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Research Statement

My research interests are in Macroeconomics and Time Series. In the past decade or so, optimistic beliefs about the profitability of future technological innovations in information and communication contributed a great deal to the remarkable growth and decline in capital investment and economic activity. Consequently, an emerging body of work based on the Pigouvian hypothesis that good news about future economic conditions may cause short-run economic fluctuations has sought to provide an appealing explanation to the recent experiences of the economic recessions of the past 30 years. In my research papers, I focus on the interplay between such expectation beliefs, business cycle fluctuations, and technological innovations embodied in capital equipment.

Current Research

In my job market paper, I identify the main source of fluctuations in the labor share of income in the United States. The labor share, defined as the share of total income that goes to labor, exhibits significant short-run fluctuations: it is about half as volatile as GDP. Building on existing literature that argues that such fluctuations may be related to technological changes (see Solow, 1958; Young, 2004; Rios-Rull and Santaeulalia-Llopis, 2009; and Young, 2004), I propose that technological changes embodied in capital equipment are the main sources of fluctuations in the labor share. Using the standard approach of the Maximum Forecast Error Variance (MFEV), I find that the shock that explains over 55 percent of all unpredictable fluctuations in the labor share in the U.S. over a 15-year forecast horizon can be interpreted as news about future technological progress embodied in capital. The shock induces a negative and overshooting response of the labor share. Specifically, the labor share increases above its pre-shock level and returns to its long-run equilibrium after 40 quarters. To interpret these dynamics, I use a standard Real Business Cycle (RBC) model with a Constant Elasticity of Substitution (CES) production function and document that an elasticity of substitution less than one is an essential margin to replicate qualitatively the empirical dynamics of the labor share. As opposed to models with wage frictions, the findings highlight that a simple framework with an anticipated shock to future technology embodied in capital is sufficient enough to understand the empirical properties of the labor share. Additionally, the results indicate that labor and capital are complementary inputs in the production process as opposed to being substitutes as argued recently in the literature. These findings impose a clear discipline that may be used to discriminate between alternative classes of models that attempt to decipher the cyclical characteristics of the labor share.

In a concurrent paper with my coauthor, Kaiji Chen, we investigate how much of the fluctuations in aggregate variables and Total Factor Productivity (TFP) are explained by the expectation of future technological improvements embodied in capital goods. Our interest is motivated by the need to develop a clear framework that ties expectation beliefs to the evolution of economic fundamentals. Using the MFEV approach mentioned above, we sequentially identify two separate shocks - a news shock to the inverse of the relative price of investment and a news shock to TFP - and find that both shocks are highly correlated and generate identical impulse responses. In addition, our identified shocks account
for over 50 percent of the Forecast Error Variance (FEV) of TFP at horizon beyond 30 quarters. We use a standard two-sector business cycle model to argue that the close link between the two identified shocks is a consequence of spillover effect arising from slowing diffusing innovations in investment-specific technology (IST) to TFP. From our estimation, we find that the spillover effect is significant. This result is consistent with the argument that embodied technological progress is a General Purpose Technology (GPT); that is, a new invention that leads to fundamental changes in the production process of industries using it.

In another closely related study, I investigate the extent to which the expectation of future technological improvements has contributed to economic fluctuations in the United States from 1955 to 2012. Technological progress increases our knowledge about production capacities; however, it could be either embodied or disembodied in capital goods such as equipment and software. Most of the empirical studies in the news-driven literature, except for Beaudry and Lucke (2012), separately identify anticipated innovations to each type of technology to determine their role in business cycle fluctuations. In contrast, I argue that a distinct identification of a news shock to neutral technology and a news shock to IST will not reveal the relative importance of each shock to business cycle fluctuations. Consequently, using sign and impact restrictions derived from a standard RBC model, I identify simultaneously a news shock to neutral technology and a news shock to IST and find that the latter is a major source of short-run fluctuations while the former plays a minor role.

Future Research

The theory of news-driven business cycles has branched out into several dimensions including, but not limited to, international settings, asset price dynamics, and financial friction models. The theory delivers several implications that present great avenues for future research.

One avenue pertains to the unsettled issue of the relationship between news shocks and inflation. Since the first and most influential empirical evidence in the news-driven business literature was offered by Beaudry and Portier (2006), a great deal of empirical and theoretical work has been devoted to reconcile some of the well-known characteristics of business cycles with this theory. One robust result has been prevalent across most empirical studies: news shocks are highly disinflationary. Consequently, few studies have attempted to provide a theoretical framework to shed light on the importance of news shocks for inflation dynamics (see for example Barsky and Sims, 2009; Christiano et al., 2012; and Beaudry and Portier, 2013). Given the results of my study on the main sources of fluctuations in the labor share, I plan to revisit the relationship between news shocks and inflation in an economy comprised of a labor market that features routine occupations and non-routine occupations such that capital is complementary to non-routine workers, and sticky output prices to allow for the derivation of the New-Keynesian Phillips curve (NKPC).

Another avenue of research, to be conducted with Kaiji Chen, stems from our argument that much of the fluctuations in Total Factor Productivity (TFP) are explained by the expectation of future technological improvements embodied in capital goods or IST news shocks. An interesting corollary is that our identified IST news shock generates a negative co-movement between the relative price of investment
and stock prices. This result is difficult to obtain in a standard Real Business Cycle Model with either an unanticipated IST shock or an unanticipated neutral technology shock. In fact, a positive neutral technology shock drives up both stock prices and the relative price of investment as it increases the demand for investment goods, while a positive IST shock drives down both stock prices and the relative price of investment as it increases the supply of investment goods. Therefore, we intend to develop a framework to decipher the mechanism under which anticipated innovations in technology embodied in capital may create a pro-cyclical movement in stock prices along with a countercyclical movement in the relative price of investment.

Other minor questions relate to the fit of the NKPC given the declining secular trend of the labor share and the contradicting empirical responses of aggregate variables produced under the MFEV approach. The first question follows from a recent study by Karabarbounis and Newman (2013), who document that the labor share has experienced a decline in its secular trend for the past 30 years. This observation raises questions for the assumption underlying the relationship between real marginal costs and the labor share of income and the construction of forecasts of future marginal costs in VAR models (Gali and Gertler, 1999; and Sbordone, 2002, 2005). Therefore, I plan to explore whether or not this structural break in the trend of the labor share bears ramifications to the fit of the NKPC.

The second question is relevant to the contradicting empirical responses of aggregate variables produced under the MFEV approach. Specifically, when the news shock is identified as the shock that maximizes the sum of the forecast error variances of TFP over a forecast horizon of zero to a specified upper bound, the response of hours worked, investment, and output vary with the chosen upper bound. My current research with my coauthor, Kaiji Chen, shows that improvements in productivity are a result of slowly diffusing technological progress. Hence, longer upper bounds are justified on the basis of capturing such effects. Nonetheless, proponents of imposing shorter upper bounds contend that the choice of longer upper bounds may produce inconsistent impulse responses. Notwithstanding the merits of both arguments, the question on the selection of the upper bound might not be settled empirically. Therefore, I plan to follow the approach in Ercerg, Gust, and Guerrieri (2005) and investigate the reliability of the MFEV approach under different upper bounds through Monte Carlo simulations using calibrated business cycle models. The models will feature news shocks to TFP as well as other shocks that have been documented to have permanent effects on TFP to assess the validity of the claims against the use of longer upper bounds.
References


