Capital Market Inflation theory: An empirical approach

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1.0 INTRODUCTION

A good economic model is said to make sharp and clear predictions that are consistent with reality. It is on the grounds of this statement that the capital market inflation theory stands in the current literature as a study of the capital market and unique in that the theory considers its' effect on economic activity. Traditional theory of finance, analyses markets within a general equilibrium framework, in which the underlying assumptions are based on Walras' theory, so that savings and investment in the market for loanable funds are brought into equilibrium by the price of finance (price mechanism). Thus, market equilibrium is achieved when the supply of finance (by rentiers) and the demand for securities intersect at a given price. In the event of market disequilibrium, the tatonnement process will establish a new general equilibrium by means of Walrasian auctioneers adjusting prices in accordance to the demand and supply conditions.

This approach considers the functioning of capital market in isolation from the rest of the economy; in such that any changes in a market affects other markets by means of establishing a new general equilibrium. By contracts, the capital market inflation theory suggests that demand and supply are usually unequal and this has profound implication for the structure of the capital market, which in turn affects the rest of the economy.

Capital market inflation theory provides a link between the structure (functioning) of the capital market and the real economy. As a starting point, this theory suggests that the price level of long-term securities is determined by the flow of funds into the

capital market. Most of that inflow is taken out by government in forms such as issuing bonds, and corporations by means of issuing stock. The balance is a net excess inflow, which forms the liquidity of the market, circulating around in it until is taken out by additional stock issues or investors' sales. It is therefore the net excess inflow that determines stock prices and the liquidity of the market. The implication here is that demand and supply of equity are not usually in equilibrium but are usually unequal and balanced by net inflows or outflows into the market. When the price of securities rises, the demand will increase even more, as investors are attracted by additional returns of capital gains. An excess demand for long-term securities, largely driven by the inaugural of funded pension schemes, results in changes on the structure of balance sheet operation of companies. They find it easier to increase profits by substituting debt finance with equity in takeover and/or mergers and acquisition, than through productive investment.

This paper provides empirical evidence supporting the theory of capital market inflation applied to the US capital market. The demand and supply for equity capital is derived using data from the flow of funds account for the period 1964-2010. The supply of capital represents purchases of corporate equity from households, institutional investors and rest of the world. Demand is derived from combining non-financial sector issues of corporate equity with that of the financial sector. Using S&P price index data, the regression results supports the capital market inflations theory, that the price level of securities is determined by the inflow of funds into capital markets.

The rest of the paper is organised as follows. The second section of this paper provides an outline of the capital market inflation theory. Section 3 describes the model and the methodology approach, together with the results. Section 4 concludes.

2.0 CAPITAL MARKET INFLATION

The capital market inflation theory brings an insight of how capital markets actually operate and identifies the critical effect that its' activates have on the economy. The theory brings together the supply and demand for equity capital: supply being form

households and funds operating with households (pension schemes, mutual and investment funds) and the financial and non-financial businesses, which issue equity capital.

The inflows in the capital markets circulates around its participants, the initial money put into the market will be turned over more than once, until is taken out by government in forms such as issuing bonds, and corporations by means of them issuing stock. The balance is a net excess inflow, which will continue to circulate within the market until it is taken out by additional stock issue or investors' sale. If the initial transaction was a sale, the exchange will continue until the liquidity will be replaced by purchasing securities in the market.

The excess net inflow determines the value of turnover in stock and liquidity in the capital market. It also provides a margin of liquidity that allows the market to absorb to some degree the net sales by investors. In other words, when investors sell stock, the market is kept stable not by lowering prices to attract buyers, but using the past accumulation of net excess flow out to purchase the excess stock that investors have put on sale. The implication of this is that demand and supply of equity are not usually in equilibrium but are usually unequal and balanced by net inflows or outflows of credit into the market. Hence, stock markets crash not because they were not in equilibrium but because their disequilibrium has not been sufficient to accumulate enough inflow to accommodate the desired net level of stock sales.

It is the net excess inflow that determines the price level of securities. When the inflow of funds increases and circulates around in the market for a lengthy time before is taken out by government issuing bonds or companies issuing stock, the price of securities rises. This describes the process of capital market inflation. When the price of securities rises, the demand will increase even more, as investors are attracted by additional returns of capital gains. However, not all securities rise equally or proportionally. Short term securities and bonds, usually will have to be repaid at par value on their maturity date. Therefore, these securities are not likely to capture any capital gain, because the amount that the holder will receive on maturity is predetermined. In contrast, shares or common stock, have no guarantee repayment value. Capital gains are therefore more likely to be sustained. This will increase investors' preference for equities, in prospect of capital gains.

An increase in stock prices is supposed to reduce the yield on stock. But this reduction is offset by returns additional to dividend and interest, of capital gain. An excess speculative demand for stock impacts most directly on the balance sheet operations of companies. Companies find that they can issue equity at lower earnings per share and at a lower cost because of capital gains, which is paid by other equity buyers in the market. Therefore companies are inclined to issue equity to repay bank borrowing so that they substitute debt with equity finance. Because of this disintermediation, with banks losing their best and safest borrowers, they have been forced to lend to less financially secure borrowers, carrying greater risks.

Furthermore, as companies find issuing stock a cheaper and a more profitable activity, will tend to discourage productive investment. If and when debt borrowing has been exhausted, companies are inclined to search in other possible ventures to further increase their profits. And one way of achieving this, and what has been a characteristic of corporate finance since the 1980s, is by acquiring or merging with other companies. These can be held and sold later at a higher price if the market continues to inflate.

The actual overcapitalisation emerged in UK and US with the rise of institutional investor: mainly pension funds and insurance companies. The concentration of savings in long-term financial institution let to the process of capital market inflation illustrated above. Pension funds and insurance companies dominate the capital market. So it is their flow of funds of particular interest as it has a critical effect on the functioning of the market and the activities of businesses.

If the capital market is deflating, lower prices will not evoke additional buying. High dividend yields on the one hand will be offset by prospective capital-losses, thus failing to elicit sufficient repurchases or redemptions of stock by companies to provide an inflow of funds that will balance the outflows. Toporowski argues that it is in this way that capital market inflation and deflation reinforce the inelastic demand and supply in the long-term stock market.

Thus the demand and supply of equity capital is not equal, and the price mechanism does not bring them into equilibrium. The capital market enters a process of inflation or deflation, resulting from whether is excess demand or excess supply in the market.

Companies demand for finance is determined by the size and nature of business and circumstances. More precisely, in the case of pension funds demand for equity will depend on its maturity, and in case of banks its determined to some extend on their capital requirements. Furthermore, under conditions of inelastic demand by banks, and the tendency of pension funds to mature, the nonfinancial companies could be forced into debt thus discouraging their investments and limiting their cash flow.

Pension funds do not need to issue capital. They will buy equity in proportion to the inflow of pension contributions and the maturity structure of their liabilities.
Banks in the US and UK systems are not allowed to hold equity as assets, but issue equity to raise capital.

The capital market inflation also analysis the effect of rising capital requirements as set by the Basel accords. Requiring banks to increase their capital reduces the amount of capital available to non-financial firms. When banks are faced with tighter capital regulation they have to adjust their capital accordingly. There are various ways in which banks adjust their required capital ratios. Either one of them will have a negative impact in the capital market. The first one is by issuing more equity capital reducing the amount of equity capital available to non-financial firms. The second one is by reducing their lending in relation to existing equity. The second reduces the amount of bank borrowing outstanding, and the size of bank balance sheet. In turn this reduces the amount of (bank) credit money in the economy, forcing companies to borrow from each other or in the case of large companies issue debt securities.

 The higher the amount of capital held by bank, the lower the quantity available to nonfinancial intermediaries in the market. Therefore, they are left with no option other than to raise their needed capital through the issue of debt instruments. Hence, firms are forced to borrow more than planned, which in turn reduces future fixed capital investment. Securitization is a way, which allows banks to raise capital ratios

and shift balance sheet composition toward less risky asset. The sale of loan-backed bonds to other financial intermediaries reduces the amount of capital available to firms in the market. This is another way in which companies are forced into more debt. Toporowski argues that "enforced indebtedness" increases the financial fragility of the economy. Firms that planned to issue equity to reduce the amount of debt held, now have debt in excess of what they planned which can be accommodated in two ways. Firstly, companies can hold larger amount of liquid assets. But this is not efficient since it means that the capital that firms have issued is being "wasted" by being held as financial asset rather than being used to expand production or fixed capital. Alternatively, firms could reduce their future fixed capital investment in order to be able to have those liquid assets. Therefore, the excess debt level being held by firm as a consequence of higher banks' capital regulation requirement reduces productive investment below what it would otherwise be. The reduced productive investment also reduces the cash flow of firms and their ability to service their debt. Therefore, higher capital requirement that aims to circumvent banks unsoundness, encourage firms to reduce their productive investment in fixed capital in response to their increased indebtedness. Toporowski, notes that such reduction in is the key determinant in causing the real economy to enter in recession. Furthermore, as history reveals the case of 1930s or Japan after 1992, excess debt can turn recession into economic stagnation and depression (Toporowski 2008, 2009).

3.0 EMPIRICAL ANALYSIS

This section provides empirical evidence illustrating the capital market inflation theory applied to the USA capital market. Data is obtained from the flow of funds accounts for the period of 1964-2010.

The main purpose here is to derive/calculate the supply and demand for capital in the market. The supply of funds for equity financing represents purchases of corporate equity from households, institutions and rest of the world. The calculations were made as follows:

- Household purchases represent increases in holdings of mutual funds, closed closed-end funds, change-traded funds, broke and dealers and funding corporations.
- Institutions represent purchases by property-casualty insurance companies, life insurance companies, private pension funds, state and local government retirement funds and federal government retirement funds.
- Rest of the world, is derived from subtracting net purchases from net issues to better determine its' flows in the market.

Demand is derived from combining non-financial sector issues of corporate equity with that of the financial sector.

As a first step in the analysis the inflow contributions of institutions in the capital market is analysed. The correlation between these contributions and the stock prices is calculated in order to establish their relationship. Data on S&P 500 composite, price index, is obtained for the period between 1964-2010, from DataStream. It is worth noting here, that this span period is chosen for the analyses, because the S&P 500 composite price index was only available from 1964 onward. The negative correlation of -0.015 obtained supports the theory that institutions demand for equity is relatively inelastic with respect to stock prices. As argued above the theory states that the demand for securities in the capital market by institutions depends on their contributions or premiums minus current liabilities determined by the maturity structure of all liabilities.

Furthermore, the correlation between the non-financial sector issues and the financial sector issues reveals a negative correlation of -0.46. This inverse relationship between them, highlights the argument raised above that as banks raise more capital reduces the amount available for firms, hence they are forced to indebtedness.

To empirically analyse the role of the net excess inflows in the capital market the following function is estimated:

$$\Delta p = f(S-D)$$

Where: Δp represents a change in stock prices; S is the supply of equity capital and D is the demand for equity capital, hence (S-D) represents the excess supply (or purchases) in the capital market.

Because stock price indices data show trending behaviour it is necessary to test whether the series is stationary in the mean. The Augmented Dickey Fuller test is used to detect whether the log level price index data is of a stationary form. The results indicate that the series is non-stationary so the difference-stationary procedure is used to remove the trend. The results for the first difference unit root test show that the series no longer contains a unit root. Hence, the first difference of log price index is stationary and the series used is said to be integrated of order 1, I (1).

After estimating the model, testing the presence of heteroskedasticity in the residual is also necessary. On inspection of the data, which is the informal way of detecting heteroskedasticity, a non-linear relationship between S&P 500 stock price index and the excess supply of equity capital was revealed, leading to suspicions of heteroskedasticity being present.

The presence of heteroskedasticity in the residuals could be an indication of model misspecification, in that an incorrect functional form is used. So that in order to analyse whether the functional form of the model is correct the Ramsey reset test was used[1]. The test uses various powers of fitted values of the dependent variable as proxies for the squared independent variable, to capture any possible non-linear relationship. This suggests testing for functional form misspecification the following equation is estimated:

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[1] Even though the Ramsey Reset test is used to detect nonlinearity, it does not give any indication of the most appropriate nonlinear model that could be used.

$$\Delta p = \beta_1 + \beta_2(S - D) + \delta_1 \hat{Y}^2 + \delta_2 \hat{Y}^3 + \varepsilon$$

The result of the test are shown below:

Ramsey RESET Test:

F-statistic	3.381462	Probability	**0.043486**
Log likelihood ratio	6.867831	Probability	0.032260

The p-value associated with the F-statistics, 0.04, is smaller than the 5% significance level; hence the null hypothesis of correct specification is rejected, concluding that the model is misspecified.

To fully recognise the presence of the problem, the following quadratic model was estimated:

$$\Delta p = \beta_1 + \beta_2(S - D) + \beta_3(S - D)^2 + \mu_t$$

In effect, what this regression implies is that the change in price depends on the excess supply of capital, but it does so in a quadratic fashion. This relationship supports the argument of the capital market inflation theory in that the demand for equity (or the supply of funds for equity capital) is relatively price inelastic. This means that in periods of market inflation, the price of long-term securities increases, and the subsequent capital gains attract speculative funds into the market. This in turn increases the demand for equity further more (Toporowski 2010).

The results of the regression output are presented below:

$$\Delta p = 0.066*^2 + 0.005255*(s-d) + 1.80E\text{-}05**(s-d)^2$$
$$(0.024) \qquad (2.66E\text{-}06) \qquad\qquad (9.85E\text{-}11)$$

The estimated equation[3] reveals a positive relationship between the two variables indicating a concave upward function. Because both, $(S-D)$ and $(S-D)^2$ have a positive sign, increases in excess supply always have a positive and increasing effect on stock price. The estimated coefficients are very small albeit significant. In order to calculate the increasing marginal effect of excess supply of capital on change in stock prices the following approximation is used:

$$\Delta\hat{p} = \left(\hat{\beta}_2 + 2\hat{\beta}_3\,(S-D)\right)\Delta(S-D),$$

$$so$$

$$\frac{\Delta\hat{p}}{\Delta(S-D)} \approx \hat{\beta}_2 + 2\hat{\beta}_3(S-D)$$

This approximation indicates that the slope and the relationship between excess supply of capital and stock price index depends on the value of the excess supply of capital.

Thus, the first \$1b of excess supply of capital increases stock price index by around 0.5255%. As the inflow of equity capital increases by a further \$1b, stock index prices increases by about 0.00526+1.80E-05(\$1b)=0.5291%. Even though the effect is rather small, because of the upward concave function a bigger value of the excess supply will lead to a higher percentage change in stock prices.

Taking the upper quartile value of highest value of excess inflow of £20.361b the increase of excess inflow to £21.361b increases price by around 0.6%.

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[2] * Denotes significance at 5% level or better; ** Denotes significance at 10% level or better. In paranetheses is the standard error…………..
[3] The tests carried out, confirmed that heteroskedasticy was no longer present, and no autocorrelation. Furthermore, the residuals are normally distributed.

Even though the results represent a small change in the price of stock, it is apparent that the higher the value of net inflows the higher the increase in stock prices.

4.0 CONCLUSION

This paper has developed a simple model to illustrate the capital market inflation theory applied to the US capital market. The model is composed by deriving the demand and supply of capital in the market using flow of funds data for the period 1964-2010. Estimating a quadratic relationship, the results support the capital market inflation theory in that the price level of long-term securities depends on the inflow of equity capital into the market.

5.0 BIBLIOGRAPHY

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