Macroeconomic Dynamics, **12** (Supplement 2), 2008, 149–153. Printed in the United States of America.
doi:10.1017/S1365100508070430

INTRODUCTION TO MACROECONOMIC DYNAMICS SPECIAL ISSUE: INEQUALITY

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This special issue features inequality. This is a subject that rightly draws immediate attention from both the profession and the popular press. The numbers themselves are intrinsically interesting, if not disturbing. There is, on the one hand, great variety in the distribution of earnings and an enormously right-skewed distribution of wealth. On the other hand, there is absolute and relative poverty. In developing countries there are extremes coexisting on both ends of the distribution. But developing economies also feature growth with time-varying levels of inequality. Macroeconomic growth, stability, and social policies seem correlated with poverty reduction in some instances.

More specifically, Cagetti and DeNardi concentrate primarily on the distribution of wealth in the United States. The richest 1% hold one-third of total wealth and the richest 5% hold more than half. Cunha and Heckman concentrate on the distribution of earnings in the United States. Many who go to college earn less than those who complete only high school and, more generally, the two distributions are overlapping (even controlling for selection, as in their model). Brazil is a country that at times has had virtually the highest level of inequality in income in the world (the Gini index at 0.625, behind Sierra Leone at 0.629 in 1989). The spread between the rich and poor is enormous. The distribution is again right skewed with the mean at 302 and the median at only 162 in 1992, expressed in 1994 monthly reals. Brazil is featured here in the paper of Ferreira and Litchfield. Brazil and especially Thailand have experienced substantial growth, with increasing—and then decreasing—inequality. In the case of Thailand, as with other Asian miracles, growth rate was 5% per year on average, 1976–1996, and reached 12% during the late 1980s. Poverty was reduced from 48% to 13%, and the distance of those below the poverty line closed substantially. Thailand is featured here in the work of Jeong, and also in Jeong and Townsend.

We present in this special issue not simply these facts but also diverse takes on these subjects, ranging from measurement to theory, typically featuring both in some degree. Ferreira and Litchfield also feature concerns about the data per se; for example, the construction of the poverty line and an unexplained discrepancy in income in Brazil in 1986. More generally, the use of data and econometric approaches also vary considerably across the various papers. Part of the goal of having these papers written for joint appearance in this special issue is to draw the

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https://doi.org/10.1017/S1365100508070430 Published online by Cambridge University Press

reader into thinking about this variety, hopefully more aware of the trade-offs and perhaps creating new hybrids in future work.

Accounting decompositions of levels and changes in income, inequality, and poverty in Thailand and Brazil are important exercises in measurement and provide important data summaries. The emphasis here is on what proportion of observed levels or changes can be accounted for by observable categories in available data. Implicit also are suggestions as to what subsequent generations of models should focus on, for example, individual and household choice problems, what policies may be needed as remedies, or which policies have had an apparent impact.

In Brazil, measured levels of inequality are best accounted for by education, at 34%–42%, whereas race and family types are important at 6%–11%, depending on the category. Convergence seems to be in evidence in the diminishing importance of regional and urban rural gaps. Earnings from employment versus employer earnings are the most important contributions to income differences, although with the former declining and the latter—along with Social Security—rising. Oddly, decompositions of changes do not reveal many patterns, with many movements offsetting one another and the majority falling into the residual "unexplained" category. There are exceptions, such as a decline in the mean returns to schooling, in the latter period.

In Thailand, the key measured observables are what Jeong refers to as self-selection categories—education, occupation, and use of financial institutions—and in his paper the emphasis is on change. In Thailand, all three key categories enter into changing per capita income levels, poverty reduction, and changing inequality change. Indeed, they account for a 39% change in income and poverty reduction and over three-fourths of the change in inequality. Astoundingly, the latter rises to 98% in the high-growth period during which changing financial sector access plays a key role. Income convergence across all three categories contributes 99% of inequality change in the growth-with-declining-inequality period. More generally, composition/population shift effects are high for education and financial access, whereas diverging and then converging income levels are more salient for occupation/sector contributions. The punch line of Jeong's work is that growth, inequality, and poverty dynamics are linked through self-selection in a way envisioned by Kuznets.

As accounting identities, the "dark" or unknown side is clearly documented in the tables of both sets of authors, Ferreira et al. and Jeong; that is, the proportion of inequality within a category that is simply unexplained. Related, gender and age of the household head as categories are seemingly unimportant in both countries, but, in fact, what may be going on are distinctions that are blurred (death of husband vs. migration) or various ways of taking care of the elderly. Both authors cautiously go beyond correlation to causal statements or hypotheses, but only as agendas for future work. Naturally enough, these conjectures are driven by what is seen to be large in the decompositions, or correlated in the data.

By contrast, Cunha and Heckman focus on unobserved heterogeneity and the theory of choice. Although of course there is a list of covariates for which they

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control (mother's education, father's education, distance from school, family income at age 17, parents divorced), their interest is a theory that can explain the observed variety in outcomes for households that appear otherwise equal, diversity created via selection into anticipated outcomes and diversity created ex post via luck. Multidimensional unobserved talents and how to measure them are key in their framework. The first of two factors accounts largely for selection into different levels of education and the second for heterogeneity in subsequent earnings. Evidently, much of subsequent uncertainty (from the standpoint of the econometrician) is able to be forecasted by the agents at the time of their choices. Essentially, all underlying parameters of the model, including factors with diverse factor loadings and the distributions of disturbances, are estimated using an explicit, well-articulated framework. Moreover, a variety of factor models and timings are considered—an agent knowing no factors, knowing one factor for selection, or both. This is the motivation behind the title of their paper.

Cagetti and DeNardi take the reader through a vast array of general equilibrium models of the U.S. economy, focusing on a recursive framework and discounted expected utility maximization. Key variables are savings, occupation choice, and bequests. These models include dynamic, infinitely lived, representative consumer models, which do not work well, the same setups but with more variety, typically in observables such as occupation—some of the literature that they review has selection based on talent and some advance knowledge of shocks. Other models are life cycle, intergenerational with retirement, uncertain lifetimes, accidental and deliberate bequests, as well as mixtures of these. Practically all of the work Cagetti and DeNardi report, including their own, is in the tradition of macroeconomics RBC (real business cycle calibration), although Markov chains parameters and various key moments or ratios are estimated from micro data. They also report on model sensitivity checks, feeding in alternatives values (not the calibrated values) of risk aversion and the discount rate/impatience parameters.

Jeong and Townsend take the reader through two explicit models of wealth-constrained occupational choice and financial deepening, representative of models widely featured in the development literature—and key categories in Jeong's work. The models have both observed covariates such as wealth, and unobserved heterogeneity as in talent or draws of idiosyncratic shocks. Most of the parameters of preferences and technology are estimated via maximum likelihood from micro data on household choices in initial cross-sections, and other data are deliberately set aside for comparisons with the models' simulations/predictions. Specifically, each of the models is simulated over time, drawing macro shocks from well-defined distributions and/or computing market clearing prices. The focus is on how well the models at estimated parameters (and with sensitivity checks at alternative values within standard error bands) can explain levels and movements in growth, inequality, and poverty at both macros aggregated and sector/disaggregated levels. The sectors use key categories suggested by the models, for example, entrepreneurs versus wage earners and those using the financial system versus those who do not. The reporting of anomalies and a model comparison section is a deliberate attempt

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to fuel further iterations of theory with data, very much in the spirit of the work and literature that Cagetti and DeNardi report so well. The point in both Cagetti and DeNardi, as well as in Jeong and Townsend, is that new models are needed to address the anomalies. Cunha and Heckman's work also might be placed in the context of a larger literature, for example, the evolving literature both interpreting, and altering, Mincer regressions.

Most of the models used by the various authors of this special issue are general equilibrium models of entire economies. This is quite clear in the work of Cagetti and DeNardi, as aggregated capital and labor supply, the integrals over micro decisions, are used in an aggregate production function to generate marginal productivities; hence the interest rates and wages taken as given in these same household decisions. Although less obvious in Cunha and Heckman, in which the earning equations appear more as reduced forms, the same aggregation and pricing can be done in this literature on schooling, and the authors do propose this as the next step, following Heckman, Lochner, and Taber (1998a,b). The Jeong and Townsend (2008) model of occupation choice is also explicitly general equilibrium, with labor and capital demand and supply obtained as integrals over observed and unobserved characteristics—the computation of interest and wages is more demanding, as the framework cannot be tricked into an approximate representative consumer framework with aggregate technology. A related TFP paper by the same authors, Jeong and Townsend (2007), makes that point.

The various models across the papers do vary in other substantive ways. Some assume perfect credit markets, as in Cunha and Heckman, although they report that this does not matter, whereas Cagetti and DeNardi use a Bewley-Aiyagari model of limited credit [Aiyagari (1994) and Bewley (1977)]. The models of Jeong and Townsend have these two kinds of extremes, financial autarky versus complete markets, imbedded in the same overall context, either exogenously as in Lloyd-Ellis and Bernhard (2000) model of occupation choice or endogenously as in the Greenwood and Jovanovic model of financial access. Finally, Cagetti-DeNardi and Cunha-Heckman are essentially steady state models, whereas Jeong and Townsend is a model in which transitions are very much featured.

The various papers differ in their attention to policy issues, but practically all raise the subject. Ferreira and Litchfield point to reduced inequality as consistent with the impact of various Brazilian social transfer programs, and reduced poverty and declining inequality with the impact of macroeconomic stabilization policies that lowered inflation. Ferreira and Litchfield also note that returns to schooling seem to be diminishing, although this is based on observed differentials across school categories. By contrast, the point of Cunha and Heckman is not to explain inequality per se but, rather, to address policy issues, such as tuition subsidies for those below the mean, financed by taxes on others. With unobserved heterogeneity in talent, different segments of the population will self-select into different levels of schooling, depending on the policy. Some may leave college, for example. The point is that observed averages in the data reflect selection "bias." Returns to schooling might appear to decrease only because less talented are drawn into

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higher levels. Other papers touch on policy issues. Cagetti and DeNardi mention tax policy, especially on the estates of the rich. The models used by Jeong and Townsend have been subjected to policy experiments in other work, Giné and Townsend (2004) and also Townsend and Ueda (2006, 2007), computing the distribution of gains and losses to credit market expansion, financial liberalization, or foreign capital inflows.

In the end, the diverse approaches of these papers to inequality complement each other. We understand a given approach more in comparison with others than in isolation as a stand-alone contribution. Thus, hopefully, the whole of this special issue will appear greater than the sum of the constituent parts. Ideally, the reader will be drawn into this literature and encouraged to contribute to these lively, productive debates. I want to thank each of the teams of authors for allowing the Journal to publish their important work.

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