Mutual fund flows, expected returns, and the real economy

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Abstract

The paper explores whether the co-movement of market returns and equity fund flows can be explained by a common response to macroeconomic news. I find that variables that predict the real economy as well as the equity premium are related to mutual fund flows. Changes in dividend-price ratio explain mutual fund flows beyond the information contained in returns. Further predictive variables such as default spread, relative T-Bill rate and, in particular consumption-wealth ratio also explain mutual fund flows. Mutual fund flows are, in accordance with the information-response hypothesis, forward-looking and predict real economic activity.

Keywords: aggregate mutual fund flows, equity premium, return predictability, asset pricing

JEL: G12, G14

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1 Introduction

Stock market returns and flows into equity funds are contemporaneously correlated (Warther 1995): positive returns are accompanied by inflows into equity funds, and negative returns are accompanied by outflows or diminished inflows. Several competing theories provide an explanation for this co-movement. The so-called *feedback-trader hypothesis* states that market returns cause fund flows. Investors irrationally buy fund shares as a response to rising prices and sell when prices fall, hereby causing the positive co-movement. But causality could also run the opposite way. Mutual fund flows may represent market sentiment and increase demand for stocks, leading to a rise in prices. This hypothesis, which claims that flows cause returns, is known as the *price-pressure hypothesis*. A third explanation, the *information-response hypothesis*, states that both stock market returns and fund flows together react to new information. It is the latter that I explore.

The key argument of this paper is that stock market returns and mutual fund flows both react to information about the real economy. A long line of research has shown that expected stock market returns vary considerably over time and are linked to the business cycle (e.g. Fama and French 1989, Cochrane 1994, Lettau and Ludvigson 2001): expected returns are low in good times and high in bad times. In a recession, people are generally less willing to hold risky assets. Some investors will reduce their equity holdings in these adverse economic times. But not all investors can simultaneously sell their stocks, since someone has to hold the stocks in the end. Those investors who are willing to shoulder stock market risk in adverse economic times have to be compensated, which results in higher expected returns in bad times.

The portfolio adjustment of one particular investor group, mutual fund investors, can be observed in their flows. Assuming that mutual fund investors either have higher idiosyncratic income risk, or that they are more risk averse than the average investor, then bad news about the economy (reflected in falling prices) should lead to outflows from equity funds; good news about the economy (reflected in rising prices) should lead to inflows into equity funds. In this context it is news about the economy that is the driving force behind both fund flows and returns. And mutual fund flows responding to macroeconomic news is just the other side of an equity premium varying over the business cycle.

Why should mutual fund investors be more likely to sell stocks at bad news about the economy than the average market participant? Mutual fund investors are predominantly private investors, who are probably more severely affected by a recession than their institutional counterparts.[1] It can be argued that mutual fund investors have different preferences and are more risk averse than other investors. A number of models allow for heterogeneous investor preferences, including Dumas (1989), Wang (1996), Grossman and Zhou (1996) and Chan and Kogan (2002). Moreover, in the framework proposed by Mankiw (1986) and Constantinides and Duffie (1996), one could argue that mutual fund investors have a higher exposure to idiosyncratic income shocks than other private or institutional investors.

The information-response hypothesis provides two testable implications, both of which I address in this paper. First, changes in news variables which indicate riskier times and thus a higher risk compensation reflected in a higher equity premium should result in outflows from equity funds. Second, if fund flows and market returns together react to news about the real economy, then mutual fund flows and stock market returns should both predict economic activity.

The results of this paper can be summarized as follows. Mutual fund flows do indeed react to variables that forecast the equity premium, and in particular to dividend yield. Changes in the dividend-price ratio explain fund flows beyond the information contained

[1] According to the ICI, around 93 percent of total net assets of equity funds were held by individual accounts during the time period 2000-2009 (see ICI Factbook 2010).

in returns. In line with the information-response hypothesis, mutual fund flows also respond to other variables that predict the equity premium: an increase in default spread or consumption-wealth ratio *cay*, both indicating a rise in equity premium, leads to outflows; an increase in relative T-Bill rate, indicating a decrease in equity premium, leads to inflows into equity funds. Lettau-Ludvigson's *cay* is of particular interest, since it is known to provide another dimension of return predictability. This additional information included in the consumption-wealth ratio is also reflected in the fact that *cay* is able to explain mutual fund flows in addition to the dividend-price ratio. With regard to the second hypothesis, I find that mutual fund flows - like stock prices - are forward-looking. Mutual fund flows predict future economic activity, measured by real GDP, industrial production, consumption and labor income. These findings support the theory that market returns and mutual fund flows simultaneously react to macroeconomic news.

2 Related Literature

This paper connects and contributes to several strands of literature. First and foremost, it expands the literature that investigates aggregate fund flows and their relation to stock market returns. Warther (1995), one of the first to examine fund flows and their relationship to security returns, documents a significant contemporaneous correlation between stock market returns and mutual fund flows at a monthly frequency. As regards explanations for this co-movement, Warther concludes that stock returns and fund flows move together either because of price pressure or because of a common response to information. To disentangle causality between flows and returns, Edelen and Warner (2001) and Goetzmann and Massa (2003) turn to high-frequency data. However, evidence with regard to one or the other explanation is, despite the high frequency, inconclusive. This paper takes a different approach. Rather than examining high frequency flows, I investigate low frequency flows and their link to the real economy, since ultimately the decision to invest into financial assets cannot be isolated from the real economy.

This article links the studies on aggregate mutual fund flows to the broader literature on time-varying equity premium and asset prices. Several variables have been established to predict the equity premium, and these predictive variables are related to the business cycle.[2] In this paper I argue that mutual fund flows reacting to macroeconomic news is just the flip side of an equity premium varying over the business cycle. The link between mutual fund flows and predictive variables provides new evidence with regard to investor heterogeneity (see, e.g., Mankiw 1986, Dumas 1989, Constantinides and Duffie 1996, Wang 1996, Grossman and Zhou 1996, Chan and Kogan 2002). The paper contributes to this literature by demonstrating that one specific group of investors, mutual fund investors, are less willing to hold equity in adverse economic times and sell at news of such times. We thereby learn which investors are willing to hold equity throughout the business cycle.

Time-varying risk premia on the stock market are closely intertwined with the real economy. Consequently, this paper is also connected to the body of literature that documents a strong relationship between stock returns and future economic activity.[3] In particular it refers to the studies by Fama (1990) and Schwert (1990) which show that stock market returns predict future economic activity. The paper augments this literature by showing that not only stock market returns, but also mutual fund flows are forward-looking and predict real economic activity.

[2]See Table 4 for a summary of the literature.

[3]E.g. Fama (1981), Geske and Roll (1983), Kaul (1987), Fama (1990), Schwert (1990), Barro (1990) and Chen (1991).

3 Data and descriptive statistics

Data on aggregate flows into equity funds are provided by the Investment Company Institute (ICI).[4] Following Warther (1995) and Fant (1999) I calculate quarterly net flows as new sales minus redemptions plus exchanges-in minus exchanges-out, and standardize flows by the total market value of the previous quarter using the total market index from Thomson Reuters Datastream. Fund flows are measured over the period of one quarter in order to link them to macroeconomic data. For example the consumption-wealth ratio, which serves as a key predictive variable in our context, is only available at quarterly frequency. Overall, the mutual fund data cover 26 years, from 1984:Q1 until 2009:Q4.

The market return is proxied by the return of the S&P500, which is also obtained from Thomson Reuters Datastream. Several variables that predict the equity premium are considered in this paper: dividend-price ratio, default spread, term spread, relative T-Bill rate and the consumption-wealth ratio. The dividend yield of the S&P500 is measured by the ratio of average annual dividends and end-of-quarter prices, taken in logs. Data on dividends and prices of the S&P500 are taken from Robert Shiller's homepage. The default spread is calculated as the end-of-period difference between Moody's BAA and AAA Seasoned Corporate Bond Yield. Term spread is computed as the difference between the 10-year and 1-year maturity Treasury rates at the end of each quarter. Following Campbell (1991) and Hodrick (1992), who use a stochastic detrended T-Bill rate to forecast returns, the relative T-Bill rate is calculated as the 3-month T-Bill rate minus its 12-month moving average. Data on corporate bonds and Treasury rates are all obtained from the Federal Reserve Bank of St. Luis. The updated time series of the consumption-wealth ratio *cay* is from Martin Lettau and Sydney Ludvigson.[5]

[4] ICI data cover about 98 percent of assets in the mutual fund industry (see, e.g., ICI - Trends in Mutual Fund Investing, July 2010).

[5] The consumption-wealth ratio *cay* is computed as $cay_t = c_t - 0.2084a_t - 0.6711y_t$ and demeaned, where c_t is consumption, a_t asset wealth, and y_t labor income. For further details, see Lettau and Ludvigson (2001, 2004).

Economic activity is measured by the real gross domestic product (GDP). In addition I also consider real industrial production, consumption and labor income as measures for the state of the economy. Several studies link stock returns to these macroeconomic variables, including Fama (1990), Schwert (1990), Chen (1991) and Lamont (2001). As the corporate bonds and Treasury rates data, all macroeconomic data are also from the Federal Reserve Bank of St. Luis.

[Insert Table 1 about here]

Table 1 exhibits descriptive statistics of mutual fund flows, stock market returns and the first difference of predictive variables, as well as GDP growth. Panel A provides mean, standard deviation and autocorrelations, while Panel B shows correlations. In order to illustrate the relation of market return, fund flows and predictive variables to the real economy, the table also reports correlations to past, future and contemporaneous GDP growth. The relation to the other measures of economic activity (industrial production, consumption and labor income growth) is similar, but not reported for reasons of brevity.

First differences of all predictive variables are taken, since changes in these variables should be connected to mutual fund flows. A shift in a predictive variable reflects a change in the level of risk and thus should lead to an adjustment in equity holdings for mutual fund investors visible through higher or lower net flows. Changes in the predictive variables show no considerable autocorrelation and thus can be seen as news variables.

Panel B displays the correlation matrix of the variables mentioned above. First of all, there is a strong co-movement of mutual fund flows and stock market returns with a correlation coefficient of 0.46. But other variables also show a notable correlation with mutual fund flows, in particular $\Delta(d-p)_t$ and Δcay_t. The correlation between fund flows and $\Delta(d-p)_t$ is even stronger than between flows and returns with a correlation of -0.53. Most of the predictive variables are correlated with each other, and they are correlated with, or predict real economic activity. Note that market returns and mutual fund flows are also positively related to contemporaneous and future GDP growth.

[Insert Figure 1 about here]

Figure 1 illustrates the business cycle pattern of mutual fund flows and the most important predictive variables: the dividend-price ratio and the consumption-wealth ratio *cay*. Just before and during recessions there is a surge in both dividend yield and *cay*, and at the same time there are outflows from equity funds. The rise in the dividend-price ratio and *cay* accompanied by outflows from equity funds is particularly strong for the most recent and most severe recession.

4 Mutual fund flows and stock market returns

I begin by analyzing the properties of aggregate mutual funds and their relation to stock market returns. Following Warther (1995) I run a regression of mutual fund flows on its lag and concurrent market returns, the results of which can be found in Table 2. In line with Warther's findings, column (1) shows that quarterly fund flows can be modeled by an AR(1)-process. The coefficient of the first lag is 0.73 and statistically significant, and the Ljung-Box Q-statistic is unable to detect any remaining autocorrelation in the residuals. Mutual fund flows show a sizable contemporaneous correlation with stock returns, as demonstrated in column (2). The share of mutual fund flow variance explained by market returns amounts to 20.8 percent. In column (3) both regressors, past flows and concurrent returns, are included and coefficient estimates are virtually the same as before.

[Insert Table 2 about here]

Once more following Warther (1995), fund flows are separated into their expected and unexpected components, where the expected component is the fitted values of the

AR(1)-model estimated in column (1), and the unexpected component is its residuals. Comparing columns (4) and (5), we observe that market returns are correlated with unexpected flows, but are uncorrelated with expected flows. The result of column (4) underlines the strong relation between market returns and flows, with market returns explaining up to 40.8 percent of flow innovations. This regression should not be read in a causal sense, i.e., that returns cause flows: it merely measures the linear dependence between flows and returns, and one can likewise run a regression of returns on flows. The results with respect to the R^2, the explained variation, are the same, i.e., 40.8 percent of returns are explained by mutual fund flow innovations.

The separation of mutual fund flows into expected and unexpected flows provides a direct insight into the relation between returns and fund flows. For the remainder of the analysis, however, I will use the multiple regression model presented in column (3), since according to the Frisch-Waugh Theorem, the market return's regression coefficients of the partial model (4) and multiple regression model (3) have to be equal. This avoids any complications regarding inference, which might arise due to the fact that unexpected flows are estimated.

Table 2 documents facts about fund flows and stock market returns, yet there are several, not necessarily mutually exclusive, explanations for these facts (Warther 1995, Edwards and Zhang 1998, Fant 1999). The first explanation for the co-movement of stock market returns and equity fund flows is the so-called feedback-trader hypothesis, in which mutual fund investors react irrationally to positive returns with inflows and to negative returns with outflows. Another explanation is the price-pressure hypothesis. In this setting, mutual fund investors represent investor sentiment, i.e. optimism or pessimism unrelated to fundamentals, with the larger demand for stocks leading to price-pressure and a temporary increase in prices. A further possibility is that a common factor drives both returns and flows. This study focuses on the last explanation and its implications, examining in particular whether both fund flows and returns together react to a specific sort of information, namely news about the macroeconomy.

In both cases, under the price-pressure hypothesis and the information-response hypothesis, the mutual fund investors' demand for equity changes. The crucial difference between the two explanations, though, is that in case of the price-pressure hypothesis fund flows are unrelated to fundamentals, but in case of the information-response hypothesis they are driven by fundamentals (i.e., news about the economy).

The information-response hypothesis has two main implications, which are tested in the following. First, variables that predict the real economy should affect mutual fund flows. Second, if mutual fund flows react to news about the real economy, then mutual fund flows should also predict real economic activity.

5 Mutual fund flows and predictive variables

5.1 Dividend-price ratio

To test the information-response hypothesis I first explore the connection between mutual fund flows and changes in the dividend yield. The dividend-price ratio or dividend yield is one of the most common variables used to predict the equity premium (see, e.g., Shiller, Fischer and Friedman 1984, Fama and French 1988, Campbell and Shiller 1988, Ferson and Harvey 1991). A high dividend-price ratio forecasts a high market excess return. In riskier times prices are low in relation to dividends, and the dividend-price ratio is high. During these times investors are less willing to hold equity, and those investors who are willing to hold equity need to be compensated by a higher expected return.

News about a change in the level of risk is thus captured by a *change* in the dividend-price ratio: $\Delta(d-p)_t$. When there is no news, mutual fund investors have no reason to alter their investment behavior, thus fund flows should not change. A shift in the level of risk, on the other hand, is reflected by a change in dividend-price ratio and thus should lead to an adjustment in mutual fund owners' investment decision. Changes in dividend-price ratio should therefore be relate to unexpected mutual fund flows.

[Insert Table 3 about here]

This relationship is tested by regressing fund flows on its lag and concurrent changes in the dividend-price ratio. Results of this regression can be found in Table 3. Consistent with the information-response hypothesis, I find that an increase in dividend yield is linked to outflows from mutual funds. Moreover, the explanatory power of the dividend-price ratio is even higher than that of the market return: the adjusted R^2 of model (2) is 73.4 percent compared to the 71.6 percent of the baseline model (1). Including both market return and dividend-price ratio as regressors, as in column (3), leads to an insignificant coefficient for market return and no increase in adjusted R^2. This result shows that changes in the dividend-price ratio capture all the information of market return with respect to mutual fund flows.

At first sight, the results of Table 3 do not seem surprising. Market returns and $\Delta(d-p)_t$ show a strong negative correlation (compare Table 1), since both variables are to a large extent driven by price innovations. This negative correlation suggests that market returns and $\Delta(d-p)_t$ have the opposite effect on flows. But mutual fund flows respond to changes in dividend-price ratio to an even greater extent than to market returns, indicating that dividend yield contains additional information for mutual fund investors. If unexpected mutual fund flows react to macroeconomic news and their reaction to $\Delta(d-p)_t$ is stronger than to returns, then changes in dividend yield should also provide more information about the future economy.

Dividend yield is indeed a better forecasting variable for economic activity than market return. Just by looking at the correlation matrix of Table 1, we can see that the correlation between future GDP growth and $\Delta(d-p)_t$ is -0.42, while the correlation between future GDP growth and market returns is only 0.32. More specifically, in a forecasting regression for GDP growth, dividend yield achieves a higher adjusted R^2 than market return. Furthermore, in a joint forecasting model $\Delta(d-p)_t$ drives out market return, indicating that all relevant information is captured in the dividend yield (see Appendix, Table A.1). Since dividend yield apparently is a better measure for macroeconomic news, fund flows are more responsive to this variable than to market returns.

These findings provide a new way of looking at the co-movement of mutual fund flows and market returns. Changes in dividend yield can be seen as the third variable, which simultaneously affects returns and fund flows. Shifts in dividend-price ratio represent changes in expected returns and thus changes in the level of (macroeconomic) risk, which is the variable mutual fund investors *actually* react on. Because changes in dividend-price ratio are highly correlated with returns, we also observe a correlation between fund flows and returns.

5.2 Other predictive variables

The information-response hypothesis is not only able to explain the co-movement of market returns and fund flows, but also provides further testable implications. If news about the real economy is the driving force behind mutual fund flow innovations, other variables that indicate riskier or less risky times should also be related to mutual fund flow innovations. Several other variables besides the dividend-price ratio relate to the equity premium, of which I investigate the following: default spread, term spread, relative T-Bill rate and the consumption-wealth ratio.

Default spread, term spread and the consumption-wealth ratio have been found to be *positively* related to the equity premium (see Fama and French 1988, Campbell and

Shiller 1988, Fama and French 1989, Chen 1991, Lettau and Ludvigson 2001), while the relative T-Bill rate has been found to be *negatively* related to the equity premium (see Campbell 1991, Hodrick 1992). Consequently, under the information-response hypothesis an increase in default and term spread as well as *cay* should lead to *outflows*, and an increase in the relative T-Bill rate should lead to *inflows* from mutual fund investors. As discussed before, it is the *change* in predictive variables, which reflects a shift in (macroeconomic) risk, that leads to an adjustment in inventor behavior and thus should be related to equity fund flows.

[Insert Table 4 about here]

Table 4 summarizes the literature on return predictability and the testable hypotheses for mutual fund flows under the information-response hypothesis. It provides the predictive variables mentioned above, their link to the business cycle and their relation to expected returns. The last column shows the testable relation of predictive variables to mutual fund flows implied by the information-response hypothesis. Isolated from the macroeconomic context, one might wonder why variables that signal high expected returns should result in outflows from equity funds. Should mutual fund investors not react to the signal of high expected returns and buy equity? The information-response hypothesis argues that it is the other way around. It is news about riskier economic times that is reflected in the predictive variables. As a response to this news, there is a downward adjustment of mutual fund investors' equity holdings (either due to higher risk aversion or higher income risk). Other investors who are willing to hold equity in riskier economic times are compensated by higher expected returns.

[Insert Table 5 about here]

The regression results of mutual fund flows on other predictive variables are presented in Table 5. Panel A shows the predictive variables without the change in dividend yield, Panel B the predictive variables combined with the change in dividend yield. The results in Panel A show that mutual fund flow innovations are negatively related to changes in default spread. An increase in default risk signals riskier times to invest in equity and thus leads to outflows from mutual funds. The opposite is the case for the relative T-Bill rate, where a rise in the relative T-Bill rate indicates a lower equity premium: more investors are willing to hold equity, which results in higher inflows. Mutual fund flow innovations seem to be unrelated to changes in term spread. This lack of response can be explained by the fact that term spread is related to a greater degree to past and contemporaneous economic activity than to future economic activity (see, e.g., Fama and French 1989, Fama 1991, or Panel B of Table 1). Thus, term spread is rather an indicator of bad times than a proxy for news about imminent bad times, explaining why fund flows show no relation to it.

Finally, mutual fund flows are, as predicted, negatively linked to the consumption-wealth ratio. The consumption-wealth ratio is high before and around economic contractions and therefore positively related to the equity premium. Increases in *cay* signal poor economic times, leading to a downward adjustment in mutual fund investors' equity holdings. Overall, these findings support the information-response hypothesis: bad news about the economy (reflected in a rise in default spread and consumption-wealth ratio) leads to outflows by mutual fund investors, while good news about the economy (indicated by an increase in relative T-Bill rate) leads to inflows.

Panel B in Table 5 constitutes an investigation of which predictive variables have an influence on mutual fund flows in addition to the dividend-price ratio. The results in column (3) show that the relative T-Bill rate provides additional explanation for mutual fund flows with an adjusted R^2 of 74.1, which is slightly higher than the model including only dividend yield (Adj. R^2: 73.4, see Table 3). The default spread, on the other hand, becomes insignificant when the dividend-price ratio is added. This is not surprising, since it is well established that default spread has no marginal explanatory power for expected returns, when the dividend-price ratio is included (see, e.g., Fama and French 1989, Chen 1991, Hodrick 1992). This is due to the fact that the two variables contain similar information about the business cycle. (See Table 1, Panel B for the correlation structure of these variables.) If a variable has no additional information with respect to the equity premium, then it should not have an additional effect on mutual fund flows either.

The consumption-wealth ratio *cay*, on the other hand, is known to provide another independent dimension to the predictability of excess returns (Lettau and Ludvigson 2001, 2005). If *cay* contains additional information about the risk premium of the stock market, changes in cay should also help to explain unexpected fund flows in addition to the dividend-price ratio. The results documented in column (4) suggest that this is the case. The adjusted R^2 of this model is 75.7, which is considerably higher than that of the benchmark model using only lagged flows and contemporaneous returns as explanatory variables, which has an adjusted R^2 of 71.6 percent (see Table 2, column (3)). The joint model uniting all predictive variables even yields an adjusted R^2 of 77.0 percent, as can be seen in column (5). These results are also robust, when market return is included as an additional explanatory variable as in column (6). The predictive variables stay significant, while market return adds no explanatory power to unexpected flows. In summary, changes in the dividend-price ratio and consumption-wealth ratio constitute the two major variables that are related to mutual fund flows.

Figure 1 depicts the relation between mutual fund flows and the most important predictive variables: dividend-price and the consumption-wealth ratio. As mentioned before, rises in the dividend-price ratio as well as *cay* occur at the beginning of and during recessions, coinciding with outflows from equity funds. The figure also clarifies why *cay* provides additional explanatory power with regard to mutual fund flows. On a number of occasions where we observe outflows, such as the recessions of 1990/1991 and 2001, *cay* is more responsive than the dividend-price ratio, thus providing additional information.

6 Mutual fund flows and future economic activity

6.1 Vector autoregression analysis

The previous section investigated the relation of predictive variables to mutual fund flows, while stressing the link of both to the real economy. Now I will analyze in detail the relation of mutual fund flows to the real economy, as an alternative test to see whether mutual fund flows react to macroeconomic news. The idea behind this test is that if mutual fund flows respond to news about the real economy, then mutual fund flows should be able to predict real economic activity. If there is news about a worsening economy, the marginal mutual fund investor, unwilling to hold equity funds through this time, will withdraw his or her shares. On the other hand, if positive news about the economy occurs, the marginal investor will be more willing to hold equity funds, increasing his or her shares. If mutual fund investors are *on average* right, then the state of the economy should be worse after outflows and better after inflows into mutual funds. This is the second main hypothesis implied by the information-response explanation of mutual fund flows.

This hypothesis will first be tested within a bivariate vector autoregression (VAR) framework of mutual fund flows and economic activity growth. Measures for economic activity are real GDP, industrial production, consumption and labor income. To answer the question of whether mutual fund flows contain information about future economic activity, I employ the concept of Granger causality. That is, I test whether lags of economic activity provide statistically significant information about future mutual fund flows, or whether lags of mutual fund flows provide statistically significant information about future economic activity. Of course, Granger causality does not imply true causality, i.e., it does not say that mutual fund flows cause higher economic activity or vice versa. It merely states that one variable contains information about the other. And for that matter it is exactly the question we are interested in, since we want to investigate if mutual fund flows react to macroeconomic news and therefore contain information about the real economy.

[Insert Table 6 about here]

Table 6 shows the estimation results of the VAR model using one lag. The small lag length is chosen in order to provide a parsimonious model of mutual fund flows and economic activity growth. This model selection is also supported by the Schwarz-Bayes (SBIC) information criterion. For VAR models including additional lags, see Table A.2 in the Appendix.

For all four proxies of economic activity we find a consistent pattern: mutual fund flows help to predict economic activity growth, but economic activity growth does not help to predict mutual fund flows. In the economic activity equation, lagged flows are significant for all proxies of economic activity, while in the fund flow equation lagged economic activity is insignificant. This result is supported by the Granger causality F-test. The results of the Granger causality test are robust for VAR models of several lag lengths (see Appendix, Table A.2).[6]

Table 6 documents a new and important fact about mutual fund flows: they are forward-looking. At a first glance this might seem surprising, yet we are quite familiar with the fact that financial variables are forward-looking: it is well established, for example by Fama (1990) and Schwert (1990), that stock prices or returns predict economic

[6] Vector autoregression models are estimated with lags 1 through 4. For all VAR models, Granger causality tests yield similar results.

activity. If fund flows and returns react to the same macroeconomic information, it must follow that mutual fund flows predict economic activity as well. Hence, the next section considers the joint forecasting ability of market returns and fund flows.

6.2 Forecasting comparison of market returns and fund flows

Following Ludvigson (2004) and Lemmon and Portniaguina (2006) I run a forecasting regression of economic activity on its lags and lagged market return and/or flows. The baseline model is a simple model of economic activity growth regressed on its four lags, the results of which are not reported for reasons of brevity. I calculate the increment of adjusted R^2, which is the percentage point increase of adjusted R^2 relative to the baseline model.

[Insert Table 7 about here]

Table 7 shows the results of this forecasting regression for real GDP, industrial production, consumption and labor income growth. As documented in previous literature (e.g. Fama 1990, Schwert 1990), we see that stock market returns help to predict economic activity in addition to its lagged values. The incremental R^2 varies between 4.4 and 11.1 percent depending on the economic activity measure considered, and mutual fund flows predict economic activity in a similar manner. The regression coefficient is significantly different from zero throughout all specifications and the incremental R^2 is comparable to that of the market return. Consumption and labor income growth are in general harder to predict. Their regressions' incremental R^2 is lower for both market return and fund flows.

When both market return and mutual fund flows are included to predict economic activity, we observe a reduction in regression coefficients and significance for both variables indicating that returns and flows contain partly redundant information about future economic activity. This is especially the case for GDP and consumption growth, where the market return coefficient becomes insignificant. Overall, these results imply that market returns and mutual fund flows contain similar (but not completely identical) information about the real economy, which explains their co-movement over time.

7 Concluding Remarks

Competing theories provide an explanation for the co-movement of stock market returns and mutual fund flows. This paper considers two testable implications of the explanation that both returns and flows react to news about the real economy, and it provides support for this explanation. Variables that predict the business cycle and the equity premium are able to explain mutual fund flows, notably the dividend-price ratio and consumption-wealth ratio. Furthermore, mutual fund flows - like stock returns - are forward-looking and help to predict real economic activity. In summary, the paper connects mutual fund flows, expected returns and the real economy.

These results have significant implications for other related questions. The facts documented in this paper call into question the notion that mutual fund flows reflect market sentiment, a view often expressed by practitioners or the popular press. Mutual fund flows do not merely represent sentiment, i.e. optimism or pessimism unrelated to fundamentals. Instead they are related to the real economy similarly to the way that market returns are.

The findings presented in this paper also provide a new perspective on the question of "market timing". Nesbitt (1995), Ben-Rephael, Kandel and Wohl (2010), and Fang (2010), for example, provide evidence that mutual fund investors have poor "market timing" ability - that is they earn lower returns than the market. The information-response hypothesis provides an explanation for their low expected return. Mutual fund investors seem to be less willing to bear risk in bad times, and therefore earn a lower expected return in equilibrium.

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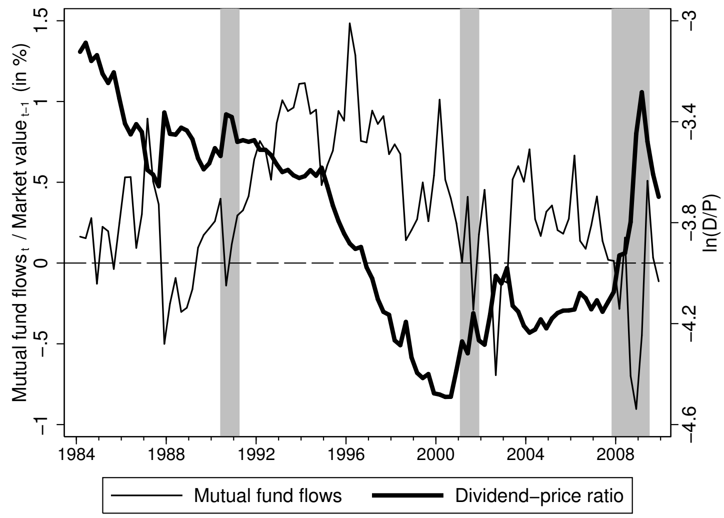
(a) Mutual fund flows and dividend-price ratio



(b) Mutual fund flows and consumption-wealth ratio

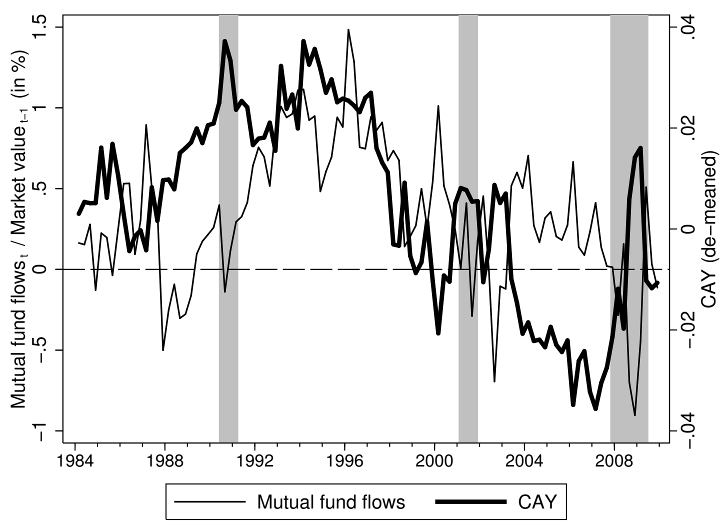


Figure 1:
Mutual fund flows and predictive variables

This table displays flows into equity mutual funds (in percent) normalized by dividing by lagged total market capitalization and their relation to a) the log dividend-price ratio and b) the consumption-wealth ratio *cay*. Shaded areas indicate recessions as defined by the National Bureau of Economic Research, NBER. The sample period is 1984:Q1-2009:Q4.

Table 1:
Summary Statistics

This table reports summary statistics of net flows into equity funds (in percent) normalized by dividing by lagged total market capitalization, market returns (in percent) measured by the return of the S&P500 index, the first difference of predictive variables and GDP growth (in percent). $\Delta(d-p)_t$ is the change in the dividend-price ratio, $\Delta\text{Default}_t$ is the change in the default spread, ΔTerm_t the change in the term spread, $\Delta\text{Rel. T-Bill}_t$ the change in the relative 3-month T-Bill rate and Δcay_t the change in the consumption-wealth ratio. Panel A provides mean, standard deviation and autocorrelations; Panel B displays correlations.

Panel A: Mean, Standard Deviation and Autocorrelations

			Autocorrelations for Lag						
Variable	Mean	Std. Dev.	1	2	3	4	5	10	20
Flow_t	0.35	0.44	0.72	0.55	0.51	0.48	0.38	0.19	-0.14
Return_t	3.11	8.55	0.07	0.00	0.02	0.08	-0.02	0.04	-0.06
$\Delta(d-p)_t$	-0.01	0.08	0.13	-0.01	-0.02	0.01	-0.03	0.00	-0.05
$\Delta\text{Default}_t$	0.00	0.25	0.11	-0.25	-0.16	0.01	-0.08	0.02	0.00
ΔTerm_t	0.01	0.42	0.20	0.19	0.10	-0.06	-0.05	-0.01	0.04
$\Delta\text{Rel. T-Bill}_t$	-0.01	0.59	0.03	0.10	-0.07	-0.28	0.08	-0.03	-0.01
Δcay_t	0.00	0.01	-0.19	0.00	-0.09	0.04	-0.08	-0.08	0.00
GDP Growth_t	0.69	0.63	0.46	0.42	0.13	0.15	0.05	0.02	-0.03

Table 1 -Continued

Panel B: Correlation Matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	Flow_t	1.00									
(2)	Return_t	0.46	1.00								
(3)	$\Delta(d-p)_t$	-0.53	-0.92	1.00							
(4)	$\Delta\text{Default}_t$	-0.23	-0.31	0.44	1.00						
(5)	ΔTerm_t	-0.10	-0.09	0.08	-0.08	1.00					
(6)	$\Delta\text{Rel. T-Bill}_t$	0.17	0.06	-0.13	-0.16	-0.50	1.00				
(7)	Δcay_t	-0.32	-0.58	0.53	0.18	0.01	-0.12	1.00			
(8)	GDP Growth_{t-1}	0.26	0.14	-0.16	0.02	-0.34	0.03	0.05	1.00		
(9)	GDP Growth_t	0.37	0.20	-0.30	-0.18	-0.22	0.17	-0.14	0.47	1.00	
(10)	GDP Growth_{t+1}	0.44	0.32	-0.42	-0.27	-0.12	0.05	-0.25	0.44	0.47	1.00

Table 2:
Mutual fund flows and stock market returns

The table shows the results of a regression of net flows into equity funds on past flows and contemporaneous market returns. The R^2 (simple and adjusted) is provided for each regression. Column (1) displays the Ljung-Box Q-statistic for the test that residuals are not autocorrelated (up to lag 20). Unexpected and expected net flows in columns (4) and (5) are the residuals and fitted values of the regression model in column (1). Heteroskedasticity-robust t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level respectively.

	(1)	(2)	(3)	(4)	(5)
	Dependent Variables:				
				Unexpected	Expected
	$Flow_t$	$Flow_t$	$Flow_t$	$Flow_t$	$Flow_t$
$Flow_{t-1}$	0.73***		0.72***		
	(10.92)		(13.52)		
$Return_t$		0.02***	0.02***	0.02***	0.00
		(5.30)	(8.41)	(8.45)	(0.27)
Constant	0.09**	0.27***	0.02	-0.07***	0.35***
	(2.30)	(6.69)	(0.80)	(-2.95)	(10.24)
R^2	52.5	21.6	72.2	41.4	0.1
Adj. R^2	52.1	20.8	71.6	40.8	-0.9
Q-Statistic	20.0				
p-value	0.46				

Table 3:
Mutual fund flows, market returns, and changes in dividend yield

The table shows the results of a regression of net flows into equity funds on past flows, contemporaneous market returns and changes in dividend-price ratio. The R^2 (simple and adjusted) is provided for each regression. Heteroskedasticity-robust t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level respectively.

	(1)	(2)	(3)
	Dependent Variable: $Flow_t$		
$Flow_{t-1}$	0.72***	0.68***	0.69***
	(12.60)	(12.19)	(12.21)
$Return_t$	0.02***		0.01
	(7.47)		(0.92)
$\Delta(d-p)_t$		-2.47***	-1.89**
		(-7.46)	(-2.58)
Constant	0.02	0.09***	0.08**
	(0.79)	(3.14)	(2.12)
R^2	72.2	73.9	74.1
Adj. R^2	71.6	73.4	73.3

Table 4:
Testable hypotheses: Predictive variables and mutual fund flows:
The table summarizes the findings for several predictive variables X_t and their connection to the equity premium, as well as their link to economic activity. It also displays the relation of a change in the predictive variable ΔX_t to mutual fund flows implied by the information-response hypothesis.

Variable:	Relation to economic activity:	Relation to equity premium:	Implied relation to mutual fund flows:
Dividend-price ratio	negative	positive[a]	negative
Default spread	negative	positive[b]	negative
Term spread	negative	positive[c]	negative
Rel. T-Bill rate	positive	negative[d]	positive
Consumption-wealth ratio	negative	positive[e]	negative

[a] Shiller, Fischer and Friedman (1984), Fama and French (1988), Campbell and Shiller (1988), and Ferson and Harvey (1991)

[b] Fama and French (1989), and Chen (1991)

[c] Campbell (1987), Fama and French (1989), and Chen (1991)

[d] Campbell (1991) and Hodrick (1992)

[e] Lettau and Ludvigson (2001, 2005)

Table 5:
Mutual fund flows and changes in other predictive variables
This table shows the regression results of mutual fund flows on lagged flows and changes in predictive variables. $\Delta(d-p)_t$ is the change in log dividend-price ratio, $\Delta\text{Default}_t$ the change in default spread, ΔTerm_t the change in term spread, ΔRel. T-Bill$_t$ the change in the relative 3-month T-Bill rate, and Δcay_t the change in the consumption-wealth ratio. The table provides R^2 and adjusted R^2 for each regression. Heteroskedasticity-robust t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level respectively.

	(1)	(2)	(3)	(4)	(5)
	Panel A:				
	Dependent Variable: Flow_t				
Flow_{t-1}	0.71***	0.73***	0.73***	0.76***	0.76***
	(12.25)	(10.85)	(11.05)	(13.33)	(14.14)
$\Delta\text{Default}_t$	-0.27**				-0.09
	(-2.24)				(-0.92)
ΔTerm_t		-0.01			0.07
		(-0.10)			(0.93)
ΔRel. T-Bill$_t$			0.12***		0.11**
			(2.96)		(2.09)
Δcay_t				-21.69***	-20.22***
				(-5.78)	(-5.23)
Constant	0.10***	0.09**	0.09**	0.08***	0.08***
	(2.71)	(2.34)	(2.40)	(2.80)	(2.92)
R^2	55.0	52.5	55.2	67.5	69.7
Adj. R^2	54.1	51.6	54.3	66.9	68.1

Table 5 -Continued

	(1)	(2)	(3)	(4)	(5)	(6)
			Panel B:			
			Dependent Variable: Flow_t			
Flow_{t-1}	0.69***	0.69***	0.68***	0.71***	0.72***	0.73***
	(11.54)	(12.08)	(12.78)	(13.49)	(14.30)	(14.42)
$\Delta(d-p)_t$	-2.58***	-2.48***	-2.39***	-1.91***	-2.06***	-1.80***
	(-7.47)	(-7.42)	(-7.16)	(-4.91)	(-5.42)	(-2.67)
$\Delta\text{Default}_t$	0.09				0.14	0.13
	(0.61)				(1.19)	(1.08)
ΔTerm_t		0.03			0.11*	0.12*
		(0.48)			(1.95)	(1.98)
$\Delta\text{Rel. T-Bill}_t$			0.07**		0.11***	0.12***
			(2.43)		(3.20)	(3.10)
Δcay_t				-10.66**	-9.85**	-9.42**
				(-2.61)	(-2.34)	(-2.11)
Return_t						0.00
						(0.42)
Constant	0.09***	0.09***	0.10***	0.09***	0.08***	0.07**
	(2.94)	(3.09)	(3.29)	(3.30)	(3.19)	(2.59)
R^2	74.1	74.0	74.9	76.5	78.4	78.4
Adj. R^2	73.3	73.2	74.1	75.7	77.0	76.8

Table 6:
Mutual fund flows and economic activity

The table provides estimates of a VAR(1) of mutual fund flows and proxies for economic activity growth. Measures for economic activity are gross domestic product (Panel A), industrial production (Panel B), consumption (Panel C) and labor income (Panel D). It also displays a Granger causality test for fund flows and economic activity. In column (1) the Granger causality F-statistic tests that flows are excluded from the economic activity growth equation, and in column (2) that economic activity growth is excluded from the flow equation. Heteroskedasticity-robust t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level respectively.

	(1)	(2)
	Dependent Variables:	
Panel A:	GDP Growth$_t$	Flow$_t$
GDP Growth$_{t-1}$	0.35***	-0.02
	(3.94)	(-0.29)
Flow$_{t-1}$	0.43***	0.74***
	(3.42)	(10.00)
Constant	0.29***	0.10**
	(3.73)	(2.18)
Granger Causality: F-Statistic	11.7	0.1
p-value	0.00	0.77

	Dependent Variables:	
Panel B:	Industrial Production Growth$_t$	Flow$_t$
Ind. Production Growth$_{t-1}$	0.25***	0.03
	(2.85)	(1.09)
Flow$_{t-1}$	1.31***	0.69***
	(4.57)	(9.26)
Constant	-0.53***	0.11***
	(-3.46)	(2.67)
Granger Causality: F-Statistic	20.9	1.2
p-value	0.00	0.27

Table 6 -Continued

	(1)	(2)
	Dependent Variables:	
Panel C:	Consumption Growth$_t$	Flow$_t$
Consumption Growth$_{t-1}$	0.29***	0.03
	(3.10)	(0.50)
Flow$_{t-1}$	0.30**	0.72***
	(2.50)	(9.92)
Constant	0.43***	0.08
	(4.98)	(1.45)
Granger Causality: F-Statistic	6.2	0.2
p-value	0.01	0.62

	Dependent Variables:	
Panel D:	Labor Income Growth$_t$	Flow$_t$
Labor Income Growth$_{t-1}$	0.36***	0.03
	(4.02)	(0.88)
Flow$_{t-1}$	0.48***	0.71***
	(2.86)	(9.70)
Constant	0.20**	0.08**
	(2.09)	(1.97)
Granger Causality: F-Statistic	8.2	0.8
p-value	0.00	0.38

Table 7:
Mutual fund flows, market returns, and real economic activity

The table provides the estimates of a forecasting regression of economic activity growth. Measures for economic activity are gross domestic product (GDP), industrial production, consumption and labor income. The forecasting regression also includes four lags of the dependent variable (baseline model). The incremental adjusted R^2 (in percent) is reported relative to the baseline model, which includes only lagged values of the dependent variable. Heteroskedasticity-robust t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable: GDP Growth$_t$			Dependent Variable: Ind. Production Growth$_t$		
Return$_{t-1}$	0.02***		0.01	0.06***		0.04**
	(2.79)		(1.57)	(3.72)		(2.55)
Flow$_{t-1}$		0.42***	0.33**		1.29***	0.90***
		(3.41)	(2.45)		(4.62)	(3.38)
Incremental Adj. R^2	4.4	6.9	7.7	11.1	11.4	15.2
	Dependent Variable: Consumption Growth$_t$			Dependent Variable: Labor Income Growth$_t$		
Return$_{t-1}$	0.01*		0.01	0.02**		0.02*
	(1.83)		(1.35)	(2.44)		(1.81)
Flow$_{t-1}$		0.27**	0.18*		0.49***	0.33**
		(2.40)	(1.98)		(2.74)	(2.13)
Incremental Adj. R^2	3.8	3.5	4.5	5.4	5.2	6.9

A Appendix

Table A.1: Economic activity forecasting comparison: Market return and change in dividend yield

The table provides the estimates of a forecasting regression of economic activity proxied by GDP growth (see Table 7). The forecasting regression also includes four lags of the dependent variable (baseline model). The incremental adjusted R^2 (in percent) is reported relative to the baseline model, which includes only lagged values of the dependent variable. Heteroskedasticity-robust t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level respectively.

	(1)	(2)	(3)
		GDP Growth$_t$	
Return$_{t-1}$	0.02***		-0.02
	(2.80)		(-1.06)
$(d-p)_{t-1}$		-2.23***	-3.90**
		(-4.17)	(-2.47)
Incremental Adj. R^2	4.4	7.5	7.6

Table A.2: Mutual fund flows and real economic activity: Further specifications

In this table the analysis of Table 6 is repeated for further lag lengths: VAR(1) - VAR(4). The table further provides the Schwarz-Bayes (SBIC) and Akaike (AIC) information criterium for model selection (minimum in bold face). For each equation the table also provides the Ljung-Box Q-statistic for the test that residuals are not autocorrelated (up to lag 20). Heteroskedasticity-robust t-statistics are in parentheses. *, **, and *** indicate significance at the 10%, 5% and 1% level respectively.

	VAR(1)		VAR(2)		VAR(3)		VAR(4)	
Panel A:	GDP Growth$_t$	Flow$_t$	GDP Growth$_t$	Flow$_t$	GDP Growth$_t$	Flow$_t$	GDP Growth$_t$	Flow$_t$
GDP Growth$_{t-1}$	0.35***	-0.02	0.23**	-0.02	0.28***	0.01	0.27***	0.02
	(3.94)	(-0.29)	(2.38)	(-0.32)	(2.72)	(0.12)	(2.66)	(0.26)
GDP Growth$_{t-2}$			0.29***	-0.01	0.37***	-0.04	0.35***	-0.04
			(3.22)	(-0.24)	(3.87)	(-0.71)	(3.28)	(-0.63)
GDP Growth$_{t-3}$					-0.16*	-0.04	-0.15	-0.06
					(-1.68)	(-0.62)	(-1.45)	(-0.92)
GDP Growth$_{t-4}$							0.06	0.04
							(0.64)	(0.68)
Flow$_{t-1}$	0.43***	0.74***	0.60***	0.68***	0.59***	0.66***	0.62***	0.64***
	(3.42)	(10.00)	(3.74)	(6.84)	(3.72)	(6.63)	(3.82)	(6.39)
Flow$_{t-2}$			-0.28*	0.08	-0.20	-0.05	-0.20	-0.05
			(-1.66)	(0.79)	(-1.03)	(-0.44)	(-1.02)	(-0.42)
Flow$_{t-3}$					-0.13	0.23**	-0.05	0.14
					(-0.77)	(2.15)	(-0.27)	(1.08)
Flow$_{t-4}$							-0.15	0.12
							(-0.80)	(1.11)
Constant	0.29***	0.10**	0.21***	0.10**	0.25***	0.10**	0.24***	0.08
	(3.73)	(2.18)	(2.58)	(2.05)	(3.05)	(2.03)	(2.63)	(1.45)
SBIC		**2.20**		2.27		2.37		2.54
AIC		2.05		**2.01**		**2.01**		2.07
Q-Statistic	24.2	19.9	19.4	21.5	21.9	18.2	20.0	16.8
p-value	0.23	0.46	0.49	0.37	0.34	0.58	0.46	0.67
Granger Causality: F-Statistic	11.7	0.1	15.2	0.3	14.8	1.4	15.6	1.5
p-value	0.00	0.77	0.00	0.88	0.00	0.71	0.00	0.82

Table A.2 -Continued

Panel B:	VAR(1)		VAR(2)		VAR(3)		VAR(4)	
	Industrial Prod. Growth$_t$	Flow$_t$	Industrial Prod. Growth$_t$	Flow$_t$	Industrial Prod. Growth$_t$	Flow$_t$	Industrial Prod. Growth$_t$	Flow$_t$
Ind. Production Growth$_{t-1}$	0.25***	0.03	0.25**	0.02	0.25**	0.02	0.26***	0.03
	(2.85)	(1.09)	(2.54)	(0.94)	(2.55)	(0.97)	(2.60)	(1.13)
Ind. Production Growth$_{t-2}$			-0.02	-0.00	0.01	-0.01	0.03	-0.01
			(-0.16)	(-0.00)	(0.11)	(-0.25)	(0.25)	(-0.25)
Ind. Production Growth$_{t-3}$					0.03	-0.03	0.06	-0.04
					(0.34)	(-1.34)	(0.60)	(-1.39)
Ind. Production Growth$_{t-4}$							-0.11	-0.02
							(-1.06)	(-0.62)
Flow$_{t-1}$	1.31***	0.69***	1.33***	0.67***	1.34***	0.66***	1.28***	0.63***
	(4.57)	(9.26)	(3.50)	(6.74)	(3.52)	(6.78)	(3.26)	(6.33)
Flow$_{t-2}$			0.00	0.03	0.21	-0.08	0.21	-0.07
			(0.01)	(0.29)	(0.45)	(-0.62)	(0.44)	(-0.55)
Flow$_{t-3}$					-0.41	0.23**	-0.31	0.12
					(-1.01)	(2.17)	(-0.63)	(0.98)
Flow$_{t-4}$							-0.00	0.19*
							(-0.00)	(1.74)
Constant	-0.53***	0.11***	-0.55***	0.11**	-0.47**	0.06	-0.48**	0.04
	(-3.46)	(2.67)	(-3.14)	(2.30)	(-2.46)	(1.25)	(-2.39)	(0.84)
SBIC		**3.81**		4.01		4.14		4.30
AIC		**3.65**		3.75		3.78		3.83
Q-Statistic	13.6	16.7	13.7	17.3	13.2	15.2	9.5	15.2
p-value	0.85	0.67	0.85	0.63	0.87	0.76	0.98	0.77
Granger Causality: F-Statistic	20.9	1.2	19.6	0.9	19.7	2.9	18.1	4.2
p-value	0.00	0.27	0.00	0.63	0.00	0.40	0.00	0.38

Table A.2 -Continued

Panel C:	VAR(1)		VAR(2)		VAR(3)		VAR(4)	
	Cons. Growth$_t$	Flow$_t$	Cons. Growth$_t$	Flow$_t$	Cons. Growth$_t$	Flow$_t$	Cons. Growth$_t$	Flow$_t$
Consumption Growth$_{t-1}$	0.29***	0.03	0.20**	0.03	0.12	0.01	0.14	0.06
	(3.10)	(0.50)	(2.09)	(0.42)	(1.26)	(0.16)	(1.39)	(0.89)
Consumption Growth$_{t-2}$			0.26***	-0.01	0.19**	-0.02	0.19**	0.00
			(2.76)	(-0.09)	(2.12)	(-0.28)	(2.03)	(0.03)
Consumption Growth$_{t-3}$					0.38***	0.00	0.39***	0.01
					(4.14)	(0.06)	(4.18)	(0.11)
Consumption Growth$_{t-4}$							-0.06	-0.10
							(-0.62)	(-1.50)
Flow$_{t-1}$	0.30**	0.72***	0.18	0.67***	0.23	0.67***	0.22	0.64***
	(2.50)	(9.92)	(1.14)	(6.74)	(1.57)	(6.70)	(1.48)	(6.41)
Flow$_{t-2}$			0.11	0.06	0.24	-0.06	0.24	-0.07
			(0.67)	(0.61)	(1.37)	(-0.48)	(1.36)	(-0.56)
Flow$_{t-3}$					-0.31**	0.19*	-0.31*	0.09
					(-2.09)	(1.82)	(-1.67)	(0.71)
Flow$_{t-4}$							0.01	0.16
							(0.09)	(1.51)
Constant	0.43***	0.08	0.30***	0.08	0.16*	0.07	0.18*	0.09
	(4.98)	(1.45)	(3.23)	(1.28)	(1.78)	(1.15)	(1.88)	(1.42)
SBIC		**2.13**		2.22		2.21		2.34
AIC		1.97		1.96		**1.84**		1.87
Q-Statistic	29.9	20.0	25.4	21.1	9.5	17.1	8.3	14.9
p-value	0.07	0.46	0.18	0.39	0.98	0.65	0.99	0.78
Granger Causality: F-Statistic	6.2	0.2	5.1	0.2	9.5	0.1	9.0	2.4
p-value	0.01	0.62	0.08	0.91	0.02	0.99	0.06	0.66

Table A.2 -Continued

Panel D:	VAR(1)		VAR(2)		VAR(3)		VAR(4)	
	Labor Income Growth$_t$	Flow$_t$	Labor Income Growth$_t$	Flow$_t$	Labor Income Growth$_t$	Flow$_t$	Labor Income Growth$_t$	Flow$_t$
Labor Income Growth$_{t-1}$	0.36***	0.03	0.25**	0.04	0.19*	0.04	0.13	0.06
	(4.02)	(0.88)	(2.57)	(0.92)	(1.89)	(0.94)	(1.32)	(1.33)
Labor Income Growth$_{t-2}$			0.23**	-0.02	0.17*	-0.02	0.12	-0.01
			(2.43)	(-0.47)	(1.68)	(-0.40)	(1.25)	(-0.17)
Labor Income Growth$_{t-3}$					0.19**	-0.06	0.13	-0.05
					(1.97)	(-1.37)	(1.31)	(-1.11)
Labor Income Growth$_{t-4}$							0.25**	-0.07
							(2.34)	(-1.57)
Flow$_{t-1}$	0.48***	0.71***	0.25	0.67***	0.29	0.65***	0.36	0.60***
	(2.86)	(9.70)	(1.13)	(6.73)	(1.30)	(6.66)	(1.62)	(6.10)
Flow$_{t-2}$			0.26	0.06	0.17	-0.05	0.21	-0.05
			(1.16)	(0.57)	(0.66)	(-0.44)	(0.81)	(-0.43)
Flow$_{t-3}$					0.07	0.21**	-0.12	0.13
					(0.32)	(2.04)	(-0.43)	(1.09)
Flow$_{t-4}$							0.14	0.15
							(0.60)	(1.48)
Constant	0.20**	0.08**	0.11	0.08*	0.05	0.09**	-0.04	0.11**
	(2.09)	(1.97)	(1.11)	(1.92)	(0.53)	(2.02)	(-0.39)	(2.35)
SBIC		**2.80**		2.91		3.01		3.09
AIC		2.65		2.65		2.65		**2.62**
Q-Statistic	17.8	18.3	15.5	18.3	13.4	15.4	7.7	17.4
p-value	0.60	0.57	0.75	0.56	0.86	0.75	0.99	0.62
Granger Causality: F-Statistic	8.2	0.8	7.9	0.9	8.0	2.7	10.4	5.6
p-value	0.00	0.38	0.02	0.65	0.05	0.44	0.03	0.23