# 論文の内容の要旨

論文題目 : News, Productivity, and Business Cycle Fluctuations
( ニュース、生産性、および景気循環の分析)

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Dynamic stochastic general equilibrium (hereafter DSGE) models have been used as powerful tools for business cycle analyses. During the 1980s, 1990s, and 2000s, business cycle research is exploratory and researchers investigate effects of many different shocks, mechanisms that propagate them, and welfare implications in a consistent way that made clear what factors are important and why. There are many interesting fields in DSGE, in this dissertation, we try to investigate three of them : (i) news-driven business cycles, (ii) business cycle accounting, and (iii) short-run effects of technology shocks.

## 1 News-Driven Business Cycles

DSGE is often criticized on the ground that it does not provide a theory of recessions. It is well known that standard real business cycles models have difficulties explaining recessions without technological regress. When agents receive positive news (or have optimistic expectations) about the future, they decide to build up capital since future's aggregate demand increases. If the news turns out to be false, there will be a period of retrenched investment which is likely to cause a recession. Such effects of "news shock" might be one of important sources of business cycle fluctuations. A news-driven business cycle (hereafter NDBC) is a business cycle in which a positive news about future causes a current boom defined as simultaneous increases in consumption, labor, investment and output.

There are two major reasons why NDBC is highlighted in modern macroeconomics. One comes from empirical episodes. The Internet bubble of the U.S. economy during the late 1990s and the Japanese bubble era during the late 1980s might be accounted for by NDBCs; positive news about the future might cause such booms. The other comes from the theoretical side. It is well known that standard real business cycle (hereafter RBC) models do not generate NDBCs. News about the future moves consumption and labor in opposite directions due to the wealth effect in a standard RBC model. Therefore, one of the important challenges in macroeconomic theory is investigating what kinds of features should be introduced in a standard model in order to generate NDBCs.

In Chapter 2, we find that a fairly popular market friction, nominal rigidity, can be a source of NDBCs and that they can be generated by changes in markups in response to news about the future. NDBCs occur due to news about technology growth, technology level, and expansionary monetary policy shock in our model. We also find that the economy might fall into recession if news turns out to be false. The key mechanism of booms and recessions is that markups are moved by news through nominal rigidities. When the good news arrives, people expect that both inflation increase in the future, implying that the current optimal price level increases. But price-setting firms cannot fully increase their prices in response to the increasing inflation because of nominal rigidities, which is modeled as a Calvo-type sticky price and it leads to decrease of their markups. The decrease of markups induces an increase of aggregate demands. Then, output and labor input increase. Finally, household income becomes so high that both consumption and investment increase. If the news turns out to be false, the optimal price level decreases, but price-setters cannot fully decrease their prices because of nominal rigidities. This means the increase of markup, and the economy fall into recession. Our model also generates procyclical movements of Tobin's $q$ (asset price).

In Chapter 3, we show that if the working capital, such as labor payment, is subject to the collateral constraint, and there are adjustment costs of investment, neoclassical business cycle models can generate NDBCs. The news about future technology growth and technology level cause NDBCs and the intuitive mechanism as follows. The news raises the price of capital today, which relaxes the collateral constraint. Since the wage payment is collateral constrained, the relaxation of the collateral constraint reduces the inefficiency in the labor market. It shifts the labor demand curve outward. If this force is sufficiently strong, it offsets the wealth effect on the labor supply schedule, and the equilibrium labor supply increases. So do output and investment. Consumption increases because of the wealth effect due to good news. We consider a models with collateralized capital, adjustment costs of investment, and heterogeneous of consumers: households and entrepreneurs. Our model generates NDBCs and procyclical movements of asset prices. Our model also generates a recession, if the news turns out to be false. This is due to heterogeneity of consumers; when the good news arrives, the price of the collateral asset increases, and hence entrepreneurs need less capital to achieve the desired value of collateral. Hence, in response to the good news about the future, entrepreneurs sell their capital. When the news turns out to be false, the price of capital essentially goes back to its steady state level, and it means too tightened collateral constraint. Then, a recession occurs.

# 2 Business Cycle Accounting

In the first generation of DSGE, technology shock is the main and dominant source of business cycle fluctuations. In the current generation of DSGE, many frictions and many shocks are proposed to account for the real economy. Then, researcher often faces hard choice about where to introduce frictions into model to construct model to generate business cycles similar to data. In other words, what types of frictions are promising to the research of business fluctuations?

Business cycle accounting (hereafter BCA) is a method to address this question. In BCA, the economy is assumed that it is described as a standard neoclassical prototype model with time-varying productivity, labor tax, investment tax, and government consumption. These are called efficiency, labor, investment, and government wedges. This assumption is justified by *equivalence results*; this prototype model with wedges covers a large class of frictional business cycle models. Wedges are measured so that the prototype model accounts for the observed data perfectly. Equivalence results are shown under general conditions about evolutions of wedges. However, in practice, they impose that wedges evolve according to the first order vector autoregressive, VAR(1), process and it is not clear whether conventional VAR(1) specification of wedges is consistent with conditions in terms of equivalence results.

In Chapter 4, we examine the equivalence results by focusing on the VAR(1) representation of wedges. We characterize the class of frictional models covered by the prototype model with the conventional VAR(1) specification of wedges. We find that the prototype model covers a detailed model if and only if wedges have sufficient information about the endogenous and exogenous states of the detailed model. Intuitively, the number of independent wedges should be larger than that of endogenous and exogenous states variables in the detailed model. We also show that the class covered by the prototype model is much smaller than that is shown under general conditions of wedges. Therefore, the condition for equivalence results is highly restrictive if we employ the VAR(1) representation of wedges. As a solution to this problem, we provide an alternative specification in order to let the prototype model cover much larger class and show that, in theoretically, it is possible to let the prototype model cover any class of frictional DSGE models by using our alternative specification.

# 3 Short-Run Effects of Technology Shocks

What are the short run effects of technology shocks? Economic theory provides two different predictions. Standard flexible price models like real business cycle theory predict that technology shocks are expansionary in the short-run; inputs

and output increase immediately. On the other hand, standard sticky price models like New Keynesian's theory predict that technology shocks are contractionary in the short run; inputs and output decrease. Of course, both models predict that technology shocks are expansionary in the long run. The difference in the short-run is due to the flexibility of prices. It is important to address this question since the answer tells us the character of good economic model to draw the reality.

In Chapter 5, we use JIP (Japanese Industry Productivity) database, which is Japanese sectoral panel data, and identify technology improvements as purified TFP growth. Purified TFP growth is the one that the effects of (i) non-constant returns to scale of gross production function, (ii) variable utilizations of inputs, and (iii) sectoral reallocation, are excluded from the Solow residual. We focus on the relationship between technology shock and labor input in the short run as in related literature. We find that aggregate technology shocks are not labor-saving even in the short run and our result is robust to various cases. This is the first result which finds expansionary technology shocks for the Japanese economy by the Solow-Hall approach.