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Uncertainty about welfare effects of consumption fluctuations

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ABSTRACT

This paper proposes Bayesian estimates for welfare effects of consumption fluctuations and growth. Annual data from 82 developed and developing countries indicate a large degree of uncertainty as regards point estimates. Moreover, the comparison between the welfare gain from consumption stabilization and the welfare gain from growth yields inconclusive results for many developed and developing countries. These findings suggest the need for caution in drawing policy conclusions from point estimates.

1. Introduction

Lucas (1987) measures the welfare cost of consumption fluctuations as the percentage increase in consumption, across all dates and states, required to leave a representative agent indifferent between consumption fluctuations and a smooth consumption path. According to this definition, he obtains an estimate of 0.042% of consumption in the USA.[1] Lucas then estimates the welfare loss of a 1% reduction in the growth rate at 20% of consumption. These results lead Lucas to conclude that further stabilization would yield little welfare gain in the USA and that growth should be the priority of macroeconomic policies.

A large body of research has challenged Lucas' estimations by altering his modeling framework. First, whereas Lucas employs a model based on a trend-stationary consumption process and a CRRA utility function, Obstfeld (1994) and Dolmas (1998) adopt a martingale consumption process and recursive preferences of Epstein and Zin (1989). The predictions of their model indicate higher welfare costs of fluctuations ranging from 0.1% to 4.3%. Second, another line of research relaxes Lucas' assumptions on homogenous agents and perfect capital markets. For instance, Imrohoruglu (1989) considers a general equilibrium model with idiosyncratic shocks and liquidity constraints and finds the welfare cost of

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[1] This result is obtained with a coefficient of relative risk aversion equal to 5. For risk aversion levels of 10 and 20, Lucas estimates the welfare cost of fluctuations at 0.084% and 1.7%, respectively.

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fluctuations in the range of 0.3–1.5%. Atkeson and Phelan (1994) extend Imrohoruglu (1989) to the endogenous labor supply and asset pricing. Their results indicate little welfare gain from stabilization as does Lucas (1987). In a related study, Krusell and Smith (1999) propose a model with a variety of heterogeneity including employment status, wealth and preferences. They find that poor unemployed individuals who face liquidity constraints and rich individuals would benefit from stabilization while the middle-income class would lose. As a result, the welfare gain from eliminating fluctuations is negligible for the aggregate economy. However, Krebs (2007) observes that unemployed workers face persistent income loss even after they are re-employed. Given that such risks are not insured in asset markets the author claims that unemployment risks would cause a larger welfare cost compared to previous studies. To come to this conclusion Krebs (2007) introduces long-term earning losses of job displacement into a general equilibrium model. Depending on parameter values he finds estimates of the welfare cost of business cycles in the range of 0.2–9.0%.

Third, Tallarini (2000) addresses the problem in a real business cycle (RBC) model with Epstein–Zin type preferences, which are calibrated to be consistent with observed asset prices in the USA. He finds much larger welfare cost of fluctuations as of 44%. Otrok (2001) also considers an RBC model. However, he finds little welfare gain from stabilization with non-separable preferences, the parameter values of which are chosen to match observed fluctuations in the USA. The fourth strand of the literature is based on endogenous growth models. For instance, Barlevy (2004) proposes a framework with diminishing returns on investment. As a result, stabilization generates higher growth through the reallocation of investment from periods of high investment to periods of low investment. In turn, he finds the welfare cost of fluctuations to be substantially higher than in the original Lucas exercise. However, Francois and Lloyd-Ellis (2006) challenge this finding in a model where fluctuations and growth are endogenously determined. Moreover, their model generates a positive relationship between fluctuations and growth as in Blackburn (1999). In this set-up, stabilization induces welfare costs. For a detailed survey of the literature, see Barlevy (2005), Imrohoroglu (2008) and Lucas (2003).

This brief review shows that different modeling assumptions yield different estimated values for the welfare cost of fluctuations. In this paper, I take a different approach to examining the welfare effects of consumption fluctuations and growth. Instead of proposing another model economy, I investigate the impact of parameter uncertainty on welfare effects.[2] For this purpose, I use the model economy proposed in Dolmas (1998) and Obstfeld (1994) and assess parameter uncertainty with Bayesian inference. In particular, the sample from the posterior distribution of welfare effects is obtained by repeatedly drawing parameters of a consumption process from their posterior distribution. Moreover, I estimate the posterior distribution for the difference between the welfare cost of consumption fluctuations and the welfare effects of growth. Subsequently, a 90% credible interval is constructed to gauge the uncertainty on estimates of welfare effects.[3] This metric also allows to examine whether the welfare gain from consumption stabilization and the welfare gain from growth are significantly different from one another. Lucas (1987) and subsequent studies have relied on point estimates for such welfare comparison, thereby neglecting the uncertainty surrounding their estimates. However, by ignoring uncertainty, one cannot make statements about how likely these estimates are from their population values. As a result, policy conclusions drawn from point estimates should be taken with caution.

My second contribution to the discussion relates to a large number of countries included in the empirical analysis. In particular, I examine data on 82 developed and developing countries while earlier studies mostly focus on the USA. The few existing cross-country studies include Pallage and Robe (2003) who compare point estimates for welfare effects across a group of African countries and the USA. Giannone and Reichlin (2005) compare consumption responses to technology shocks between the Euro area and the USA and interpret the results in terms of the welfare cost of fluctuations. Finally, Van Wincoop (1994) examines the welfare gain from international risk sharing in the USA, Japan and European-OECD countries.

Consumption data have three main characteristics: the trend growth, the size of fluctuations, and the degree of persistence of these fluctuations. Given the differences in these three parameters and their uncertainty, how large are welfare effects of consumption fluctuations and growth in developing countries compared to those in developed countries? Are these welfare effects similar across countries in each group? For instance, are welfare effects of consumption fluctuations different between the USA and the European industrialized countries? Analysis of data from a large number of developing and developed countries enables these general questions to be addressed.

Moreover, developing countries represent a natural framework for the Lucas-type welfare comparison. In particular, these countries display strong volatility in consumption such that successful stabilization policies should substantially improve the welfare of their residents. However, there has been an increasing emphasis on growth in these countries. For instance, The World Bank (2004) argues that Africa needs to achieve a 7% long-term growth rate in order to meet the target for poverty reduction of the Millennium Development Goals. To what extent then should developing countries focus on stabilization or on growth[4] or on both policies?

[2] Eichenbaum (1991) made a similar point on the uncertainty in parameter estimates of real business cycle models.

[3] The credible interval has a different interpretation than the confidence interval notion used in frequentist statistics. For instance, a 90% credible interval (or region) gives the interval of minimum length that contains the true value of a parameter with probability 90%.

[4] Blackburn (1999) provides a theoretical support for the trade-off between stabilization and growth. Using an endogenous growth model, he shows that monetary stabilization policies lead to a lower long-term growth. This result is based on a positive link between growth and volatility found in Blackburn (1999). However, the relationship between growth and volatility hinges on the mechanism that generates technological progress. When it is generated by the creative destructive mechanism, the link between growth and volatility is positive (see, for example, Aghion and Saint-Paul, 1998a,