

1. Phelps demonstrated the choice problem of suppliers of labor and of goods in terms of their expectations of wages and prices "elsewhere"; the analysis led to the notion of the "equilibrium" level or path of employment in the correct-expectations sense of Marshall, Hayek and Myrdal--and of "disequilibrium." *Second*, to argue that the hazard of employee quitting ensures disequilibrium (each firm's wage exceeding the expected norm) at too low an unemployment rate, so equilibrium requires high enough unemployment--an equilibrium *without market clearing*.
 - "Money-Wage Dynamics and Labor-Market Equilibrium," *Journal of Political Economy*, August 1968 (Part 2)--for the notion of wage competition leading to nonclearing labor-market equilibrium; the equilibrium path leading gradually, because of training or search frictions, to the steady-state rate; for invariance of equilibrium to inflation; disequilibrium under-response of wages when demand increase not perceived as general; point that nonsynchronization also helpful.
 - "Optimal Price Policy under Atomistic Competition," with Sidney Winter, in Phelps et al., *Microeconomic Foundations of Employment and Inflation Theory* (Norton, 1970)--for notion of a customer market; positive pure profit; mark-up a function of interest rate; disequilibrium underresponse of prices when a demand increase not perceived as general.

In what became known as the 'island parable' of search unemployment, I further pointed out that models can be constructed in which, because of similar imperfections in the flows of information, there can be both labor-market equilibrium and disequilibrium *with* market-clearing wage rates (so the unemployment is voluntary):

- "The New Microeconomics in Inflation and Employment Theory," *American Economic Review: Papers and Proceedings*, May 1969; expanded upon in "Introduction," Phelps et al.
2. The next contribution was the project at Columbia to elaborate nonsynchronous models of wage-setting and price- setting, most of this in collaboration with Calvo and Taylor. These models were the first wave of what Parkin dubbed the *New Keynesian school*--models in which, even if the macro shock is commonly observed, the general price or wage level does not jump to the final-adjustment level because firms' have *overlapping*, or staggered, price or wage *commitments*.
 - "Disinflation without Recession," *Weltwirtschaftsliches Archiv*, December 1978--for an algebraic model based on the suggestions in my 1968 paper and its 1970 version (Appendix 2), but focused only on disinflation policy.
 - "Introduction: Developments in Non-Walrasian Theory," in my selected papers *Studies in Macroeconomic Theory*, Vol. 1 (Academic Press, 1979)--for a discussion of the microeconomic reasons why firms make commitments, do not synchronize, etc.
 - "Stabilizing Powers of Monetary Policy under Monetary Policy under Rational Expectations," with John Taylor, *Journal of Political Economy*, February 1977--for the macro implications of the key feature, that some (in this case, all) prices are currently predetermined, under rational expectations.

3. The latest effort has been to complete the structuralist "model" of unemployment determination, emerging over the last decade, in which the equilibrium unemployment-rate path is constantly approaching a steady rate that is a moving target--a *variable* natural rate adjusting to the evolution of the economy's state variables and shifting with shifts in some parameters. (The parameter shifts first emphasized were foreign oil shocks and shifts in unemployment compensation; state variables include the capital stock and the fraction of workers who are currently insiders.) My contribution in a series of models has been to introduce real assets to obtain an *intertemporal general-equilibrium framework*. That framework determines the effects on the equilibrium employment path of: *real demands* as well as "supply shocks"; capital stock and oil; the level and rate of progress of the technology; tax structure and tariffs; overseas real interest and real exchange rates.
 - *The Slump in Europe*, with J. P. Fitoussi, (Blackwell, 1988)--for early arguments why an external *real-interest rate shock* to an open economy is *contractionary*--by pushing up mark-ups, dampening labor hoarding and training by firms, and depressing real prices of nontradeable capital goods. (The Keynesian velocity-of-money mechanism gives the opposite result.)
 - "Macroeconomic Shocks in a Dynamized Model of the Natural Rate of Unemployment," with Hian-Teck Hoon, *American Economic Review*, September 1992, and "Consumer Demand and Equilibrium Unemployment ...," *Quarterly Journal of Economics*, August 1992--for closed-economy models showing that increased consumer demand, in raising real interest rates, is contractionary for equilibrium employment; and that the *rate* of technical progress also matters.
 - "A Working Model of Slump and Recovery from Disturbances to Capital-Goods Demand...," *American Economic Review Papers and Proceedings*, May 1988, "The Effects of Productivity, Total GDP Demand, and 'Incentive Wages' on Unemployment in a Non-Monetary Customer-Market Model of the Small Open Economy," *Scandinavian Journal of Economics*, March 1990, and "A Working Model of Slump and Recovery from Disturbances to Capital-Goods Demand in a Closed Non-Monetary Economy...," in *Nicholas Kaldor and Mainstream Economics*, Nell & Semmler, eds. (Macmillan, 1991)--for the result that in some settings, despite their non-monetary nature, *some* expenditures have *expansionary* effects.

Most of the modeling of the labor market derives from my 1968 formulation. This work is synthesized and extended in my [*Structural Slumps: The Modern Equilibrium Theory of Unemployment, Interest, and Assets*](#).

4. Among the other contributions, one has been to try to extract from optimal tax theory some implications of policy relevance: an exploration of the implications of tax-revenue maximization, and the translation of optimal taxation to the area of optimal inflation.
 - "Taxation of Wage Income for Economic Justice," *Quarterly Journal of Economics*, August 1973, and "On the Concept of Optimal Taxation in the Overlapping-Generations Model of Economic Growth," with Janusz Ordover, *Journal of Public Economics*, August 1979--for the result that

the marginal tax rate ought to approach zero as taxable income approaches the top attained level (Phelps-Saadka theorem).

- "Anticipated Inflation and Economic Welfare," *Journal of Political Economy*, February 1965, "Inflation in the Theory of Public Finance," *Scandinavian Journal of Economics*, March 1973, and my *Inflation Policy and Employment Theory*--for the proposition that, revenue considerations apart, the nominal interest rate should be just low enough (deflation great enough) to ensure *full liquidity*, a result later loosely expounded by Friedman; the point that the inflation tax matters because it (like other taxes) it restrains consumers' claims on output; the further result that, with tax revenue scarce, it may be optimal to establish a higher money rate of interest, even positive inflation.
5. Contributions to the theory of economic growth, especially the effects of the division of society's saving between investment in tangible capital, investment in education, and investment in technology, and also the welfare economics of optimum national saving:
- "The Golden Rule of Accumulation," *American Economic Review*, September 1961--for a basic result on over-saving.
 - "Investment in Humans, Technological Diffusion, and Economic Growth," *American Economic Review*, May 1966--a challenge to the past-education-is-a-human-capital-analog-of-physical-capital view.
 - "Models of Technical Progress and the Golden Rule of Research," *Review of Economic Studies*, April 1966--for a model in which even the long-run rate of growth is, in a word, *endogenous!*--thanks to research (not education).
6. The little time for research in the early 1980s was directed toward a theory of expectations and consequent macroeconomic behavior. The basic point was that rational expectations, though there may often be a pragmatic justification for adopting it, does not generally have an epistemological basis. If expectations are rational according to A's model, they cannot be rational in B's contrary model. Owing to the pluralism of models, I argued, it is more plausible to hypothesize that each agent's expectations are "model-theoretic" but consider that other agents' expectations are based on their own models. A number of operational consequences of this state of affairs have been studied.
- "The Trouble with Rational Expectations and the Problem of Inflation Stabilization," in *Individual Forecasting and Aggregate Outcomes*, Frydman and Phelps, eds., (Cambridge, 1983)--introduces model-theoretic expectations and shows that, with the expectations of others are not *common knowledge* the credibility problem takes longer to overcome. (M. Miller at IMF picks up the approach.)
 - "Post-Rational Expectations in a Pluralist Economy," with R. Frydman (mimeo. 1992)--studies "theories-consistent expectations" in a pluralist economy and the consequent errors in inference.