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Economic Theory

Comments on Bruce Smith's work

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The remarks on Bruce Smith's work, that follow, have been presented at the Bruce D. Smith Memorial Conference held by the Department of Economics of the University of Texas at Austin, on April 12–13, 2003. The conference was organized by Scott Freeman, Sebastian Centennial Professor in the Department of Economics of the University of Texas at Austin, and Bruce Champ, of the Research Department of the Federal Reserve Bank of Cleveland. These remarks are in three parts, dealing with Bruce Smith's contributions to the study of financial intermediation and development, monetary history, and economic dynamics.

1 David K. Levine: Bruce Smith on financial intermediation and development

The Historical and intellectual background

Bruce Smith is one of the finest men I have had the honor to have as a friend. This appreciation, however, focuses on Bruce Smith the economist, and especially on his work on financial intermediation and development. To understand Bruce's work, some historical perspective is useful. When Bruce and I were in graduate school, the first wave of the freshwater revolution was roundly criticized by our saltwater advisors as a naive model without frictions. Bruce was a leader of the second wave of the freshwater revolution, ironically, as a graduate of M.I.T., a confirmed saltwater school. This second wave introduced serious market frictions into the rational expectations dynamic equilibrium framework of the first wave, and this ended the intellectual debate.

The intermediation story

I find it helpful when thinking about the monetary side of the economy, to think for a moment about the corresponding real side. The intermediation story on the real side goes something like this: I have some useful machines. Should I keep them in my basement to sell if I need to buy something? Or should I lend them out to other people to use in production? Intermediation allows me to do both. However, the devil always is in the details, especially when we want to consider the monetary side of the economy along with the real side. Bruce's trademark in studying these issues is to provide a comprehensive theory. This is always in the framework of dynamic general equilibrium theory – generally in an overlapping generations model, although as Bruce rightly recognized, this was a convenience, and his models moved far beyond the simple OG model of money. The underlying monetary story in Bruce's framework were generally frictions involving some combination of Diamond and Dybvig taste shocks and/or locational shocks. The heart of the model always is that the shocks can be insured only by holding money.

Bruce, unlike his mentor Neil Wallace, did not have much patience with elaborate theories of money. We know what money is and what it does: Bruce always wanted to understand the consequences.

Unique features of developing countries

Developing countries have certain features that differentiate them from developed countries and these features always play an important role in Bruce's study of development. There are two crucial features Bruce focused on. The first is the need to monetize the debt – the fact that developing countries do not have good institutions for collecting taxes, and so must depend heavily on the inflation tax. The second feature is that financial markets are not so well organized in developing countries, so both money and the banking system play a more central role in the economy.

Intermediation and development

Bruce is nothing if not prolific. In the bibliography, I count some five papers on intermediation and growth, and another eight on intermediation and development. I cannot sensibly do justice to all of these contributions here, so I have elected to focus on a few key papers showing both the depth and breadth of his contributions.

1. Financial intermediation and endogenous growth (with Valerie Bencivenga). Review of Economic Studies **58**, 195–209 (1991) (Reprinted in: Grossman, G. (ed.) Economic growth: theory and evidence. Cheltenham, UK: Edward Elgar 1996

Bruce and Valerie combine an overlapping generations framework with endogenous growth. Intermediaries serve to allow the shifting of savings away from unproductive money to productive capital. The basic theme of the paper is to show how the introduction of intermediaries not only improves welfare, but leads to a higher growth rate.

2. Deficits, inflation, and the banking system in developing countries: the optimal degree of financial repression (with Valerie Bencivenga). Oxford Economic Papers **44**, 767–790 (1992). (Reprinted in: Courakis, A.S. (ed.) Financial markets, institutions and policy. Oxford: Oxford University Press 1993)

Bruce and Valerie examine arguments examine how financial "repression" during development hinders the development of a banking sector, keeping interest rates high and impeding development. As in Bruce's other work, a financial repression means that there are high reserve requirements and/or deposit interest rate ceilings. The crucial starting point of the analysis is to observe that in a developing country it is probably necessary to monetize a sustained deficit. The key observation is that the efficiency of an inflation tax is improved by "repression."

The paper studies in some detail the output/taxation efficiency trade-off. Since a "developing" country does not have many financial markets, the model supposes that there is both a "formal" and "informal" sector for intermediation. In the steady state, with a binding reserve requirement, liberalization may simply shift resources from the "informal" to "formal" sector without increasing investment. However, unlike in the structuralist critique – this shift in a general equilibrium setting does improve efficiency.

One key conclusion that emerges from the analysis is that when reserve requirements are set optimally reductions in government spending should be accompanied by liberalization.

3. The effects of open market operations in a model of intermediation and growth (with Stacey Schreft). Review of Economic Studies **65**, 519–550 (1998)

Bruce and Stacey examine how spatial separation and limited communication creates a role for banks. Specifically, random reallocation of traders between locations forces them to hold money which is the only portable asset. This leads to a reserve ratio that is increasing in the nominal interest rate. When money is tight – that is, the bond to money ratio is increased – there can be multiple steady states, indeterminacy and oscillations. Interest rates rise, there is inflation, and long-run output is reduced.

Argentina and the contemporary message

Bruce's work on intermediation and development has important implications for the recent crisis in Argentina – which to a certain extent his work anticipated. Many analysts have suggested that fundamentals in Argentina were good before the crisis – that the deficit was not large as a fraction of GDP, and it is clear that drastic steps were being taken to curb the deficit. However, it is important to recognize that the currency board originally introduced to cure high inflation also tied Argentina to tight US money policy. This was combined with liberal banking rules. This is a combination that worked well in Hong Kong. But as Bruce would surely point out, Hong Kong is not a developing nation, and has much higher income and more highly developed financial markets than Argentina. Hence, this tight money combined with liberal banking rules and poorly developed financial markets – in combination with the need to monetize the debt in the absence of effective means

of tax collection – predictably leads to indeterminacy and oscillations and slow growth. Bruce would recommend instead a modest expansionary policy combined with some repression. This is much closer to the policy followed in Brazil – with much better consequences. The concluding observation is that perhaps it is not too late for Argentina to follow Bruce's advice.

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2 Arthur J. Rolnick: Bruce Smith on monetary history

Economists are often said to be at a disadvantage when compared to academics in the "hard" sciences. That is because, without incurring considerable expense, economists cannot run controlled experiments with the economy.

I do not think Bruce ever thought this was a serious handicap. That is because Bruce used economic history as his lab. And many of us would claim that his work in this lab was highly successful, by almost any metric. With economic theory as his guide, Bruce treated historical experiences as tests of prevailing models and conventional economic wisdom, and in the process he helped to rewrite the economic history and to revise some of the tenets of monetary theory and policy.

The two papers to be presented in this session on monetary history are good examples of how Bruce used his lab. They are also good examples of why his work will continue to influence the economics profession for many years to come.

The first paper by Loren Brandt, University of Toronto, Thomas Sargent, New York University, and Bruce has two titles, "Unintended Consequences of the U.S. Silver Purchase Program for China and Hong Kong" and "(Intended) Consequences of the U.S. Silver Purchase Program for China and Hong Kong." (If I know Sargent, there will probably be a third paper, "The Consequences Revisited.") But, while I am a bit unclear about the title, I am clear that the paper is heavily influenced by Bruce's work on the quantity theory of money. In preparing these remarks, I enjoyed rereading Bruce's writing on this issue – one paper in particular.

As most of you know, Bruce was not a shy academic. Who would be so bold as to question the bible of monetarism, *A Monetary History of the United States*, by Friedman and Schwartz? But question it he did in his Journal of Monetary Economics article (August 1994) "Mischief and monetary history: Friedman and Schwartz thirty years later." Bruce presented a cogent argument that to understand the relation between changes in the money supply and changes in inflation, one needed to dig much deeper into the historical record than Friedman and Schwartz did. In particular he warned us that (in the tradition of Tobin and Sargent and Wallace) the fiscal and banking regime matters and that the quantity theory must be interpreted within this financial environment. With several historical examples, he showed that the quantity theory – in its simple form – failed dramatically when the fiscal regime changed or did not conform to the implicit assumptions underlying the quantity theory.

In the first paper by Brandt, Sargent, and Smith, Bruce's dictum on financial regime is a key principle underlying the analysis. Bruce not only pursued a research agenda to try to better understand the relation between money and prices; he was also very interested in money's influence on banking stability or the lack thereof. In his Canadian Journal of Economics article (November 1996) "Currency elasticity and banking panics: theory and evidence" with Bruce Champ and Steve Williamson, he began to explore how seasonal variation in the demand for money could play a critical role in generating banking panics. Again with theory as a guide and history as a lab, Bruce and his co-authors present a convincing case that seasonal variations and legal restrictions are key ingredients to understanding banking panics and economic history.

The second paper of this session on monetary history is an extension of this work. In "The Seasonality of Banking Failures During the Late National Banking Era," Pere Gomis-Porqueras, University of Miami, and Bruce examine how a central bank should respond to banking panics generated by seasonal demands for currency. Once again Bruce and his co-author turn to history.

3 Karl Shell: Bruce Smith on economic dynamics

Bruce Smith was a best friend and superb colleague. The fact that Bruce played the same crucial role for many people in and out of economics did not diminish his marvelous gift. When Bruce and I were together at Cornell, we would often spend an hour or so together at the end of the day. We would mix business, science, gossip, and personal matters. Somehow this was the best way for us to take new looks at economic issues. When Bruce moved to Austin, we kept to this format on the telephone. When Bruce would call, he claimed to be merely "checking in." Then one of the best and most productive hours of my week would unfold. Bruce "checked in" regularly with several colleagues, students, and friends. We miss him very much.

Bruce had a style of his own for doing economics. His style survives in the awesome number of high quality papers that he published in his shortened career. His style survives in the published work of students, protégées, and colleagues. Even those who have not emulated his full style have been influenced mightily by Bruce's published work and his presence.

What was the style of Bruce Smith? His interests were very wide, so that any short answer is bound to be incomplete. Bruce was a scientific economist motivated by important public policy questions. Bruce was a full participant in seminars ranging from the most applied to the most theoretical. Bruce used and adapted existing theory in novel and appropriate ways for the policy problems at hand. He supported his models by extensive and imaginatively utilized historical and other evidence.

Bruce's theoretical tools were largely drawn from economic dynamics. He often applied Diamond's version of Samuelson's overlapping-generations model. This was the correct choice. The OG model accommodates real-world demographic facts. Demography is essential for twenty-first century economic policy analysis. The OG model allows for money and other government debt that need not be retired. The OG model can accommodate bequests and other intra-family transfers in a realistic and theoretically acceptable ways. Bruce rarely left his reader with only steady states. He did the full dynamic analysis. He found both deterministic cycles and "sunspots" as sources of economic fluctuations.

Sunspots are a polar case – a source of economic randomness that affects economic outcomes without affecting economic fundamentals. Sunspots can be thought of as the limit of intrinsic uncertainty as the effects on the fundamentals becomes small. "Excess volatility" is the volatility of the economy that cannot be explained by the volatility of the fundamentals (endowments, preferences, technol-

ogy, etc.). Gain is one measure of excess volatility:

$$\text{gain} = \frac{\text{randomness in outcomes}}{\text{randomness in fundamentals}}$$

In practice, it is difficult to measure excess volatility because several economic elasticities intervene between the fundamentals and the outcomes. The sunspots model is theoretically useful because with pure sunspots the denominator of the gain fraction is by definition zero. Hence if the numerator is positive, we can be sure that the volatility is excess. When sunspot equilibria exist, it suggests by continuity that intrinsic uncertainty is also likely to generate excess volatility.

Bruce applied sunspot and sunspot-like analyses to policy questions. In judging Policy A versus Policy B, Bruce was not content to focus on the best outcome (often an approach implicitly taken in game theory) of a given policy. Bruce worried about "expected outcomes" and worst outcomes (Sargent's robust control?). Bruce's focus – as it must be in macro and monetary economics – was on the fragility or stability of the various policies, measured, for example, by the distance between best and worst outcomes of that policy. For example, a policy of reducing financial market frictions might improve economic efficiency in the best outcome, but possibly at the cost permitting greater volatility or other bad outcomes.