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How Keynes' General Theory Enters Economics

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1 Introduction

Two situations confront the standard theory of general equilibrium with formidable obstacles, the first by challenging its assumptions especially about production conditions and the second by accepting the standard theory but with uncertainty. Debreu's Theory of Value contains one of the best expositions of the theory of general equilibrium under certainty. However, it fails to handle indivisibilities in production (combinatorial problems), avoidable costs that put discontinuities into cost functions and nonconstant returns to scale. It also does not handle departures from the standard demand theory that allow jumps in the boundaries of preference sets as well as other realistic assumptions about relations among consumer goods. Even with certainty these departures from the standard theory remain difficult unsolved problems about the existence and nature of general equilibrium. None of these issues concerns Keynes in his General Theory.

Keynes works within the framework of the standard economic theory of general equilibrium but with a far reaching revision of its major foundation. The standard theory assumes certainty. Knight's Risk, Uncertainty and Profit elucidates what this means in the first chapter of his famous book. Keynes does not assume certainty in his General Theory. All manner of changes occur in an economy with uncertainty. People have invented many ways to deal with the effects of uncertainty in the real economy. It is illuminating to regard the General Theory of Keynes as a pioneering foray into some of these adaptations to uncertainty. Whether Keynes would agree is uncertain. After 1936 he had little leisure for economic theory. Great Britain entered the Second World War in September 1939 after the German invasion of Poland. Keynes became the leading economist in Britain's war efforts.

Economic theory needs a new kind of asset in an economy with uncertainty. Every asset carries a liability of equal magnitude when uncertainty is present with a single exception that I call a safe asset. A safe asset is not offset by an equal liability so it cannot default. Only the monetary authority can produce safe assets. Another less descriptive name for a safe asset is outside money. Safe assets play an important role in an economy with uncertainty.

Uncertainty in Knight's sense gives a basic framework for understanding the real economy. People adapt to changes in uncertainty. Macroeconomics can do no better than explain how these adaptations to uncertainty affect the real economy. The late 1930's and the present exhibit common symptoms and adaptations consistent with greater uncertainty. Similar causes precipitated both situations. In 1928 new legislation made credit more easily available by national banks to finance housing. More than 60 years later the legislation enacted during the Great Depression to separate commercial banks from speculation was repealed. Among the effects was a surge in mortgages, sub-prime mortgages.
The causes were the same and so were the effects - a huge financial crisis, the first starting at the beginning of 1930, the second starting in early Fall of 2008. Greater uncertainty spurs a desire for holding safer assets. By the late '30's in response to aggressive efforts by the Fed to revive the economy there was a huge increase in the money supply financed by open market operations and coupled with large Federal deficits. In both cases short term interest rates on Treasury securities were close to zero. Long term interest rates on Treasury paper were below 3 per cent. There was a flight to the U.S. dollar and the Swiss franc. Employment that had begun to rise in 1936 fell sharply although still above the 1933 levels. The rate of unemployment was more than twice as high then than now. Sound familiar? Nor is this all. European difficulties mounted for political reasons supposedly justified by the Versailles Treaty. The political dissensions in Europe today seem equally intractable but less likely to cause war.

2 Exposition and Critique

Economics became an academic discipline in the last half of the 19th century. Since J. M. Keynes was born in 1883, his father taught economics at Cambridge University and was a favorite pupil of Alfred Marshall, the paucity of Keynes' formal training in economics is surprising. Therefore, Keynes is the best-known of the amateur economists so far. It should be said in his defense that the standard economic theory to which he was exposed had little to offer about an economy with uncertainty.

Formal models of economics were begun by Cournot, Jevons, Walras, Edgeworth, Fisher, Pareto and Slutsky. In these models prices and quantities in every market adjust so every market clears. The economic theories that grew out of their work allow no room for unemployment because unemployment means markets do not clear. Game theory brought new theories to economics. These offer alternatives to market equilibria in the shape of the status of the core. Instead of equilibrium now there is a non empty core. Disequilibrium means an empty core. An empty core is no longer a rare oddity. It reflects common conditions amenable to repair. The causes of an empty core on the production side are free-loader problems, durable capital goods, indivisibilities and non constant returns to scale. The terms of sale between buyers and sellers reflect these complications. Sometimes owing to their differences from received economic doctrine these terms of sale arouse concern among some economists as departures from their views of competition.

Keynes presented his General Theory (1936) to challenge conventional economic theory. It clarifies his approach to interpret it as a two sector model of the economy. One sector produces consumer goods. The second sector produces capital goods. These two sectors employ workers. Outlays by all firms in these two sectors ultimately go to workers and to capitalists. Capitalists receive interest, dividends and profits. Workers get wages. Workers are poor and save nothing. Capitalists are rich and do not consume their whole income. The difference between their income and their consumption is their saving. Saving may finance 'investment' or be hoarded, unspent. Hoarding causes unemployment. Outlays and expenditures are flows. Hoarding flows into the stock of idle assets. Idle assets are unemployed assets. Keynes does not say what capitalists do as their stock of idle assets grows and grows.
The classical theory is different. In the classical theory with constant returns to scale for producers and convex preference sets for consumers, there are outputs, prices, inputs and wages at which all markets clear. Unemployment is meaningless. Keynes did not regard unemployment as an anomaly. By calling his model a General Theory, he took the classical theory of full employment to be a special case of his own theory. Unemployment can be an equilibrium in the Keynesian theory. It is due to rigid nominal wages, rigid demand for capital goods in the form of physical investment unresponsive to interest rates and idle assets accumulating from hoarding that Keynes called the liquidity trap. Idle assets are problematic in his General Theory. One usually balances assets against liabilities. This raises a question about the form of these idle assets. If they are fiat money, then they are not offset by any liabilities. Such idle assets are safe assets called outside money. Only the monetary authority can supply safe assets. If the monetary authority accommodates the demand for idle assets in this form and increases the stock of outside money, then Keynes must explain what will happen. Will prices remain unchanged? Keynes offers another case for a liquidity trap in the form of interest paying securities. Because interest rates are already very low, they are more likely to rise than fall even lower. Short term securities are less vulnerable to capital loss in this situation. The long term interest rate must be above the short term interest rate in a liquidity trap. Holding short term paper that pays interest, no matter how low, is better, apart from default risk, than holding outside money, especially if prices are falling. If idle assets are liabilities of private entities, then how can these increase indefinitely? If the General Theory measures idle assets in real terms, then rising idle assets must result from falling prices. In this case the real interest rate is high and that reduces the demand for new capital goods. How the General Theory resolves all this is unclear.

Debreu’ s Theory of Value is the best exposition of general equilibrium in standard economics. Nothing changes in the classical model if all prices are multiplied by any positive number. The neoclassical theory can avoid the need to explain nominal prices, nominal wage rates and nominal interest rates by assuming the existence of forward contracts. Let all transactions be forward contracts. Assume all are faithfully fulfilled. Insurance is available because it is a forward contract. All terms of trade would be real. There is no uncertainty. Explicit spot markets are unnecessary in this economy because they are implicit in forward prices. All interest rates are real. Nothing changes in this economy if all prices are multiplied by a finite positive number.

Actual spot markets owe their existence to uncertainty, to the impossibility of foretelling the future. Unforeseen events can prevent fulfilling prior agreements. The quantity theory cannot rescue the pure theory of general equilibrium with its plethora of forward contracts. Nominal prices can affect the actual economy insofar as they are surprising departures from real prices.

Sraffa was grappling with the implications of non constant returns to scale throughout his career in economics. Keynes had a very high opinion of Pierro Sraffa. (Skidelsky, 1994, vol. 2, 289-91). Yet despite their close friendship for more than three decades, it is remarkable how little effect Sraffa seems to have had on the economics of Keynes with a single exception, Chapter 17 of Keynes’ General Theory (1936), The Essential Properties of Interest and Money, where Keynes records his struggles with interest rates. This chapter introduces the own-rate of interest, a new concept according to Keynes, who attributes it to Sraffa. The own rate of interest is the real rate of interest in terms of a single commodity. Different commodities can have different own rates. The own rate of interest
on outside money is the nominal rate of interest minus the expected rate of change of prices. It cannot have a positive lower bound unless the rate of deflation is below the nominal interest rate taken to have a positive lower bound assuming it costs nothing to store outside money.

### 3 A. P. Lerner's Identity: Savings Equal Gross Investment

The economy has two sectors, consumer goods and capital goods. Both sectors employ workers and use capital goods. Payments to workers and owners of capital goods constitute the total cost of all firms. Their revenue equals sales of consumer goods and capital goods. Capitalists own firms that own or rent capital goods. Firms pay dividends, interest and profits to their owners. Profits and losses result from uncertainty. There is no loss of generality and gain much simplicity by assuming dividends are zero. Consequently, interest payments are contractual and profits are residuals, positive or negative.

\[
\begin{align*}
y(t) &= \text{business receipts from the sale of consumer goods and capital goods} \\
c(t) &= \text{sales of consumer goods} \\
k(t) &= \text{stock of capital goods} \\
worn\text{ out capital goods} &= \text{depreciation} = \alpha k(t), \ 0 \leq \alpha \leq 1 \\
g(t) &= \text{sales of new capital goods} \\
dk(t) &= k(t) - \text{depreciation} + \text{replacement of worn out capital goods} + \text{new capital goods} \\
g\text{ross investment} &= \text{replaced capital goods plus new capital goods} \\
w(t) &= \text{total wages paid by all business firms.} \\
\text{interest payments} &= \rho k(t), \ \rho = \text{real rate of return on capital goods} \\
\text{contractual costs} &= w(t) + \text{interest payments} \\
\text{net revenue} &= \text{business receipts minus contractual costs} \\
cw(t) &= \text{purchases of consumer goods by workers} \\
ck(t) &= \text{purchases of consumer good by capitalists} \\
c(t) &= \text{total purchases of consumer goods} = cw(t) + ck(t) \\
y(t) &= \text{total income} = \text{income of workers plus income of capitalists} \\
yk(t) &= \text{income of capitalists} \\
yw(t) &= \text{income of workers} \\
s(t) &= \text{savings by capitalists} = yk(t) - ck(t) \\
y(t) &= c(t) + g(t) + \text{replacement of worn-out capital goods} \\
y(t) - c(t) &= s(t) = g(t) + \text{replacement of worn-out capital goods} = \text{gross investment.} \\
\end{align*}
\]

The last step completes the proof of

Lerner's Identity (1947). Savings $\equiv$ Gross Investment

This identity says nothing about the level of employment, income, consumption, stock of capital and so forth. It serves to verify the consistency of any model that seeks to explain these variables.
4 Uncertainty Enters

- More Identities

Because workers do not save by hypothesis, savings are the difference between the income of the capitalists and their spending on consumer goods. Savings are a flow that must affect either stocks of capital goods or stocks of safe assets. Safe assets are idle assets. Safe assets serve no purpose in an economy with certainty. The stock of capital goods is constant if and only if outlays on capital goods replace worn out capital goods and there are no outlays on new capital goods. The stock of capital goods may decrease if worn out capital goods are not replaced and no new capital goods are bought, or increased if new capital goods are bought above what is spent to replace worn out capital goods. Workers are poor and own no assets by hypothesis. Only capitalists own assets.

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- **Desire for Liquidity**

A symptom of more uncertainty is a desire for more safety. Hoarding is a manifestation of a desire for more safety by means of holding more liquid assets. It has two parts, the percentage change in the stock of nominal safe assets minus the percentage change in the price level. To accommodate an increase in the desire for liquidity requires a combination of an increase in the stock of nominal safe assets, a decrease in the price level and a suitable combination of the two that satisfies the identity in equation (5). Admittedly, it runs counter to the usual form of the quantity theory to suppose an increase in the stock of outside money combines with a decrease in the price level, yet this is the message from hoarding. It is hard to envision an insatiable desire for safety. It would seem that when the stock of safe assets becomes big enough, there would be a temptation to buy more actual commodities.

Write \( \log m(t) = \log M(t) - \log \pi(t) \) so that \( d \log m(t) = d \log M(t) - d \log \pi(t) \). Therefore,

\[
(5) \quad h(t) = \frac{d m(t)}{m(t)} = \frac{d M(t)}{M(t)} - \frac{d \pi(t)}{\pi(t)}.
\]

- **Desire for Growth**

In the stationary state business buys only enough capital goods to replace worn-out capital goods. If \( dk(t) = 0 \), then

\[
(6) \quad y(t) - c(t) = s(t) = (\alpha + \rho) k(t) \quad \text{and} \quad g(t) = 0.
\]

In the model that assumes workers save nothing and only capitalists save, equation (6) says that the income of capitalists would stay constant over time if their savings suffice to replace worn-out capital. Capitalists are rentiers whose income derives from interest paid on the stock of capital that they own. This opens the way to introduce the effect of uncertainty into the theory.

Business will install new capital goods that increase their revenue by enough to cover the interest cost and to replace those parts that wear out if they believe the return on new capital will fall within a range centered on \( (\alpha + \rho) g(t) \). Outcomes outside this range may show the effects of uncertainty, favorable or unfavorable. It is beguiling but mistaken to regard \( (\alpha + \rho) g(t) \) as the expected return on new capital goods. If more unfavorable uncertainty washes over business so that outcomes fall below the lower bound of the acceptable range, business buys less new capital goods.
Summing Up

Uncertainty waxes and wanes. Increased unfavorable uncertainty is revealed by shortening the duration of all kinds of commitments. The capital goods industry sells less especially new capital goods so it employs fewer workers. New residential construction decreases. The demand for safe assets, hoarding, rises. Instead of replacing all worn out capital goods, business spends more on repairing and maintaining capital goods. Bankruptcies rise, defaults increase, credit tightens, there are fewer new business firms, new stock issues decrease and so on. Because greater uncertainty affects both buyers and sellers of forward contracts, the effect on prices is indeterminate but the effect on quantity is determinate, reduction.

References