeVry University, 35.8% at Capella University and 47% at Kaplan Higher Education in the first quarter of 2011.^{xxviii} While part of this can be attributed to for-profit institutions tightening up standards for admission due to public pressure for predatory recruiting, it appears that students are realizing that obtaining a degree from such institutions is not worth the amount they take out in loans.

The average tuition paid by students at for-profit four-year colleges was \$13,819 in 2011-2012, a drop from \$16,268 in 2006-2007, adjusted for inflation.^{xxix} This is indicative of the drop in enrollment previously noted. For-profit colleges are responding to savvy students who understand the risks of attending such a university. The National Bureau of Economic Research points out income in 2009 for graduates of for-profit institutions was approximately \$5,500 lower than their private/public counterparts. Other researchers have found that for-profit students make up 50% of all student loan defaults, despite the fact that they make up only 12% of the overall student population.^{xxx} Students

are becoming more aware of these numbers and are attending not-for-profit institutions as a result. This has led to the burst of a sub-bubble in higher education, which may explain general fears about an industry-wide bubble articulated in the introduction.

Conclusion

Given all of the potential sources of a bubble in the student loan market, it is safe to conclude that there is little risk of such a bubble in the near future. Due to the oligopolistic nature of higher education, it is possible for a bubble to manifest itself in different ways. Having identified and tested several of the major ways this is possible, all indicators either point closer to the fact that a bubble does not exist or are rendered insignificant in a macroeconomic sense. Due to the difficulty of obtaining data on a potential feedback loop in higher education as well as the fact this it is only loosely applicable to the student loan market, this area was never explored; however, it is worth looking into this type of speculation in future studies. While the data may indicate an increasing cost-earnings ratio, this trend is not nearly stark enough to be used as conclusive evidence for a bubble. Therefore, the market price is not deviating from its fundamental value in an asymmetric pattern strong enough to fit the aforementioned definition of an asset-price bubble.

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