The education-cost bubble is one of incentives

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The cost of higher education has been rising, but is there an education bubble capable of disrupting, and fundamentally shifting the higher education landscape in the United States? The discussion herein presents some thoughts on the current concern that higher education and student debt is the next great bubble in the U. S. As a matter of fact, total student charges at public four year colleges in 2011, which include tuition, fees, room and board, have doubled in real terms when compared to the 1986 price (College Board). This trend in the cost of higher education is also reflected at private not-for-profit institutions, where average student charges in 2011 were approximately thirty-four thousand dollars compared to seventeen thousand dollars in 1986. The increase in the price of education creates a monetary tightening. This monetary issue associated with higher education is magnified when considering the value of Federal loans issued in a year. In 2009, total federal loans issued was 3.5 times that in 1986 in real terms (U.S. Department of Education, 2009)[1]. More specifically, twenty-seven billion dollars in loans were issued through the *Federal Family Education Loan Program* in 2009, compared to slightly less than eight billion dollars in 1986, after adjusting for inflation. These statistics show that there has been a continued increase in the cost of education. This commentary explores the question of whether we are in the midst of an education bubble.

What exactly is an asset bubble and why do they occur?

Price bubbles are deviations in the price of an asset from its intrinsic value or underlying fundamental value. For most assets, the fundamental value is, and can be measured as, the discount of all future cash flow it generates. This idea can be presented in the equation below. where the fundamental value of an asset is given by :

$$\text{Price}_f = \sum_{t=1}^{n<\infty} \frac{\text{Cash}_t}{(1+r_f)^t} \qquad (1)$$

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[1] This combines Stafford subsidized, Stafford unsubsidized, and PLUS loans made through Federal Family Education Loan Program.

In which Price$_f$ is fundamental value, t is the time period, r$_f$ represents the fundamental discount rate, and Cash$_t$ represents the realizable cash benefit at time t. A bubble occurs when the current price of the asset, or bubble price, $Price_b > Price_f$. The size of this bubble grows as the deviation between the bubble price and the fundamental price expands, that is if $\frac{d(Price_b - Price_f)}{dt} > 0$.

A natural question as we proceed in this discussion is by what forces is the current price continuously edged away from its true value? Market theory can be used to provide two core reasons price bubbles are created, one of which is as a result of expectations. A price bubble will occur if there is an expectation, or euphoria, that the frequent cash or utility benefit from the asset surpasses and or is different from the true benefit. This bubble occurs and will eventually burst if this expectation is false or is unrealized. Equation (1) can be used to show that a price bubble will occur if the expected cash flow over time differs from the fundamental/true cash return, that is if $E(Cash_t) > Cash_f$.

Price bubbles can also occur as a result of income effects. An increase in general income creates increased liquidity. This increased liquidity may stimulate a price bubble in two ways. First it may be reflective of, or may cause, a lowering of the "bubble discount rate". From equation 1 it can be seen that a lowering of the discount rate will increase the bubble price. Second, higher liquidity can also create a bubble effect, as higher purchasing velocity placed on a scarce asset, will increase its price.

We have seen bubbles in recent history.

Examples of recent price bubbles have occurred in the stock market in 2000 and the housing market in 2008. Figure 1 shows the time trend in home prices and mortgage debt between 1980 and 2010. Between 1996 and 2007 home prices increased at an annual compounded rate of 4.94%[2], resulting in an almost doubling of home prices. This asset inflation is also reflected in mortgage debt, in which total home mortgage debt outstanding tripled in these years[3].

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[2] Calculated as $162.83 = 91.94*(1+r)^{12}$. In which 91.94 and 162.83 were the home price indices for 1996 and 2007 respectively.
[3] Outstanding mortgage debt was $4.8 billion in 1996 and $14.5 billion in 2007.

In the following two years, home prices fell by one third, and ultimately by 40% by 2012, when compared to 2007. The growth in outstanding mortgage debt also slowed to an annual compounded rate of 1.6%.
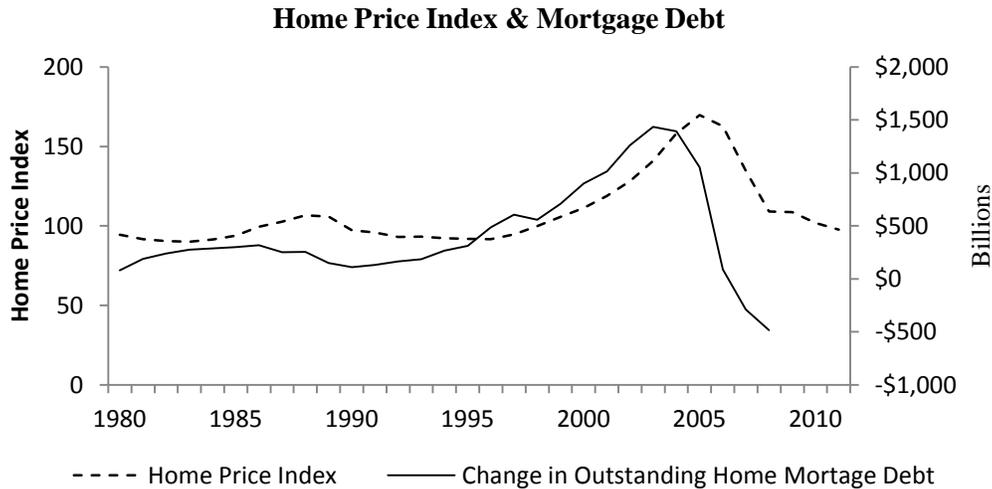
Home Price Index & Mortgage Debt

Figure 1
Source: U.S Census Bureau (2012); Shiller (2005)

Considering the stock market, at fifteen trillion dollars, the market value of outstanding shares in the U.S exceeds the value of all new goods and services produced within the year. The price of stock assets is however much more volatile than other types of assets. As a result financial markets demonstrate the potential to have more distinct price bubbles. Figure 2 demonstrates this fact as it graphs the value of the S&P composite relative to disposable income. The growth and subsequent collapse in asset value was more pronounced over a shorter time span than observed in the housing market. In just 4 years the value of the S&P composite more than doubled relative to national disposable income, and lost half its value in only three years subsequent[4].

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[4] The ratio of S&P composite index to the index of personal income was 1.8 in 1995, 4.3 in 1999, and 2.2 in 2002.

S&P Composite Index Relative to a Disposable Personal Income Index
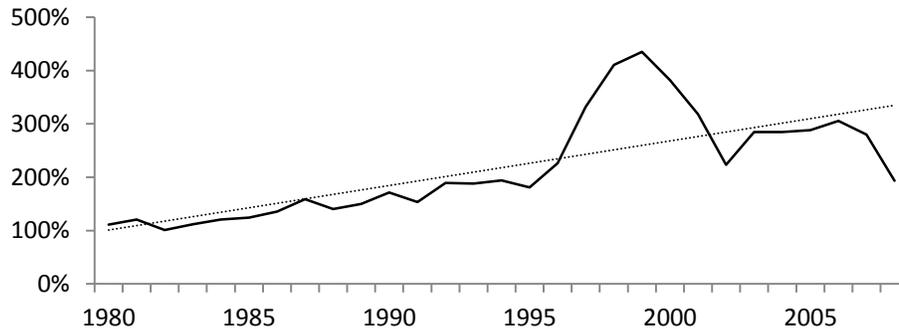
[5]Figure 2
Source: Shiller (2005); Bureau of Economic Analysis (2012)

There are concerns in the market for higher education.

Across the U.S, student debt for the class of 2010, was twenty three thousand dollars on average. Arguments have been made that rising tuition costs and yearly increases in federal and private credit are an indication of an approaching disruptive price bubble in the market for higher education (Cronin & Horton 2009; Gillen 2008). Gilen (2008) attributes the possible tuition bubble to uncertainty of the value of education, causing creditors to make available an ever increasing amount of capital for education, while creating a willingness in students to pay ever increasing charges.

Figures 3 and 4, show the time trend in student charges and federal loans associated with higher education. Over the past two decades, total student charges have grown at an annual compounded rate of three percent above inflation in public four-year colleges. This trend is also reflected in private not-for-profit institutions in which average student charges have grown at 2.7% after accounting for inflation[6]. Total federal loans almost tripled over the same time period, increasing at an average yearly growth rate of six percent. It appears that the price of education and the capital provided for its financing demonstrate characteristics similar to the financial and

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[5] Disposable personal income of $2.2 trillion in 1981 was converted to an index of 100 in that year. A ratio of the S&P composite index relative to the index of personal disposable income was then calculated over the time period. The average linear trend is also provided in the figure.
[6] In constant 2011 dollars, in 1991 average total student charges was $8,815 and $20,044 at public four-year (in-state) and private non-profit four year colleges respectively. In 2011 the average charges were $15,932 and $34,334 respectively.

housing markets during the time of turmoil, albeit over a longer time period. The question remains, is there an education bubble on the horizon and what does it look like? To answer this question the defining framework for an asset bubble provided in the previous section will be used.
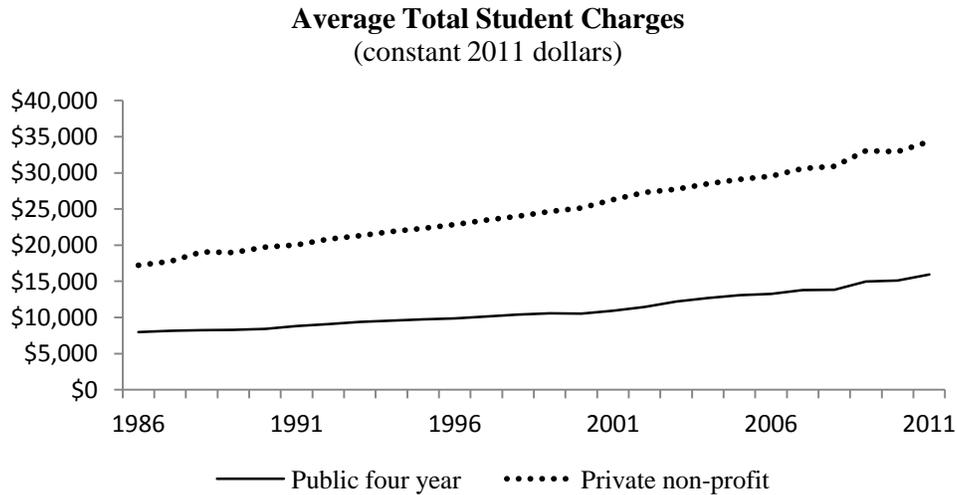
Average Total Student Charges
(constant 2011 dollars)

Figure 3
Source: The College Board (2011).

Federal Student Loans Issued
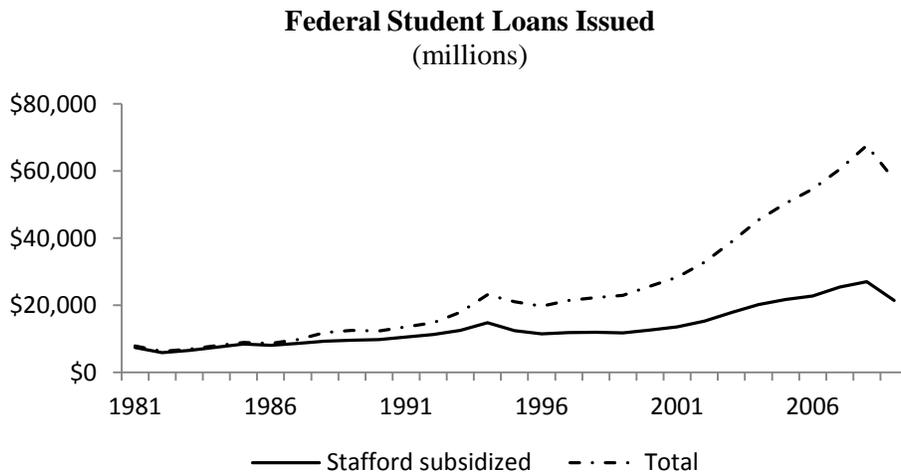(millions)

Figure 4
Source: U.S Department of Education (2009).

So is there an education-cost bubble?

To determine whether there is a price bubble occurring in higher education a comparison between its current price and the fundamental value has to be made. There are however,

complicating nuances which create an inability to accurately identify and measure the size of price bubbles generally. As discussed previously, the deviation of the current price from the fundamental price could be a result of a deviation of the inferred discount rate from the fundamental discount rate. Identification of the latter is a necessary requirement in identifying the bubble, which becomes difficult due to the immeasurable nature of the fundamental discount rate (Bernanke, 2000).

In an effort to address the objective, national personal disposable income per capita is used as a proxy for the fundamental value of education. Conceptually, since the future cash benefit, with other utility benefits being ignored, is the increase in earnings afforded by higher education, on average the price paid for education should demonstrate a constant ratio to personal income, by natural law[7].

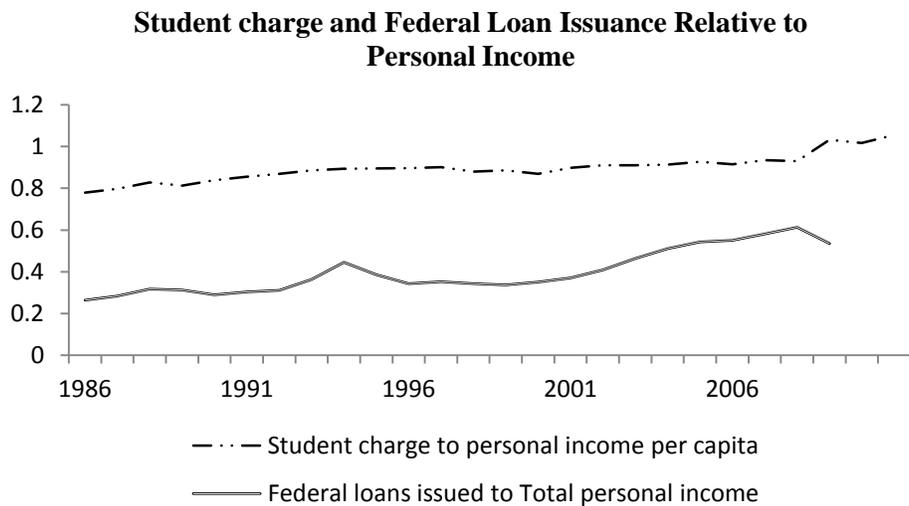**Student charge and Federal Loan Issuance Relative to Personal Income**

Figure 5

Figure 5 shows the time trend in the ratio of total student charges to disposable personal income per capita, and the ratio of total federal student loans to total disposable personal income. Between 1986 and 2010, the price of education relative to the proxy of its fundamental value has remained relatively stable. The price of education demonstrates nothing in comparison to the pricing behavior of the financial and housing markets provided in figures 1 & 2. In fact the argument could be made that the cost of education has been approaching its fundamental value

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[7] A theoretical demonstration of this relationship can be provided upon request.

over time. More specifically, the consumer of higher education would have been receiving a greater return on their investment, as the costs paid were lower than the value of future return.

In closing one can acknowledge that the price of higher education has been progressively increasing, however based on a framework of discounted cash benefit, the increases in the cost of education is not reflective of a price bubble, but approaches the value of benefits obtained from the accumulation of the human capital asset. It is the opinion of the author that this cost behavior is however indicating that the major issue of higher education is one of incentives. From a purely financial standpoint, consumer surplus in the education market is being depleted. What factors kept price artificially low? What mechanisms are creating the current shift? What is the solution to the incentives problem? These are all questions to be explored further.

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