博士学位論文要旨

Essays on Asset Prices and Economic Welfare in Endogenous Incomplete Market Models

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1 Background

In dynamic general equilibrium models, consumers maximize their lifetime expected utility subject to budget constraints, and asset prices are determined by consumers' intertemporal marginal rates of substitution. Therefore, asset prices contain useful information about consumers' utility. In general, we cannot observe economic welfare directly. Thus, observable measures of welfare are helpful to evaluate the welfare effects of economic policies and changes in the economic environment.

Standard representative agent models assume that financial markets are complete and idiosyncratic shocks are shared efficiently among agents. Using a representative agent model with constant relative risk aversion (CRRA) utility, Lucas (1987) demonstrates that costs of business cycles are low if we assume the moderate degree of relative risk aversion. In addition, exploring the idea of Lucas (1987) within a representative agent framework, Alvarez and Jermann (2004) advanced a method for measuring the cost of business cycles using asset prices.

However, it is well known that representative agent models with CRRA utility cannot explain empirically observed asset prices; in particular, equity-risk premiums and risk-free rates. Employing a representative agent model with CRRA utility, Mehra and

Prescott (1985) demonstrate that theoretical predictions for equity-risk premiums are much lower than observed equity-risk premiums and theoretical predictions for risk-free rates are much higher than observed risk-free rates. The former is called the equity-risk premium puzzle and the latter is called the risk-free rate puzzle.

The equity-risk premium puzzle is important in assessing economic welfare. For example, as discussed in Campbell and Cochrane (1995) and Tallarini (2000), costs of business cycles are high when the degree of relative risk aversion is high enough to generate large equity-risk premiums. To measure costs of business cycles, we need a model that can explain observed equity-risk premiums.

Many researchers explore asset-pricing puzzles within the representative agent framework. However, empirical evidence suggests that idiosyncratic risks are not shared efficiently among individuals. There are also many researchers who explore asset-pricing puzzles in incomplete market environments.

Considering incomplete market environments is also important to analyze economic welfare. Because uninsured idiosyncratic shocks generate ex post heterogeneity among agents, incomplete market models allow us to analyze not only the costs of aggregate consumption fluctuations, but also inequality among individuals. Because risk-free rates reflect the degree of insurance against idiosyncratic shocks, risk-free rates serve as a measure of welfare in exogenous incomplete market models. However, welfare consequences of economic policies or changes in economic environments can be different due to reasons such as markets being incomplete. Many researchers pay serious attention to limited enforcement models and dynamic moral hazard models as endogenous incomplete market models.

In limited enforcement models, borrowers cannot be compelled to repay the resources they borrowed in the past, even if they had promised to do so. Kehoe and Levine (1993) characterize constrained efficient allocation in limited enforcement economies. Alvarez and Jermann (2000) construct an economy where agents can only borrow up to the amount that they are willing to pay back in the future, given that the penalty for default is consignment to autarky. Lustig (2005) considers alternative penalties for

default to include the confiscation of an endogenously valued collateral asset. In these models, debt limits are endogenously determined by economic policies and environments, such as idiosyncratic and aggregate shocks. Krueger and Perri (2005, 2006) analyze welfare implications in these models. In addition, the literature of international finance investigates the possible effects of enforcement constraints because they are quite serious in international financial arrangements.

In dynamic moral hazard models, agents privately observe shocks to their endowment, tastes, or productivity. In this setting, agents have to be provided with incentives to reveal their information. Then, an agent's current consumption allocation has to depend on the history of shock that is reported. As discussed in Golosov, Kocherlakota, and Tsyvinski (2003), Kocherlakota (2005), and Albanesi and Sleet (2006), these models provide new insights into optimal tax systems that achieve an incentive-compatible efficient allocation. In addition, some researchers explore optimal monetary policy in these setups.

2 Outline

In this paper, we discuss implications for asset prices, economic policies and welfare in dynamic stochastic general equilibrium models. In particular, we focus on endogenous incomplete market models.

In Chapter 2, we survey the relationship between asset prices and economic welfare in dynamic general equilibrium models with complete and endogenous incomplete markets. In particular, we focus on the limited enforcement model and the dynamic moral hazard model, where financial markets are endogenously incomplete.

In Chapter 3, we focus on equity-risk premiums and economic welfare in a representative agent framework. In particular, we consider catastrophic growth shocks, such as natural disasters, wars, and severe depressions. Catastrophic growth shocks that we consider in Chapter 3 are infrequent, greatly reduce economic growth rates, and have permanent effects on the level of real per capita GDP. To generate large equity-risk premiums within the representative agent framework, Rietz (1988) and Barro (2006)

pay serious attention to the potential impacts of catastrophic growth shocks. They demonstrate that catastrophic growth shocks, although rare, play an important role in generating large equity-risk premiums. In the above literature, some catastrophic growth shocks are assumed transitory, while others are persistent. For example, natural disasters, such as earthquakes, can be considered as transitory shocks, but political conflicts, such as wars, tend to reduce economic growth rates for several years.

Chapter 3 demonstrates that persistent catastrophic growth shocks can generate negative equity-risk premiums. A major reason for the emergence of negative equity-risk premiums is that equity prices rise even after the occurrence of catastrophic growth shocks, given strong demand for assets in preparation for possible repeated events. Such an increase in equity prices during an aftermath can generate a negative correlation between consumption growth and equity returns. A negative correlation between consumption growth and equity returns implies that equity holdings would serve as insurance against catastrophic growth shocks. However, negative equity-risk premiums do not mean welfare improvements. Chapter 3 also demonstrates that equity prices rather than equity-risk premiums serve as direct measures of the representative consumer's lifetime utility.

On the other hand, if catastrophic shocks are country-specific, catastrophic shocks can be shared among countries. In Chapter 4, we focus on international risk sharing of country-specific catastrophic shocks in the presence of the enforcement problem in international financial markets. Catastrophic shocks that we consider in Chapter 4 are infrequent, greatly reduce the level of real per capita GDP for several years, but have transitory effects on the level of real per capita GDP. As discussed above, the literature of international finance investigates the possible effects of enforcement constraints because they are quite serious in international financial arrangements. For example, Kehoe and Perri (2002) apply a framework proposed by Kehoe and Levine (1993) to a two-country model. Chapter 4 applies a framework proposed by Lustig (2005) to a two-country model and tries to analyze how international financial markets efficiently provide insurance against country-specific catastrophic shocks. We employ a framework proposed by Lustig

(2005) because it can explicitly treat the role of international liquidity (collateral in international financial markets).

One important contribution of Chapter 4 is to explicitly trace the portfolio positions of collateralizable assets (Lucas tree) and contingent claims in both countries. Our calibration exercises demonstrate that, as to the insurance contract made prior to a catastrophic event, the insurance payment to a damaged country is severely constrained by the limited solvency of a nondamaged country as an insurer, given the expectation that Lucas trees will be heavily discounted in the aftermath. In the aftermath, nevertheless, a damaged country can clear solvency constraints by building up assets and liabilities, thereby financing most of its uncovered losses. In addition, this risk-sharing scheme can work even for extremely persistent country-specific shocks. Therefore, the resulting outcome is almost equivalent to the perfect insurance outcome.

In Chapter 5, we focus on the relationship between the optimal monetary policy and the real interest rates in the presence of enforcement problems and asymmetric information. In general, the optimal monetary policy rule is known as Friedman's rule, which advocates a rate of deflation equal to the real rate on risk-free assets so that it is not costly to those who have money to continue to hold it. Such a policy rule is optimal, not only in the representative agent economy, but also in an exogenous incomplete market economy. However, Aiyagari and Williamson (2000) and Saito and Takeda (2006) incorporate a dynamic insurance contract into a monetary economy with incomplete markets and demonstrate the case where the Friedman rule is not optimal.

In particular, Aiyagari and Williamson (2000) introduce fiat money into an economy where agents cannot borrow from financial markets, but can contract with an intermediary to insure themselves against idiosyncratic shocks to their endowments. In addition, they also have an option to defect from a long-term contract with an intermediary. In this case, agents live in a self-insurance economy, where money serves as a self-insurance device. Then, they explore the welfare effects of inflation. In general, inflation lowers economic welfare because of an increase in the cost of holding money. However, in their model, because an insurance contract is a substitute for money, a rise in the cost of hold-

ing money endogenously increases the efficiency of insurance contracts; consequently, the expected utility of ex ante identical agents is maximized at a moderate rate of inflation. In addition, the volume of transfers and the levels of real interest rates change according to the level of inflation. That is, in their setting, monetary policy has an impact on real interest rates as well as on welfare. In Chapter 5, we modify some numerical procedures and explore the relationship between real interest rates and welfare in the Aiyagari and Williamson (2000) model. As a result, we demonstrate that the positive relationship between real interest rates and welfare holds in this environment. Our findings imply that we can use real interest rates as a measure of welfare in an economy with incentive and enforcement constraints.

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