welfare costs of business cycles

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Abstract

The welfare cost of business cycles measures the benefits that would be obtained by individuals from eliminating all the macroeconomic instability in a given economy. In a seminal paper, Lucas (1985) argued that these benefits are almost certain to be trivially small, especially when they are compared with the benefits that can be achieved with more growth for the post-war US economy.

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Article

The welfare cost of business cycles measures the benefits in terms of additional consumption that would be obtained by individuals from eliminating all the macroeconomic instability in a given economy.

Hodrick and Prescott (1997) and Lucas (1977) define business cycles as recurrent fluctuations of output about trend and the co-movements among other aggregate time series. These fluctuations are typically represented as expansions and recessions in economic activity. The National Bureau of Economic Research, a private non-profit organization that is responsible for updating the business cycle chronology, defines a recession as 'a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real gross domestic product (GDP), real income, employment, industrial production, and wholesale-retail sales' (NBER, 2003, p. 1). One of the prevailing views in macroeconomics is that business cycles are welfare reducing and governments should try to stabilize the economy by using fiscal or monetary policies.

In his seminal work, Lucas (1985) proposes a simple framework to think about how to compute the cost of economic instability, and challenges the paradigm that business cycles have large welfare costs. His measure of the welfare cost for the United States turns out to be trivially small, which disputes the need for developing more advanced policies that would eliminate fluctuations in the United States. The following section examines his work and the subsequent research.

Lucas proposes that in order to understand the welfare cost of instability we need to start with the preferences of a hypothetical consumer who is faced with a

sequence of consumption goods over time labelled $\{c_t\}$. The expected utility of such a sequence can be calculated by,

$$E\left\{\sum_{t=0}^{\infty}\beta^t\frac{1}{1-\sigma}(c_t^{1-\sigma}-1)\right\}$$

where $U(c_t)=(c_t^{1-\sigma}-1)/(1-\sigma)$ is the period utility function, E is the expectations operator, β is the subjective discount factor and $\sigma>0$ is the coefficient of relative risk aversion. An important property of this utility function is that consumers would prefer smooth consumption streams to fluctuating ones or that they would prefer a deterministic consumption path to a risky path with the same mean.

In this construct, in order to understand how consumers may feel about economic instability, we can simply ask them to evaluate their lifetime utility under two different scenarios. In particular, suppose the consumers are asked to compare the lifetime utility of a perfectly smooth consumption path with a consumption stream that increases in good times and decreases in bad times while maintaining the same average level over time. The latter consumption stream is the one that results in the case of business cycles. Surely, consumers who care about smoothing consumption over time will rank the utility generated by such a stream lower than the one from the smooth consumption stream. In fact, the higher the value of σ, the lower the utility of a fluctuating consumption stream will be. With this in mind we can ask a second question. What would it cost to compensate all individuals in terms of extra consumption, uniform across time and different shocks, so that they will be indifferent between the smooth and the fluctuating consumption paths? This turns out to be a fairly easy calculation where the following equation provides a quantitative answer:

$$\lambda=\frac{1}{2}\sigma\mu^2$$

where λ is the compensation parameter, σ is the coefficient of relative risk aversion and μ measures the standard deviation in consumption.

Our hypothetical example can be made concrete by examining the properties of personal expenditures on consumption in a particular economy. Lucas (2003) uses US data for the period 1947–2001 and calculates the standard deviation of the log of real per capita consumption about the linear trend to be 0.032. Using this estimate, we can arrive at several measures of the cost of instability based on different assumptions on the coefficient of relative risk aversion. The amazing part of the findings is that the magnitude of these estimates range between one 20th of one per cent to one or two tenths of a per cent of consumption for risk aversion parameters between one and four. (Risk aversion coefficients in this range are considered to be consistent with many observations in an economy. However, much higher values are needed for some other observations such as the equity premium, which is discussed shortly.) For example, if $\sigma=2$ and $\mu=0.032$, then the consumption compensation that is required to make an individual indifferent between a fluctuating versus a constant consumption stream is about 0.001. For the US economy that would suggest that an annual consumption compensation as low as $28.96 per person would be sufficient to make individuals indifferent between a fluctuating and a smooth consumption stream. (Personal consumption expenditures in the United States in 2004 were $8.6 trillion. One-tenth of a per cent results in a total consumption

compensation of $8.6 billion. Using the 2004 population of 297 million people results in consumption compensation per person of $28.96.) Such a welfare cost is negligible not only in an absolute sense but also when compared with other welfare cost measures. For example, Lucas (2000) calculates the welfare loss of a one per cent reduction in the growth rate of the economy to be as high as 20 per cent of consumption and the welfare cost of ten per cent inflation to be one per cent of income annually. Both of these estimates are more than an order of magnitude higher than the welfare cost of economic instability.

Lucas proposes to take the low cost findings seriously as giving a range of estimates for the size of the potential gains from developing policies that would eliminate fluctuations in the United States. Taking these results seriously is exactly what the profession did. Twenty years after Lucas's (1985) study, many economists continue to work on this subject, investigating whether the conclusions reached in his framework are valid under more complicated and sometimes more realistic frameworks.

Many of the assumptions in the original framework have been challenged. One of the main assumptions is that all agents are identical and have access to fully developed capital markets. One can easily imagine that, while the costs of instability may be low for some consumers, such as those with large savings, they may be devastating for some others, who may not have the means to insure themselves against these shocks. Several papers have investigated the welfare costs of instability for heterogeneous agents with limited access to capital markets. (Starting with Imrohoroglu, 1989, papers that have introduced incomplete markets and examined the role of idiosyncratic risk include Atkeson and Phelan, 1994; Gomes, Greenwood and Rebelo, 2001; Krusell and Smith, 1999; 2002; and Krebs, 2003.) Krusell and Smith (1999) examine an economy with substantial heterogeneity where individuals face idiosyncratic and aggregate risk and can smooth their consumption only through private savings. Their economy generates a wealth distribution that resembles US wealth distribution reasonably well. They investigate whether the welfare costs of cycles may be very high for some members of the society such as the unemployed even if in aggregate the costs are relatively low. Their findings indicate that while the welfare effects of eliminating cycles do differ across consumers they are extremely small for almost all consumers. Only for a very few individuals with almost zero consumption are welfare losses found to be as high as two per cent of average consumption.

Some of the papers in this area have highlighted the importance of understanding the interaction between aggregate and individual shocks in an economy. For example, how long-lasting are the effects of a bad shock? Do aggregate shocks compound the effects of individual shocks? Storesletten, Telmer and Yaron (2001) show that, in an environment where small aggregate shocks can have a long-lasting impact on individuals' earnings, the welfare cost of business cycles can be much higher than the original estimates. (Beaudry and Pages, 2001, also study idiosyncratic wage risk that worsens in recessions, and obtain high estimates. However, they do not allow for savings to help smooth consumption in the economy with fluctuations.) Atkeson and Phelan (1994), on the other hand, discuss the connection between aggregate and idiosyncratic risk, and suggest as a serious possibility that the elimination of aggregate risk does not affect individual risk at all. In their framework welfare cost estimates are close to zero. However, if the effects of a bad shock are assumed to be permanent, as in Krebs (2003), then the welfare costs of business cycles can be as high as 7.5 per cent of consumption. In

such a framework, even if credit markets are perfect, individuals will not borrow to smooth the negative shocks they face since the effect of those shocks will persist for ever.

Another set of papers have introduced different preferences or have implicitly or explicitly used higher risk-aversion coefficients in examining the welfare cost of business cycles. While higher costs are obtained in some of these environments, there are questions about the soundness of using very high risk-aversion coefficients. For example, Tallarini (2000) finds much larger costs in a model with Epstein–Zin type preferences where preference parameters are chosen to be consistent with observed asset market data. However, the main factor behind this finding is the use of a high risk-aversion parameter to be consistent with asset price determination. (Similarly, Alvarez and Jermann, 2004, find large welfare costs of economic instability in a framework that uses high risk aversion to match the six per cent equity premium in asset markets. See also Dolmas, 1998; Obstfeld, 1994.) Otrok (2001), on the other hand, suggests that in a model that allows for potential time-non-separabilities in preferences, which is calibrated to be consistent with observed fluctuations in a general equilibrium model of business cycles, the welfare cost of business cycles turns out to be quite low.

It might also be possible to obtain a higher cost of fluctuations if there are links between economic growth and fluctuations. For example, Ramey and Ramey (1995) demonstrate a strong negative relationship between volatility and growth in a panel of 92 countries. However, in examining the welfare cost of instability, Epaulard and Pommeret (2003) find the volatility in the US economy to be too small to generate large benefits from stabilization policies even if reductions in volatility induce growth. Jones, Manuelli and Stacchetti (1999) demonstrate that the relationship between volatility in fundamentals and mean growth can be positive or negative. Their quantitative results indicate that the size of this effect is not large enough to generate large welfare costs of instability. Barlevy (2004a), on the other hand, proposes a set-up where eliminating fluctuations reallocates investment from periods of high investment to periods of low investment. This mechanism results in achieving higher growth rates without necessarily requiring higher investment levels. In such a framework, he finds the welfare cost of instability to be substantially higher than in the original Lucas estimates. The key to obtaining such large costs in his model is the presence of diminishing returns to investment, for which there is some, but not overwhelming, evidence.

It may be important to point out that the way Lucas, and Hodrick and Prescott have defined business cycles, namely, as fluctuations around a trend, has an important implication for the welfare cost calculations. If instead recessions were viewed as inefficient declines in output, as in the Keynesian view, and stabilization policies were seen as policies that would prevent economic activity from falling below its maximum potential, then the welfare cost measure could be higher. This is the case in DeLong, and Summers (1988) and Cohen (2000), who obtain welfare costs of stabilization of around 1.6 per cent and one per cent respectively. In their frameworks stabilization increases the average level of consumption.

It is important to stress that the estimates that have been discussed so far have been for the post-war US economy. The low cost estimate that is obtained in many of these papers is partly due to the relative stability of the US economy since the 1950s. Welfare costs of business cycles are higher in economies that are faced with larger fluctuations in consumption. Using the volatility of consumption in the United States prior to the Second World War, or the fluctuations in consumption that are

observed in many developing countries, results in significantly higher welfare cost measures (see, for example, Pallage and Robe, 2003). In addition, in the post-war period the US economy had a well-developed unemployment insurance system that may have helped reduce the volatility in consumption. Economies with less-developed welfare systems also yield higher welfare costs of instability. (Chatterjee and Corbae, 2007, find that the potential benefit of reducing the likelihood of economic crises such as a Great Depression-style collapse of economic activity can range between 1.05 and 6.59 per cent of annual consumption. They also find that uninsured unemployment risk contributes significantly to the size of these gains.)

Although there is still some debate over the size of the welfare costs of business cycles, the weight of the evidence seem to suggest that they may not be too high for the US economy. (See also Barlevy, 2004b, for a survey of the literature on the welfare cost of business cycles.)

See Also

- growth and cycles
- liquidity constraints
- neoclassical growth theory
- real business cycles

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