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THE INVISIBLE HAND IN MODERN MACROECONOMICS

by

James Tobin

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The Invisible Hand and the Keynesian Dichotomy

The Invisible Hand, one of the Great Ideas of history and one of the most influential, is Adam Smith's most important legacy to macroeconomics, as to all economics. It is particularly important today as the ultimate inspiration for the New Classical Macroeconomics and for Real Business Cycle Theory. These are intellectual movements that engage many of the best brains in the profession, especially among younger cohorts and especially in the United States. They dominate the agenda even of theorists and econometricians who are skeptical or hostile to their methods and conclusions.

These movements are revolutions counter to Keynesian economics, itself a revolution against Invisible Hand orthodoxy. Keynes claimed to have detected a massive market failure. Workers were involuntarily unemployed, workers who were willing to work at real wages not exceeding their marginal productivities. Employers did not hire them because effective demand for what they would produce was insufficient. The employment and output of the idle workers would enhance social welfare. Yet the market mechanism could neither prevent this failure nor correct it -- correct it, anyway, in good time and without government assistance. Keynes alleged this market failure to be an endemic flaw in capitalism.

The Great Depression lent credibility to Keynesian theory. So did the postwar prosperity of the advanced capitalist economies, widely attributed to the use of Keynesian stabilization policies. In the profession something of a reconciliation was achieved, between Keynesian macroeconomics and classical or neoclassical microeconomics. Paul Samuelson called it the "neoclassical synthesis." At least it was coexistence, with each tradition assigned its domain, its textbook chapters, and its semester of the introductory course. The new terms with prefixes micro and macro signaled the division of the subject.

Here is this Keynesian dichotomy in Keynes's own words:

"...I see no reason to suppose that the existing system seriously misemploys the factors of production which are in use...It is in determining the volume, not the direction, of actual employment that the existing system has broken down...Thus I agree with

[Silvio] Gesell that the result of filling in the gaps in the classical theory is not to dispose of the 'Manchester System', but to indicate the nature of the environment which the free play of economic forces requires if it is to realise the full potentialities of production." (Keynes 1936, p. 379)

In other words, the Invisible Hand does just fine, with one giant exception. Once this failing is remedied, once full employment is restored and maintained, classical economics comes into its own, telling how resources are allocated, how relative prices are determined, how private and social utilities are maximized. And Keynesian economics tells how to restore and maintain full employment.

Keynes, it is true, was also critical of the inequalities of income and wealth generated by free market capitalism. In this, however, he was not out of the mainstream of his classical opponents, notably including Professor A.C. Pigou. Moreover, Keynes saw hope for amelioration of inequality if full employment could be maintained. He asserted that the high propensity to save of wealthy countries, which might be a source of unemployment and stagnation if left to itself, could if channeled into accumulation of capital so reduce its rate of return as to bring about "the euthanasia of the rentier."

As the domain of economics was divided, the allocation of resources among various economic activities and the prices of commodities and factors of production were "micro" phenomena, to which the orthodox paradigm applied. Business fluctuations or "cycles" were macro phenomena, to be understood by theories of aggregate demand set forth by Keynes and his successors. This was also initially the viewpoint of monetarists like Milton Friedman, who differed from Keynesians regarding the determinants of aggregate demand, the sources of disturbances in it, and the proper instruments and strategies of stabilization of demand. Aggregate demand theories were, and still are, the rationales of the equations of most econometric models -- academic, proprietary, and governmental -- of short-term fluctuations.

The Classical Counter-revolution

There were always true believers in the Invisible Hand who were uncomfortable with the macro/micro partition and with the rationale for it offered by the neoclassical synthesis. Many of them were general equilibrium

theorists, or at any rate economists who took seriously its market-clearing paradigm. They balked at describing as "equilibrium" any situation with excess supplies or demands in any markets, let alone in whole economies. Direct or indirect disciples of Adam Smith, they believed that movements of prices -- including wages and interest rates -- would quickly or even instantaneously eliminate excess supplies or demands. They understood how governmental or monopolistic restrictions of competition might delay or prevent market clearings. If so, the remedies would be removal of the restrictions, and Keynesian fiscal and monetary operations would be futile or worse. They saw Keynesian macroeconomic theory as dependent on an arbitrary and gratuitous assumption, endogenous inflexibility of money wage rates, which apparently attributed irrationality, even "money illusion," to private agents.

In the 1970s unrest of this kind exploded into outright rebellion. For this explosion there were reasons outside the profession, as there always are for major developments in economics, in the times of Smith and Ricardo and Marx as well as those of Keynes. Just as the Great Depression of the 1930s was an environment favorable to the Keynesian revolution, the Great Stagflation of the 1970s inclined both economists and the general public to welcome the counter-revolution. The sociology of our discipline is fascinating, but I am concerned here rather with its internal dialectics.

The New Classical Economics is, as the name implies, a revival of the major macroeconomic propositions of Smith, Say, Ricardo, and Mill.¹ These propositions were less explicit and conscious in Smith than in his followers, but they were there nonetheless and served to inspire Say and other successors. They are implications of his central anti-mercantilist themes: that national wealth consists in the capacity to produce useful commodities, or goods that can be traded for them, rather than in the accumulation of gold and silver money; and that free competitive markets yield optimal results, while government regulations are counter-productive. The two major macroeconomic propositions are: Say's law, i.e. the impossibility of

¹ The major figures are Robert Lucas, Thomas Sargent, and Robert Barro. See Lucas 1981, Sargent 1976, Lucas and Sargent 1978, Barro 1974. "Rational expectations" is the important theoretical and methodological innovation. But the neoclassical assumption of market-clearing is essential for the strong macroeconomic propositions.

generalized excess supply, and the neutrality of money, that "veil" which obscures the true and real economic phenomena to near-sighted observers.²

Real Business Cycle Theory is a logical spinoff of New Classical Macroeconomics.³ The business fluctuations we observe are, this theory alleges, sequential equilibria moving in response to basic exogenous shocks. These shocks are changes in tastes (as among work, leisure, consumption now and consumption later), in technology and productivity, in resource availabilities, and in external supplies, demands, and prices. There can be no Keynesian shocks to effective aggregate demand, because prices clear markets so fast that there are never any excess supplies or demands. That disposes of the "Keynesian dichotomy," the view that business cycles are disequilibrium phenomena, fluctuations of demand around a fairly smoothly growing capacity to produce. Real Business Cycle Theory erases the common distinction between long-term growth trends and short-period cycles. They are one and the same. Supply and demand move together, not necessarily smoothly.

All the shocks, all the outcomes that matter, are real. Nominal prices, money supplies, indeed all variables measured in the monetary unit of account, are irrelevant sideshows. Money is neutral not just in the long run but in the short run too. (This proposition applies strictly only to fiat money. Gold and silver and other commodities of intrinsic non-monetary value may also be used as money. Changes in their supplies and demands and in their values in terms of labor and other goods and services will have real consequences.)

Macroeconomics in The Wealth of Nations

Actually, there is little macroeconomics in the Wealth of Nations, in particular very little attention to short-run fluctuations in economic activity. Larry Klein may have given us the reason in his paper, that there were not discernible business cycles in the eighteenth century, that cycles as we know them came with the Industrial Revolution.

² Dillard (1988) refers to the "veil" proposition as the "barter illusion" of classical economists, who of course scorned vulgar "money illusion." Like Keynes, Dillard contests the view that a money economy is a supremely efficient system of multilateral barter. The efficiencies of money as a medium of exchange come at a cost, namely that Say's law is not assured.

³ For exposition of this theory of business cycles see Flosser 1989.

Adam Smith would feel at home with most of the content of his self-anointed modern disciples, if not with their language, style, and methodology. His theory of economic progress in Book III focussed on the growth of "stock", accumulated savings as purchasing power over labor, at the disposition of business entrepreneurs. Continuously oriented to the most profitable uses and embodied in the most productive forms, stock is deployed to exploit opportunities for applying new technologies and for extending the division of labor.

Smith emphasized stock as circulating capital. He appears to have assumed a one-period lag between inputs of labor and materials and outputs of salable goods, in the manner of Piero Sraffa's twentieth century classical model of production and prices. This assumption enabled Smith to speak of profits on stock interchangeably as markups and as rates of return over time. (1937, pp. 48-49)

Smith would not be surprised that rates of growth fluctuate and are sometimes negative. He never found reason for such fluctuations in generalized shortages or excesses of demand. Nor did he find them in monetary expansions and contractions, even of gold and silver, or in the commodity export or import surpluses that bring money into the nation or drive it out. In contrast, Hume expected monetary expansions and contractions to have at least temporary real effects, which indeed are part of the classical specie flow mechanisms of balance of payments adjustment. (Dillard, 1988, p. 303; Smith, 1937, pp. 308-309)

Smith said little about the determinants of saving, and therefore little about the determinants of the pace of accumulations of stock. I doubt that Franco Modigliani's life cycle theory applies, because workers in Smith's day generally did not retire or expect to retire -- they died too young. Instead, it would not be far-fetched to read into Smith what is now commonly called classical saving theory, that capitalists save all or most of their incomes while wage-earners spend all of theirs. A reader might also carry away from Smith a "supply-side" lesson, that capitalist entrepreneurs save and invest more when they see more profitable opportunities.

In any case, Smith clearly regarded saving as the constraint on growth. He correctly saw holdings of gold and silver as diversions of stock from productive employment, and therefore he welcomed prudent substitution of paper

money for these precious metals. He was talking of banknotes, in modern terms "inside money," liabilities that enable banks to make productive business loans, real bills. He seemed unworried about possible inflationary dangers of this process, expecting rather that over-issue would depress the exchange values of the notes of errant banks. (1937, pp. 304-309).

Smith evidently believed in purchasing power parity for tradable goods, even in the short run. He anticipated a theory that returned to fashion about twenty years ago as "the monetary theory of the balance of payments." (Smith, 1937, 284-288, 308-309, 403-406; Kindleberger, 1984, p. 8; Frenkel and Johnson 1975) It concerns a system of fixed exchange rates, for example the gold standard. According to this model, the stock of money in any one country is just what is needed and desired to handle the economy's real transactions at given international nominal prices. The country is presumed to be too small to affect those prices by itself. Anything that creates in the one country an excess demand for real money balances -- for example productivity gains that increase output and transactions at existing prices -- will suck gold into the country, entailing temporarily an export surplus. And vice versa, an expansion in domestic credit and banknote issue could create an excess supply of money. It would be worked off by export of gold (or by incurring gold debt to foreigners) and import of goods. The world-wide aggregate of nominal money supplies determines world-wide nominal prices.

Adam Smith's specific macroeconomic ideas are not an important part of his legacy to modern "new classicals." The Invisible Hand is their true inspiration. They reject the Keynesian dichotomy and expect competitive markets to transmute self-interest into public interest in macroeconomic as well as microeconomic outcomes. I turn now to an examination of the legitimacy of this application of Smith's Great Idea.

The Invisible Hand and General Equilibrium Theory

In The Wealth of Nations the Invisible Hand is a conjecture, an audacious and powerful idea, to be sure, but an unproved assertion. It's a long way and almost two centuries from Smith to Arrow-Debreu, from Invisible Hand to the twin Fundamental Theorems of Welfare Economics. (Arrow 1953, Debreu 1959) They are: First, a competitive equilibrium is Pareto-optimal. Second, any Pareto-optimal allocation is a competitive equilibrium for some

distribution of endowments. Of course, Pareto-optimality is a very weak criterion. Smith is much bolder, identifying "public interest" with maximum "annual revenue of the society," which I take to be real net national income (1937, p. 423).

Two roads were traveled: the Anglo-Saxon line of economic theory through Marshall and Pigou; and the continental European road via Leon Walras, Vilfredo Pareto, and Maurice Allais. Thanks to Irving Fisher, John R. Hicks, and Paul Samuelson, the two strands came together earlier in this century.

Smith's conjecture was eventually rigorously proved by Arrow and Debreu, but at considerable cost to its generality. Let me remind you of some of the possible violations of the restrictive but necessary assumptions, stressing particularly those of macroeconomic significance.

Non-convexities. The Fundamental Theorems cannot survive non-convexities in tastes or technology. Smith himself eloquently and realistically stressed specialization and division of labor as sources of efficiency and progress. But general equilibrium theory cannot cope with economies of scale and scope. For one thing, if these non-convexities can be internalized in single firms, they are inconsistent with perfect competition.

Imperfect competition. The Fundamental Theorems require that all agents take market prices as parameters beyond their control. This is the meaning of perfect competition. However, because of non-convexities or other factors many prices are not impersonal data but decisions of firms and individuals or outcomes of negotiations. Smith was, understandably, imprecise on this point. The "market" was a vague metaphor for many varieties of institutions for the purchase and sale of commodities, not a rigorous concept. The same is true for many uses of the term today, indeed for almost all lay discussions.

Externalities. Third-party effects not considered by firms and households are a well-known source of market failures. Deals among the parties, even if conceivable, entail transactions costs. Competitive markets do not naturally exist for by-product goods and bads. Externalities were often treated as exceptional curiosa (orchards and beehives) in older welfare economics literature. But the spate of environmental hazards now tells us that externalities are no joke. And at this very conference even Jim Buchanan reported the discovery of a serious and widespread externality: people whose work would increase the productivity of others take too much leisure. Public

goods embody important externalities; that is why individual enterprise and free markets cannot be expected to provide them in adequate quantity. As Sir Richard Stone tells us in his paper, Smith saw little need for government to supply public goods other than security and justice.

There is some irony in the celebration of the victory of Smith over Marx and Lenin at a time when the capitalist world faces acute problems that free markets cannot be expected to solve on their own.

Time and Uncertainty. Saving, investment, and other intertemporal choices are not easy to introduce into general equilibrium models. Choices involving uncertainty are harder still. Irving Fisher and J.R. Hicks made important contributions. Arrow and Debreu "solved" these problems simply by multiplying the list of commodities, distinguishing them by the time and "state of nature" prescribed for delivery. The states of nature exhaust all possible contingencies. Competitive markets determine simultaneously prices for all these commodities, future and contingent as well as spot. The market opens only once; the rest of economic history is just the making of the deliveries then contracted. Lo and behold! The Fundamental Theorems apply. One logical difficulty is that the number of "commodities" would be so numerous relative to the number of transactors that competitive markets could not exist for most commodities. This is true even though it suffices to have a number of markets equal to the sum of the number of states of nature and the number of basic goods and services rather than to their product.

"Sequence economies" and incomplete markets. In actual economies spot markets are open continuously or repeatedly, few futures contracts are traded, and few contingencies are insurable. As a result, there are plenty of opportunities for market failures. Rational expectations methodology, the theoretical rage of the last twenty years, can be seen as an attempt to recognize but compensate for the absence of many markets. It attributes to agents a great deal of global knowledge of the structures of the economies and markets in which they are operating. However, it has not been shown how agents can acquire this knowledge from sequential observations generated by incompletely informed market participants. Those observations are distorted by the misinformations that guided the agents. Note, by the way, that Smith's Invisible Hand alleged that every individual need respond only to local information and incentive. That strong hypothesis certainly remains unproved.

Instabilities. Prices set in multiple interrelated markets might not clear all the markets of excess supplies and demands all the time. "False" trading may occur at wrong prices. Presumably prices and quantities will then move in response to excess supplies and demands. Will these movements converge to the equilibrium? It is not sure without additional restrictive assumptions, for example that traded commodities are "gross substitutes" in collective excess demand functions. A particular example of instability, related to the incompleteness of markets and the difficulty of forming rational expectations, concerns the responses of competitors to a profitable opportunity for investment. If a margin of price above cost opens up, the opportunity for each firm appears large, maybe indefinitely large if constant returns to scale apply. Each firm knows the market will absorb only a finite expansion of capacity in aggregate, but is ignorant of its competitors' plans. This situation can lead to over-building and to cobweb cycles, familiar in office space and ships.

Money. There is no room for money, especially paper money but also the fiat component of commodity money, in these general equilibrium models. Attempts to introduce it have foundered on the economies of scale and externalities that are intrinsic virtues of money. In consequence of these virtues, markets -- whether perfectly or imperfectly competitive -- generate prices in money rather than in Smith's labor hours or any other commodity numeraire. Since money useful as a means of exchange is necessarily also a store of value, decisions to hold it over time are intertwined with other saving and investment decisions and are not necessarily neutral.

Keynes's Revolt against the Premises of Classical Macroeconomics

Keynes was quite clear about the theoretical foundations of his rebellion against classical -- he could have said neoclassical -- macroeconomics. Markets or other processes set nominal wages, not real wages, and nominal prices, not relative prices. These nominal wages and prices are sticky, if only because there is not continuous and instantaneous market clearing. Perceiving, as did Smith, that money is a store of value competitive in savers' portfolios with other assets, including real capital, Keynes rejected, as Smith did not, money neutrality.

Shocks to aggregate real demand frequently occur, possibly because

business firms change their views of the future profitability of capital investments and of the acceptability of the risks, possibly because consumers decide to shift consumption between present and future. Keynes was quite explicit about missing markets, particularly the absence of futures markets. When a consumer decides not to eat lunch today, he conveys a negative demand signal to his customary restaurant but no signal of when in the future and where he intends to spend the amount saved. No investment is undertaken to prepare for his future demands. (Keynes 1936, pp. 210-213) Absent such signals or Arrow-Debreu contracts, businesses and other investors who buy long-lived durable assets are exposing themselves to incalculable risks. (Keynes 1936, Chapter 12)

Keynes also envisaged monetary shocks, changes in money supplies or velocities, which may become real demand shocks because nominal prices are sticky. But it is a vulgar fallacy, all too epidemic nowadays, to describe these as the only sources of Keynesian aggregate demand fluctuations.

Keynes questioned the capacity of the economy, once displaced from full employment equilibrium, to return to that equilibrium on its own. The normal price responses to excess supply would not, he said, be reliable adjustment mechanisms for nominal wages and prices all over the economy. He did not believe that increased flexibility of nominal wages and prices would reduce the volatility of real output and employment in response to real demand or monetary shocks. Price reductions would not occur instantaneously, fast enough to forestall even temporary declines in output and employment. Price reductions would take real time. The process of deflation itself -- the argument also applies to disinflation -- would discourage demand, quite possibly aggravating the disequilibrium instead of correcting it. (Keynes 1936, Chapter 19, especially p. 265; Tobin 1975).

Keynes's multiplier comes on stage as soon as it is admitted that even part of the adjustment to changes in aggregate demand takes place in quantities. The multiplier reinforces the changes in quantities. This is an implication of the point that Keynes regarded as his most important innovation, the principle of effective demand. Agents' purchases are constrained by the amounts they actually realize from selling their endowments (of labor, for example), regardless of how much they would buy if they could sell all they want to sell at prevailing prices. This point was rediscovered

by the mathematically formal "general disequilibrium theory" of recent years. (Barro and Grossman, 1976; Malinvaud, 1977)

In situations of excess supply of labor and of capital capacity, there are positive "multiplier" externalities to individual increases in expenditure on goods and services, for example business capital investments. These give the government a role in economic stabilization, not only via expenditures, taxes, and monetary measures but possibly also via indicative planning in the style of Jean Monnet. Moreover, if Buchanan is correct, the employment of the involuntarily unemployed, even more than longer work hours from the already employed, had desirable externalities.

Keynes's departures from the assumptions of general equilibrium theory are all, I submit, legitimate and reasonable. They do not reflect vulgar ignorance or casual neglect of the standard paradigm of economic theory, but rather a recognition of its shortcomings in application to real-world macroeconomics. Neither Keynes nor the architects of the subsequent "neoclassical synthesis" solved all the theoretical problems involved, including the specification of suitable equations for macro-econometric models. Younger generations of theorists will find a challenging and fruitful agenda here if they overcome the temptations of the new classicals.

Robinson Crusoe Macroeconomics

New Classical Macroeconomics begins with the position that the Invisible Hand, in the form of modern general equilibrium theory, deserves the benefit of the doubt. That is, the burden of proof is on anyone who contends that market failures occur and that there is room or need for government macroeconomic policy. Of course, these latter-day disciples of Adam Smith know that today's economies are not like those described in The Wealth of Nations, much less like those described in Arrow-Debreu. Following Milton Friedman's "methodology of positive economics," they hypothesize that actual economies function "as if" the general equilibrium model applied.

Real Business Cycle models simulate a simple economy with classical properties, subjected to a random process of technological shocks, and compare the variances and covariances of the simulations with those from actual economies. The tests have little power. If the hypothesis that they are the same cannot be rejected by the comparisons, it is accepted, even though

simulations of many other models could survive similar comparisons.

Even weak tests reject New Classical explanations of cyclical fluctuations of employment and unemployment as voluntary intertemporal choices. According to these explanations, periods of high unemployment reflect choices of leisure now in anticipation that work will yield higher real wages later. No reasonable empirical estimates of responses of leisure-work-consumption choices to real wages are anywhere near large enough to explain fluctuations of the magnitude of postwar business cycles, let alone those of the 1930s. Moreover, the unemployed themselves say they are searching for work, not out of the labor force. In times of high unemployment, disproportionately large numbers of unemployed result from layoffs rather than voluntary quits. The Keynesian story fits the facts much better.

Real Business Cycle models concern Robinson Crusoe economies. A single representative individual is making choices for the whole economy. This simplification enables the model-builder to derive behavior explicitly from rational optimization subject only to constraints of resource availabilities and technology. Obviously this is not a money economy. It is not even the barter economy Smith and the classicals perceived through the veil of money. It is not even a market economy, because no transactions need occur. Any prices generated are just the shadow prices of the optimal allocations chosen by Robinson Crusoe.

In Keynes's view the essential task of macroeconomics was to explain how markets do and do not coordinate the behaviors of diverse agents: households and firms, savers and investors, workers and employers, creditors and debtors, bulls and bears, citizens and governments. To assume away this diversity is to default the responsibilities of the profession to maintain seriousness and relevance.

Adam Smith is not responsible for excesses committed in his name. His main purpose was to oppose protectionism and other regulations favoring special interests at the expense of the general public. His important message was that the accumulation of precious metals by contriving foreign trade surpluses was contrary to the national interest, for the true wealth of a nation lay in its capacity to deliver useful goods and services to its citizens. Modern macroeconomists of all shades could agree, and usually do.

Who knows what Smith would have thought of Walras, Arrow, and Debreu, or of Lucas, Sargent, and Barro? The Wealth of Nations is a very down-to-earth book, with a simple thematic moral, a rudimentary theoretical model, an imaginative intuition, a vast collection of historical and institutional material, and a great deal of wisdom and common sense. Perhaps looser claims for the Invisible Hand, less sweeping, less rigorous, and less abstract than general equilibrium models, would be more congenial to Smith. Second-best claims that admit market failures but say governments are worse? Schumpeter's argument for the substantial but uneven progress due to the innovations of temporary monopolies? Perhaps Smith would not be altogether unfriendly to Keynes's activism against mass unemployment and to Keynes's contention that such macroeconomic activism would enable the principles of the "Manchester School" to achieve their full potential.

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