

WHAT'S NEW IN DEVELOPMENT ECONOMICS?

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1 Introduction

This essay is meant to describe the current frontiers of development economics, as I see them. I might as well throw my hands up at the beginning and say there are too many frontiers. In recent years, the subject has made excellent use of economic theory, econometric methods, sociology, anthropology, political science and demography and has burgeoned into one of the liveliest areas of research in all the social sciences. And about time too: the study of economic development is probably the most challenging in all of economics, and provided we are patient about getting to "the bottom line" and the "policy implications," it can have enormous payoffs.

Fortunately, considerations of space allow me to use brevity as an excuse for selectivity. So rather than attempt an exhaustive review of several areas, I would like to concentrate on a few methodological points around which recent literature appears to have clustered. More than anything else, I want to bring out for you a certain way of *thinking* about development that has become increasingly influential over the last couple of decades, one that is changing and will continue to change the face of research in this discipline.

The main trend I would like to try and document is a move—welcome, in my opinion—away from a traditional preoccupation with the notion of *convergence*. This is the basic notion that given certain parameters, say savings or fertility rates, economies inevitably move towards some steady state. If these parameters are the same across economies, then in the long run all economies converge to one another. I review this approach very briefly in Section 2. I then explain why this view leads to (a) a limited depth in the way we ask development questions, and (b) a certain type of policy bias. In Section 3, I discuss the first of two types of theories that take us away from the determinism inherent in the conver-

gence idea. This is an approach that is based on the notion of multiple equilibria—several dramatically different outcomes can occur given the same fundamentals. In Section 4 I return to equilibria that are determined fundamentally by historical conditions. That is, given a particular historical experience, the outcome that results is fully pinned down, but the influence of that historical experience persists through time in observed outcomes. In either case, there is no presumption of convergence or ahistoricity. I will argue that this approach gives us different insights, both in the way we ask questions and with regard to policy.

While I am tempted by fashionable trends in nomenclature, I hesitate to call this the "New Development Economics." If writers such as Paul Rosenstein-Rodan or Albert Hirschman were to encounter such a phrase (and the subsequent accompanying description), they would be scandalized. Much of recent thinking in development can be traced to the insights of these two eminent writers, though, to be sure, the retracing of their paths brings to light new insights and arguments.

2 A Traditional View

Open a book—almost any book—on the economics of developing countries, and it will begin with the usual litany of woes. Developing countries, notwithstanding the enormous strides they have made in the last few decades, display fundamental economic inadequacies in a wide range of indicators. Levels of physical capital per person are small. Nutrition levels are low. Other indicators of human capital such as education—both at the primary and secondary levels—are well below developed-country benchmarks. So are access to sanitation, safe water and housing. Population growth rates are high, and so are infant mortality rates. One could expand this list indefinitely.

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I am greatly indebted to Dilip Mookherjee for several conversations on this subject, and in particular, for allowing me to borrow freely from our joint introduction to *A Reader in Development Economics*, London: Blackwell (forthcoming), for the purpose of writing this essay. This essay will appear in Michael Szenberg, ed. *Shifting Paradigms, New Directions in Economics* (Cambridge University Press)

Notice that some of these indicators—infant survival rates or life expectancy, for instance—may be regarded as *defining* features of underdevelopment, so in this respect the list above may be viewed, not as a statement of correlations, but as a definition of what we mean by development (or the lack of it). But other indicators, such as low quantities of physical capital per capita, or population growth rates, are at least one step removed. These features don't define underdevelopment. For instance, it is unclear whether low fertility rates are intrinsically a feature of economic welfare or development: surely, many families in rich countries may take great pleasure in having a large number of offspring. Likewise, large holdings of physical capital may well have an instrumental value to play in the development process, but surely the mere existence of such holdings does not constitute a defining characteristic of economic welfare.

And indeed, that is how it should be. We do not make a list of the features that go hand in hand with underdevelopment simply to define the term. We do so because—implicitly or explicitly—we are looking for answers to the question: why are some countries underdeveloped and others not?¹ One way of going about answering this question is to look at empirical relationships between some measure of development (say per-capita GDP) and other (presumably exogenous) factors. For instance, one might regress per-capita income on variables such as the rate of savings (or investment) or population growth rates (see, e.g., Mankiw, Romer and Weil [1992]).

The background hypothesis of *convergence*, which goes back to Solow [1956]—but also has a parallel in the theory of optimal growth²—has often been invoked to interpret empirical work of this sort. The basic idea of convergence is very simple indeed. Suppose that all production is carried out using capital and labor, and a constant fraction of national income is saved. Then countries with a low endowment of capital relative to labor will have a high rate of return to capital (by the “law” of diminishing returns). Consequently, a given addition to the capital stock will have a larger impact on per capita income. It follows that, controlling for savings rates, poorer countries will tend to grow faster and hence will catch up, converge.

To be sure, the savings rate is not the only factor that qualifies the argument. Anything that systematically affects the marginal addition to per-capita

income must be controlled for, including sharp quantifiables such as population growth rates (which affect the denominator of per-capita income) or looser concepts such as “political climate” or “corruption” (which might affect the rate of return to capital).

Thus the convergence hypothesis, properly interpreted, does not really mean that all countries do actually converge. But it does mean that a failure to observe convergence must be traced to one or another of the so-called exogenous factors that we've just described. This has two important—and unfortunate—implications for the way we think about development.

First, it limits our search for deep explanations. It is not uncommon to find economists “explaining” inter-country variation by stating that one country is more corrupt than another, or more democratic, or is imbued with some particularly hardworking cultural ethic. One might even hang one's hat on the following sort of theory: different societies have some *intrinsic* difference in their willingness—or ability—to save, or to procreate. Therefore such-and-such country is poor or underdeveloped because it is populated by people who habitually save very little, or procreate a lot.

At some level these “explanations” are perfectly valid. But they are not very deep. We would like to have a theory which—while not belittling or downplaying the role of social, cultural and political factors—does not simply stop there. We would like to know, for instance, whether low incomes provoke, in turn, low savings rates so that we have a genuine chicken-and-egg problem. The same is true of demographics—might underdevelopment be a cause of high population growth rates, just as high population growth rates themselves retard the development process? More boldly, we might seek a theory of corruption that views corruption just as much an outcome as a cause.

Now simply asserting that “nothing is truly exogenous” doesn't take us very far. The question is whether one can study these interactions in a way that yields new insights. In what follows, I will try and argue that this can be (and is being) done.

The second problem with the convergence approach is that it generates a particular set of attitudes towards economic *policy*. By stressing the role of factors such as savings, population growth or levels of corruption that might actually be symptoms rather than causes of underdevelopment, they

promote superficial (and sometimes wrong) policy interventions. If these factors are a *result* of underdevelopment rather than simply its cause—they are unlikely to be prone to manipulation by simple-minded policy tinkering. And even if the policies are effective, such approaches can lead to misjudgment on the required duration of necessary interventions. For instance, suppose we believe that Bangladeshi growth rates are low because Bangladeshi society somehow promotes high fertility (the outcome, let us say, of religious or cultural attitudes). If the fertility rate is truly believed to be exogenous as a consequence, a policy of lowering fertility (say, through monetary incentives) will certainly have an effect on growth rates. But the incentives would have to be offered *indefinitely*. In contrast, an interactive approach to the fertility-growth problem may suggest permanent effects of one-time interventions, an issue we shall return to below in more detail.

In the two sections of the paper that follow, I outline theories that go beyond the convergence idea. In these theories, *societies that are fundamentally similar in all respects might behave differently, and persistently so*. I shall discuss two reasons for this persistent difference. The first is based on the notion of underdevelopment as a self-fulfilling failure of expectations. According to this approach (Section 3), economies exhibit multiple equilibria. Some societies may be stuck in the “bad” equilibrium, exhibiting shortfalls in familiar development indicators. Simultaneously, such societies may display low savings rates or “cultures of corruption,” but this latter set of features cannot be related causally to the former.

The second set of theories (Section 4) is based on the notion of underdevelopment as a persistent outcome of certain historical configurations. Once again, two blueprints of two societies may be the same, but differences in certain initial conditions cause persistent differences in subsequent trajectories. In particular, we will focus on differences in initial economic inequality, though all sorts of other initial conditions could profitably be considered.

3 Underdevelopment and Expectations

3.1 Multiple Equilibria

Paul Rosenstein-Rodan [1943] and Albert Hirschman [1958] argued that economic develop-

ment could be thought of as a massive *coordination failure*, in which several investments do not occur simply because other complementary investments are not made, and similarly, these latter investments are not forthcoming simply because the former are missing. Thus one might conceive of two equilibria under the very same fundamental conditions, one in which active investment is taking place, with each industry’s efforts motivated and justified by the expansion of other industries, and another equilibrium involving persistent stagnation, in which the inactivity of one industry seeps into another. This serves as a potential explanation of why similar economies may behave very differently.

The work of these two writers brings out the essential feature that is needed for “multiple equilibria” to arise, at least for multiple equilibria that can be ranked by some welfare criterion such as Pareto-dominance. This is the basic idea of *complementarity*: a particular form of externality in which the taking of an action by an agent increases the marginal benefit to other agents from taking the same (or similar) action. As examples, consider the two main sources of coordination failure discussed by Rosenstein-Rodan and Hirschman.

1. Inter-Industry Links. The expansion of a particular production sector will have both direct and indirect implications for other sectors through these links. For instance, the development of a transportation network, such as railways, will facilitate the export of certain types of products, and thereby encourage their production. This is an example of what might be called a *supply link*: one that works by lowering the cost of inputs to another sector. At the same time, the expansion of railways will raise the demand for railway inputs, such as steel. This is an example of a *demand link*.

Supply and demand links may, in turn, be direct or indirect. For instance, it is possible for railways to have a direct demand link to the coal industry (at least in the days when steam engines were in operation), as also an indirect demand link to the coal industry (via steel, for instance). The entire productive sector of an economy is covered by a web of such links.

Figure 1 provides a (vastly oversimplified) picture of what these links might look like. As an illustration of complementarity, suppose that the “action” in question is as follows: the magnitude of investment in a particular industry. Then a complementarity exists if the links are “positive.” as in the

examples given above. For instance, an investment expansion in railways increases the incentive to invest in steel. In such cases, it is possible that *the very same economy* may be plunged into a low level of activity for no other reason than the fact that sectoral depressions are self-reinforcing. At the same time, there may exist another (self-fulfilling) level of economic activity that is better for all concerned.

2. *Demand complementarities.* A different set of connections is also emphasized in this early literature. This is the possibility that an expansion in some industries will serve to raise income, and in this way, generate demand for the final goods produced by *other* industries. Once again, there is a potential complementarity here, at least across the producers of non-inferior goods. An expansionary investment in some subset of sectors will increase the incentives of other sectors to follow suit, because there is now a greater demand for their products.

As usual, this complementarity raises the possibility of multiple equilibria. Each entrepreneur would invest if he were to believe that demand would be high, and if all entrepreneurs harbored such optimism, demand would indeed be high—

these expectations would be self-fulfilling. But pessimism may also be self-fulfilling, because lack of investment would lower demand in general for all products.

The argument here is that an enhanced level of economic activity generates greater national income, and the generation of national income creates additional demand to justify that activity.

Notice that such “indirect” complementarities (not via specific interindustry links, but through the economy as a whole) do not need to work through demand alone. Suppose that the expansion of some sectors contributes to the generation of a skilled, reliable, educated workforce. Then the supply of a labor pool of high quality will stimulate the development of other industries. This is a complementarity that works by facilitating production, not by raising the demand for products.

Complementarities lead to a view of the world that is essentially non-deterministic. In its purest form, the theory says nothing about *which* equilibrium will prevail.³ Interpreted with care and some imagination, it also acts as a critique of the convergence-based methodology in the previous section. For instance, it is possible for the same economy to

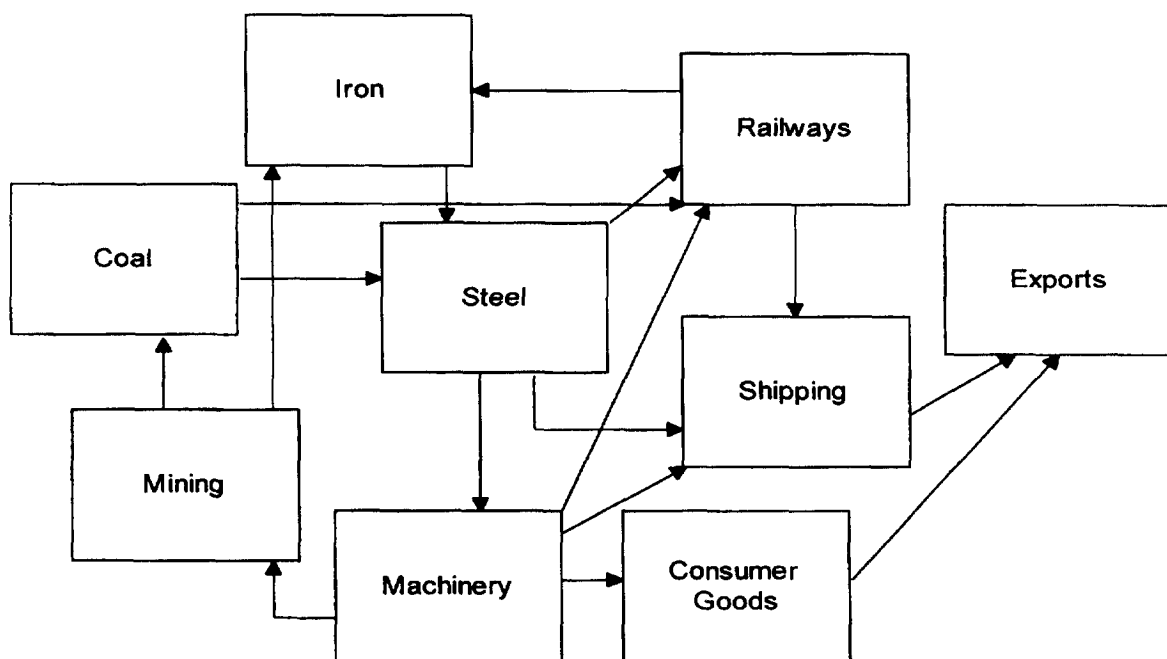


FIGURE 1. Inter-Industry Links.

be in a low-income/high-fertility trap, or in a high-income/low-fertility growth phase. In this view, fertility rates are not *casually* responsible for income, nor are fertility rates some exogenous social characteristic impeding inter-country convergence.

Once complementarities—and their implications for equilibrium multiplicity—enter our way of thinking, they seem to pop up everywhere. The Rosenstein-Rodan view of demand complementarities was given new life in a paper by Murphy, Shleifer and Vishny [1989]. Since then, there has been an explosion of interest in demand complementarities (though the equally important study of complementarity via direct inter-industry links has been surprisingly dormant). See, for example, Rodríguez [1996], Ciccone and Matsuyama [1996], and other papers in a recent issue of the *Journal of Development Economics* [1996] dedicated especially to this topic.

To be sure, there is no need to restrict the analysis to cross-industry interactions. As Arthur [1983] and David [1985] have argued, it is possible to show how the presence of complementarities can stifle the arrival of new technologies and new standards. As discussed by Acemoglu and Zilibotti [1997] and others, complementarities can be invoked to explain low financial depth in developing countries. Complementarities make an appearance in the theory of economic growth, as in the pioneering work of Romer [1986], Lucas [1990] and others. Complementarities can be used to understand spatial trends in crime, corruption or large scale defaults on debt. See Ray [1998, Ch. 4] for an introductory discussion and several other applications of the idea.

3.2 Policy Implications

The methodology of this section has three striking implications for policy.

First, a policy is to be viewed as a device for moving the economy out of one equilibrium into another. This is, conceptually, completely different from the viewpoint implicit in the previous section: that there is a single long run outcome towards which all economies must go, but this long run outcome may display underdevelopment because the underlying parameters of the economy are not right. Policy amounts to a sustained tweaking of these parameters. In contrast, the multiple equilibria con-

text views policy as a way of pulling the economy out of one equilibrium into another.

This sort of view lies at the heart of arguments put forward by Rosenstein-Rodan and Hirschman in the 1950s, arguments that led to a vigorous debate between “balanced versus unbalanced growth” (see Ray [1998] for a description of the two approaches). It is a pity that these arguments have not received the full attention that they deserve from a modern perspective; in the next subsection, I attempt to explain why.

Second, according to the multiple equilibria view, a policy need not be permanent or persistent, precisely because the desired end-state is *also* an equilibrium in the absence of the policy. Indeed, after a temporary phase in which the old, bad equilibrium is artificially ruled out with the imposition of the policy, leaving only the good equilibrium, the policy may be removed in the expectation that the new state of affairs will hold on its own. Several socio-economic phenomena conform to this view. It may be an equilibrium response for citizens of a society to employ slaves, to burn their wives, to demand dowry, to have many children, to throw garbage in or otherwise soil public places, to not observe codes of orderly conduct, or to bribe and be bribed, *provided everybody else is doing the same thing*. The very same individuals may refrain from all these activities if no one else engages in them. Consider, for instance, a policy in which one or another of these activities is made unlawful, with attendant penalties for breaking the law. It is to be expected that after some time has passed, the law (while still on the statute books in name) will not need to be enforced anymore, *assuming that initially it has been implemented well*. Social pressures may suffice. The same is true of many economic situations, such as those studied by Rosenstein-Rodan and Hirschman.

Finally, while freed of certain responsibilities of persistent implementation, an equilibrium-tipping policy will need to be artfully chosen and closely implemented in the transition, or it can fail badly. Take, for example, the notion of compulsory primary education. The reason that primary education may need to be compulsorily imposed in a society is that its benefits are unclear in a world where labor power is needed for current output and no one else is particularly educated (this was even true of Western Europe, by the way; see, e.g., Eckstein and Zilcha [1994]). Yet, in a world where everyone else

is educating their children, it would be dangerous for a single family not to do so. So this is a classic example of the multiple equilibrium story. Now, if the policy of imposing primary education is not properly implemented, the outcome may be much worse than it ever was. Resources would be committed to schools. Yet children may not be sent to them. Worse still, children (such as young girls) may be selectively removed from school for the purposes of child labor.⁴ The point is that at the time of imposition of the policy, it is (still) not optimal to do as the policy says, so if there are resources expended on the policy (such as schools) and other resources spent on avoiding the policy (say, collective “coaxing” of the village headmaster to keep a false attendance register), the resulting outcome may be worse than it was to start with.⁵

3.3 Transitions

I end this section with some comments on the persistence of particular equilibrium outcomes in the multiple-equilibria framework. I believe that it is our imperfect understanding of these issues that hinder a more careful study of issues such as balanced versus unbalanced growth.

How does an economy “move from one equilibrium to another”? I place this phrase in quotes because it is imprecise: so-called transitions from one “equilibrium” to another must themselves be viewed as the equilibria of some encompassing intertemporal process. Unfortunately, when embedded in an intertemporal setting, the multiple equilibria or coordination-game paradigm is not of much use in this regard beyond the demonstration that multiplicities may exist. In some sense, it avoids altogether any answer to the question: why is one society less developed than another, and what can be done about it? For this would require a theory of where the pessimistic beliefs originally came from. The paradigm is at a loss for *explaining* historical inertia: repeat a story of multiple equilibria and numerous dynamic equilibria emerge, including those in which the society jumps between the bad and good equilibria in all sorts of deftly coordinated ways. We lack good economic theory that actually identifies the “stickiness” of equilibria.

A small literature—too small, in my opinion—exists on this topic. See, for instance, Krugman [1991], Matsuyama [1991], and Adserà and Ray [1998] in the development literature. There is also a

corresponding smattering of literature among macroeconomists studying business-cycle models based on coordination failure (see, e.g., Chamley and Gale [1994] and Cooper [1999]).

As an example of the various approaches, the Adserà-Ray paper embeds a coordination game into a real-time model of “intersectoral choice” (the choices corresponding to the actions of the static coordination game). Now agents may switch sectors (more than once, if they so desire), and their returns are added over time, by applying a discount factor. The objective of the paper is to give meaning to the notion of inertia, to the idea that historical predominance of a “sector” might impede the development of a Pareto-superior “sector.” The main result is that if externalities manifest themselves with a lag (which may be arbitrarily small), and if there are no congestion costs in intersectoral migration, then initial conditions *do* pin down equilibria—there is inertia. The paper suggests a research program in which the study of lagged externalities may be fruitful, as also the study of moving costs (a topic given more emphasis in the Krugman and Matsuyama papers).

There is much work to be done in the area of intertemporal persistence of equilibrium. In particular, only after we have a theory of “inter-equilibrium transition” can we get to the serious details of policy interventions.

4 Underdevelopment and History

4.1 Historical Legacies

Underdevelopment—viewed as a coordination failure—directs our attention to the beliefs or expectations of the economic agents which shore up one or another of several equilibria. In particular, one might ask—and we did ask this above—how the formation of such expectations may be significantly conditioned by history. But history may dictate much more than expectation-formation; it may actually pin down the values of certain tangible variables and influence future developments. Put another way, historical legacies may actually select among *different sets* of equilibria (quite apart from the possible multiplicities in each set).

Once again, variations in historical legacies—or initial conditions—are not to be thought of as variations in the fundamental makeup of the economy.

For instance, two economies may have the same technological possibilities and individual preferences, but differ, perhaps, in the size of the initial capital stock. The capital stock is the legacy; technology and preferences represent the fundamentals. Can the former have persistent effects even if the latter are all the same? As we have seen, the convergence hypothesis says no.

Historical legacies need not be limited to a nation's inheritance of capital stock or GDP from its ancestors. Factors as diverse as legal structure, traditions, or group reputations may serve as initial conditions (see, e.g., the review in Ray [1998] or Hoff and Stiglitz [1999]). But of all these, perhaps the darkest shadow is cast by historically given *inequalities* in the distribution of asset ownership. With imperfect capital markets, the poor are limited in their access to credit necessary for production and investment (this includes investment not only in projects but also in themselves, via education or nutrition). Hence increased inequality can exert negative effects on both levels and growth rates of per capita income. High initial inequalities may also create conditions for self-perpetuation, generating a lock-in effect with economic stagnation. The very same fundamental economy would perform differently were initial inequality to be altered.

4.2 Inequality

One may think of the literature that addresses this sort of question as studying the *functional role* of inequality, as opposed to the intrinsic merits and demerits of unequal treatment. The question is: what effects does inequality have on other variables of interest, such as aggregate output, employment, efficiency or growth? The relevant literature includes Dasgupta and Ray [1986, 1987], Baland and Ray [1991], Banerjee and Newman [1993], Galor and Zeira [1993], Lundqvist [1993], Ray and Strenfert [1993], Bowles and Gintis [1994, 1995], Hoff [1994], Hoff and Lyon [1995], Legros and Newman [1996], Aghion and Bolton [1997], Mookherjee [1997], Piketty [1997] and others.

Some of the current literature based on dynamic models, finds its roots—paradoxically enough—in a paper that did *not* depart from the convergence idea (Loury [1981]). Nevertheless, this pioneering paper did pin down the crucial interaction between limited capital markets and dynamic inefficiency. The inefficiency of limited access to capital is a

theme that is common to several of the papers, though they depart significantly from the Loury model in other aspects.

As an illustration, consider the simplest version of the Galor-Zeira [1993] model. It shows how the convergence prediction of the neoclassical growth model can be overturned by dropping the assumptions of a convex technology and perfect capital markets. With setup costs in the acquisition of certain occupations or skills, and borrowing constraints for poor agents, the initial distribution of wealth will influence the aggregate skill composition of the economy and total output, resulting in reinforcement of those very same initial conditions. Poor families will not find it worthwhile to invest in the education of their children, locking their descendants into a poverty trap. High initial inequalities thus tend to perpetuate themselves. Moreover, countries with a historically higher poverty rate will have a persistently lower per capita income.

The demonstration of history-dependence in the simple version of the Galor-Zeira model can be criticized. Even in the presence of indivisibilities in investment, substantial stochastic perturbations might restore ergodicity, by simply permitting different wealth levels to communicate (though possibly with very small probability). For instance, in the presence of random elements reflecting luck, a poor family may tip over the required threshold and join the ranks of the prosperous, just as wealthy families may encounter a string of failures and temporarily drift into poverty.

A rebuttal to this criticism would argue that under the conditions of the Galor-Zeira model, those in poverty would remain locked there for a long period of time; the problem would appear in the guise of a low degree of wealth mobility. In part this is a signal that ergodicity (and convergence, more generally) is itself a problematic concept, a topic that would take me somewhat afield of my current program. But in part, it points to a second inadequacy of these simple models, which is that they are not interactive across agents. The economy is just several copies of isolated agents (or families) running in parallel. Then inequality has no aggregate effects that are not simply trivial sums of individual effects. The model (in this simple form) misses the interdependence in the evolution of fortunes of different families in a given society, which may strengthen the tendency towards lock-in.

In contrast, the more complicated interactive models—such as those in the later part of the Galor-Zeira paper, and in several of the other papers cited above—do not allow us to conclude anything from the behavior of a single family or dynasty of families. The joint behavior of all families affect important economic variables such as commodity prices, wage rates, or the rate of interest, and these in turn feed back on the decision-making of individuals.

While the following comments do run the risk of some mathematical abstraction, they permit me to quickly illustrate a number of the models in the relevant literature by adopting a framework from Mookherjee and Ray [2000].

Let H be some list of *occupations*, over which a population of unit size is distributed at any date t . The date t is to be interpreted as the lifetime of the generation alive at t .

For each λ, λ' , to be interpreted as occupational distributions (of successive generations), a *wage function* $w = \{w(h)\}_{h \in H}$ is defined on H . These define the incomes earned by different occupations.

A wage function w on H in turn helps determine a *cost function* $x = \{x(h)\}_{h \in H}$, also defined on H . This can be interpreted as the cost, payable in the current date, of acquiring skills necessary for occupation h for members of the next generation.

Thus given a sequence $\{\lambda_t\}_{t=0}^{\infty}$ of occupational distributions on H , we obtain a sequence $\{w_t, x_t\}_{t=0}^{\infty}$ of wage and cost functions defined on H , where each wage function w_t depends on the neighboring occupational distributions $(\lambda_t, \lambda_{t+1})$, and each cost function x_t is determined in turn by this wage function. We can then say that $\{w_t, x_t\}_{t=0}^{\infty}$ is *generated* by $\{\lambda_t\}_{t=0}^{\infty}$.

Individuals only foresee the wage-cost sequence (the actual generation of this sequence is of little import to them). They care about their own income, and those of their descendants. For an individual i (or current representative of family i) with $h_0(i)$ given, the problem is to

$$\max \sum_{t=0}^{\infty} \beta^t u(c_t) \quad (1)$$

subject to the constraints

$$y_t = w_t(h_t) \quad (2)$$

and

$$y_t = c_t + x_t(h_{t+1}) \quad (3)$$

for all t . [Above, u is a single-period utility function and the β discount factor.] As in Loury [1981], this formulation presumes that parents care about the utility (rather than just the consumption or income levels) of their descendants in a consistent fashion, so bequests or educational investments in children will be nonpaternalistic, thus removing one potential source of market imperfection. However, capital markets are missing: investments must be financed entirely from current income. The maximization problem above will result in a sequence of occupational choices made by successive generations, which we may denote by $\{h_t(i)\}_{t=0}^{\infty}$ for each family i .

Aggregate these occupational choices across families by defining, for each t , $\lambda_t(h)$ to be the measure of individuals i such that $h_t(i) = h$. [Of course, the distribution λ_0 is exogenously given.] This generates a sequence of occupational distributions: say that $\{\lambda_t\}_{t=0}^{\infty}$ is an *aggregate response* to $\{w_t, x_t\}_{t=0}^{\infty}$ (for given λ_0).

An *equilibrium* (given the historical distribution λ_0) is a sequence of succeeding occupational distributions, income and cost profiles $\{\lambda_t, w_t, x_t\}_{t=0}^{\infty}$ such that (a) $\{w_t, x_t\}_{t=0}^{\infty}$ is generated by $\{\lambda_t\}_{t=0}^{\infty}$, and (b) $\{\lambda_t\}_{t=0}^{\infty}$ is an aggregate response to $\{w_t, x_t\}_{t=0}^{\infty}$. In such an equilibrium all families have perfect foresight concerning the future evolution of the economy and the returns to different occupations; their optimal responses in turn justify their beliefs.

It is possible to embed several well-known models—as well as the readings included in this volume—within this framework. Consider the following examples:

[1] *Models of Noninteracting Agents.* H is the set of all capital stocks, $w(h)$ is independent of the occupational distribution, and equals some production function $f(h)$, while $x(h) = h$. This is the framework (with uncertainty added) studied in Loury [1981], under the assumption that f is a “standard” concave production function. Alternatively, one might interpret H as some discrete set of skills. This is the first model studied in Galor-Zeira [1993] (they also use a simpler paternalistic “warm-glow” formulation of the bequest motive).

[2] *Entrepreneurship.* $H = \{1, 2\}$. 1 stands for worker; 2 stands for employer. $x(h)$, the cost function, is independent of the wage function: it is 0 if $h = 1$, and is S , a setup cost for entrepreneurship, if $h = 2$. To determine the wage function, suppose that

there is a production function F defined on the amount of employed labor. Each entrepreneur chooses L to

$$\max F(L) - w(1)L,$$

where $w(1)$ is the wage rate for labor. In equilibrium, L is just the employment per capitalist, which is $\lambda(2)/\lambda(1)$. So $w(1)$ is given by

$$F'\left(\frac{\lambda(2)}{\lambda(1)}\right) = w(1),$$

while $w(2)$ is the resulting profit:

$$w(2) = F\left(\frac{\lambda(2)}{\lambda(1)}\right) - F'\left(\frac{\lambda(2)}{\lambda(1)}\right) \frac{\lambda(2)}{\lambda(1)}.$$

This is essentially the Banerjee and Newman [1993] model (see also the second part of Galor-Zeira [1993]). Like Galor and Zeira, they employ a warm-glow model of bequests, and assume a fundamental indivisibility in the occupational structure (i.e., there are two discretely different occupations). The evolution of wealth and of occupational decisions is, however, fundamentally interdependent across different families. The resulting dynamics are complicated. Banerjee and Newman manage to describe the nature of this dynamic in a number of special cases, and show how distinct occupational structures and related production systems (such as the factory system rather than independent cottage production) may evolve in the long run, depending on historical conditions.

Further developments of a related model with a divisible investment technology and random shocks were subsequently explored by Piketty [1997], who showed that the interactive nature of the wealth dynamic may still result in multiple long run steady states from different historical conditions. In this sense historical lock-in can persist even in the presence of wealth mobility at the level of individual families, and the presence of a convex technology.

[3] *Demand Effects.* H is a finite set of commodities. A person with occupation h can produce one unit of the specialized commodity h . Again, take $x(h)$ as independent of other variables.

Let $\mathbf{p} = \{p(h)\}_{h \in H}$ be a price vector on H . Given income y , a consumer generates a demand vector $c(\mathbf{p}, y)$ on H .

An equilibrium price vector will equate supply and demand. But the demand by occupants of occupation h is just $c(\mathbf{p}, p(h))\lambda(h)$, so that equilibrium prices must be given by the solution to the system

$$\sum_{h \in H} c(\mathbf{p}, p(h))\lambda(h) = \lambda$$

By constant returns to scale, take $p(h) = w(h)$ for all h . A model of this kind is studied by Mani [1998].

[4] *Labor Skills.* This is the approach followed by Lundqvist [1993]. $H = \{1, 2\}$. 1 stands for unskilled worker; 2 stands for skilled worker. The production function $F(a_1, a_2)$ defines output produced by a_1 and a_2 units of unskilled and skilled labor respectively. This determines the wage pattern:

$$w(h) = F_h(a(1), a(2))$$

for $h = 1, 2$. The function $x(h)$ defining the cost of training for different occupations in turn depends on the wage function: it is 0 if $h = 1$, and is $\alpha w(2)$ if $h = 2$. The idea is that to acquire skill a worker needs to be trained by α units of currently skilled workers, who need to be paid their opportunity cost of not working in the production sector and earning the wage $w(2)$. Skilled workers in the economy thus divide themselves between the production and training sectors, depending on the demand in the two sectors. Unskilled workers work only in the production sector. In equilibrium, the occupational distributions at successive dates will determine the allocation of skilled workers in the following manner. Let λ and λ' denote the occupational distributions for succeeding generations. Then notice that

$$a(1) = \lambda(1),$$

while

$$a(2) = \lambda(2) - \alpha\lambda'(2),$$

so that the wage function is ultimately related to the successive occupational distributions:

$$w(h) = F_h(\lambda(1), \lambda(2) - \alpha\lambda'(2))$$

for $h = 1, 2$.

It is precisely the dependence of the wage and training cost functions on the occupational distribu-

tion that generates new insights. There are three consequences that merit particular emphasis.

First, *even if there is perfect equality to start with, the subsequent evolution of inequality is inevitable.* To illustrate this, suppose all individuals in a particular generation have equal wealth. Is it possible for all of them to make the same *choices*? The answer is, in general, no. If all of them choose to leave their descendants unskilled, then the return to skilled labor will become enormously high, encouraging some fraction of the population to educate their children. Similarly, it is not possible for all parents to educate their children, if unskilled labor is also necessary in production. Thus identical agents are forced to take nonidentical actions, precisely because of the interdependence of decisions made by different families. This means, of course, that in the *next* generation some inequality must emerge.

Indeed, following this logic, it is possible to show that *every* steady state of the system described above *must* involve inequality. The evolution of unequal treatment is not precipitated by random factors such as bad luck; it is part of the inner logic of the economic system.

Second, this inequality, in turn, leads to a lack of efficiency. Individuals cannot simply compensate for their unequal positions by taking recourse to a credit market. In the models studied here, there isn't a credit market; or if there is one, it is imperfect. It is this imperfection that underlies the inefficiency of inequality. Individuals with low wealth may be unable to take advantage of profitable opportunities open to them, be these in the form of skill acquisition, certain occupational advantages, or remunerative investment opportunities.

However, I should note that lack of efficiency in this sense (in the sense of the inability to take advantage of productive opportunities) does not necessarily imply that there are other *equilibria* that are Pareto-superior. This has policy implications that I note below.

Third, there may be several steady states, in the sense that many wealth distributions (and associated levels of national output and prices) may all be self-reinforcing. One must be careful not to interpret these as "multiple equilibria"—*given* the initial historical conditions, this is perfectly consistent with the idea that the economy follows a unique path.⁶ As we shall see, the policy implications are different in each case.

Finally, as we have already noted, inequality fundamentally affects the working of equilibrium prices—broadly defined—and in so doing it affects the dynamic fate of individuals in a way that cannot be disentangled by simple stochastic perturbations of individual outcomes. Thus it is perfectly possible that a particular regime displays full mobility of individual dynasties, while at the same time there are many such regimes (depending on history).

4.3 Policy Revisited

The policy implications of history-dependence have sharper political edges than the ones implied by multiple equilibria. If multiple equilibria are Pareto-ranked, then an equilibrium-tipping policy will—at least in the long run—benefit all the agents in the economy. To be sure, there are serious problems of implementation. Nevertheless, if the policy works, it will benefit all concerned,⁷ and this knowledge can serve to dilute opposition to the policy.

These conditions are significantly harder to meet in situations of history-dependence, especially those in which the relevant historical variable is asset inequality. The sharpest expression of this possibility is in the static model of inequality and undernutrition studied in Daegupta and Ray [1986]. Under some mild conditions, *every* competitive equilibrium in that model is Pareto-efficient, even though they may display undernutrition, low output (compared to other equilibria), and involuntary unemployment. It follows that—in the Dasgupta-Ray model—every policy designed to reduce undernutrition and unemployment must hurt some segment of the population. In this scenario, the roots of opposition are not very far underground.

Admittedly, the Dasgupta-Ray model is an extreme illustration. Inefficiency appears as soon as we turn to a dynamic formulation. But here too, we must step carefully. As already discussed, the inefficiency of a particular equilibrium simply points to the fact that there are allocations that make all agents better off. But there is no guarantee that such allocations can themselves serve as equilibria. The reason I highlight this concern is that, if we wish to continue the view of economic policy as an ephemeral device, the final outcome of the policy intervention must itself be an equilibrium. But if the latter equilibrium is not Pareto-superior to the former, there may be serious opposition to the policy.

Leaving aside issues of opposition, let us take a closer look at the nature of these policies. In contrast to the policies for eliminating bad equilibria in a multiple-equilibrium framework, the objective here is to change initial conditions, thereafter permitting equilibrium outcomes to be generated in accordance with the changed history.

The models discussed above generally have the property that *steady state* equilibria in which the distribution of wealth is relatively equal are “better” from the point of view of (productive and allocative) efficiency, output and employment, and possibly the rate of growth. This suggests that a redistributive change in initial asset inequalities in favor of those who are relatively deprived will be beneficial from the point of view of other important economic indicators. But I must emphasize that the previous two sentences are not necessarily connected by infallible logic. The former assertion concerns steady states. For the latter assertion to be valid, distributions which are originally more equal must lead to steady states that are more equal as well. But there is no guarantee that this is true—at present we know too little about the out-of-steady-state behavior of these models to tell with any certainty. What we *do* know that future research will have to study carefully—and in more detail—the subtle and often complex connections between initial conditions and final steady states.

In addition, the first assertion may be wrong as well. It is sometimes true that *extremely* poor societies may gain in functional efficiency if there is some inequality (see, for example, Ray [1998, Chapters 7 and 8] or Matsuyama [1999]). We are then caught in a genuine tradeoff between efficiency and equality. A more complex phenomenon is the possibility of “wrong” responses to small or half-hearted changes, as discussed for employment in Dasgupta and Ray [1987]. In these cases, a small degree of redistribution may be worse than no redistribution at all.

The discussion so far may give the impression that we can say very little about the policy prescriptions of these models. This is not entirely true. Remember, the most important policy prescription is that in many cases, one-time interventions can have persistent, permanent effects. Where I have tried to be careful is in cautioning against a cavalier approach to such one-time interventions, arguing that there is still much to be done in connecting initial conditions to final steady state outcomes.

5 Concluding Remarks

As mentioned in the introduction, my goal in this article has been particular in nature, rather than comprehensive. I wanted to write about innovative approaches in the theory of development economics that view underdevelopment not as a failure of some fundamental economic parameters, or socio-cultural values, but as an interacting “equilibrium” that hangs together, precipitated by expectational inertia or by historical conditions.

Why is this view of the development process an important one? There are three reasons why I feel this view should be examined very seriously.

- [1] This point of view leads to a theory, or a set of theories, in which economic “convergence” (of incomes, wealth, levels of well-being) across countries is not to be automatically had. Actually, the intelligent layperson reading these words will find this reasoning a bit abstruse: why on earth would one expect convergence in the first place? And why, indeed, should I find a theory interesting on the grounds that it does *not* predict convergence, when I knew that all along? This is not a bad line of reasoning, but to appreciate why it is misguided, it is important to refer to a venerable tradition in economics that has convergence as its very core prediction. The idea is based—roughly—on the argument that countries which are poor will have higher marginal products of capital, and consequently a higher rate of return to capital. This means that a dollar of extra savings will have a higher payoff in poor countries, allowing it grow faster. The prediction: poorer countries will tend to grow faster, so that over time rich and poor countries will come together, or “converge.”

Of course, I have not examined the convergence hypothesis in detail, as my intention is to cover other views of development.⁸ But one should notice that convergence theories in the raw form described above have rarely been found acceptable, and there are several subtle variants of the theory. Some of these variants still preserve the idea that “other things” being equal, convergence in some conditional sense is still to be had. It’s only if we start accepting the possibility that these “other things”—such as savings or fertility rates—often *cannot* be kept equal, that the notion of conditional con-

vergence starts losing its relevance and very different views of development, not at all based on the idea of convergence, must be sought.

- [2] The second reason why I find these theories important is that they do not rely on “fundamental” differences across peoples or cultures. Thus we may worry about whether Confucianism is better than the Protestant ethic in promoting hard-headed, successful economic agents, and we might certainly decry Hindu fatalism as deeply inimical to purposeful, economic self-advancement, but we have seen again and again that when it comes down to the economic crunch and circumstances are right, both Confucian and Hindu will make the best of available opportunities—and so will a host of other religions and cultures besides. Once again, this is not the place to examine in detail fundamentalist explanations based on cultural or religious differences, but I simply don’t find them very convincing. This is not to say that culture—like conditional convergence—does not play a role. But I also take the view that culture, along with several other economic, social and political institutions, are all part of some broader interactive theory in which “first cause” is to be found—if at all—in historical legacies. And yes—if we do insist on recursing history backwards to find the “original cause”—I would reply that there is no such thing, that small initial “butterfly effects” have enormous, magnified consequences.

- [3] The last reason why I wish to focus on these theories is that create a very different role for government policy. Specifically, I have argued that these theories place a much greater weight on one-time, or temporary, interventions than theories that are based on fundamentals. For instance, if we were to observe that Indian savings rates are low compared to other East Asian countries, and we were to believe that Hindu fatalism is somehow responsible for this outcome, then a policy of encouraging savings (say, through tax breaks) will certainly have an effect on growth rates. But there is no telling when that policy can be taken away, or indeed, if it can be taken away at all. For in the absence of the policy, the theory would tell us that savings would revert to the old Hindu level. In contrast, a theory that is based on an interactive “chicken-and-egg” approach would promote a

policy that attempts to push the chicken-egg cycle into a new equilibrium. Once that happens, *the policy can be removed*. This is not to say that once-and-for-all policies are the only correct ones, but to appreciate that the interactive theories that we have discussed have very different implications from the traditional ones.

I have discussed one of several frontiers in development economics, but I believe this particular frontier is particularly important. Because it is more abstract than, say, an account of the latest research on labor markets, it is more a methodological frontier than anything else, and permeates much of our thinking about various theories. Of course, even the practitioners of traditional convergence theories are aware of the viewpoints expressed here, and many are even sympathetic to it. But one hopes that future researchers will embrace this methodology not just from a distance, but in the essential way in which their models are constructed.

Notes

1. Perhaps the word “underdeveloped” does not constitute politically correct usage, so that several publications—those by well-known international organizations chief among them—use the somewhat more hopeful and placatory present continuous developing.” I won’t be using such niceties in this article, because it should be clear—or at least it is clear in my mind—that *economic* underdevelopment pins no derogatory social label on those who live in, or come from, such societies.
2. See the literature on turnpike theory inspired initially by the work of von Neumann [1945], followed by several writers—see McKenzie [1976] for a survey.
3. This can sometimes be embarrassing, because such a theory is also unable to predict what will happen today even if one of the equilibria has been played repeatedly over the past 100 periods. I return to this theme below.
4. For a distinct but related view on child labor and multiple equilibria, see Basu and Van [1998]
5. For an interesting theoretical discussion of the appearance of (policy-induced) worse equilib-

ria in the Murphy-Shleifer-Vishuy model, see Bond and Pande [1999].

6. To be sure, it is possible that multiple equilibria and history-dependence coexist in the same model. That is, it may be true both that equilibria vary with history, *and* that there are several equilibria for each history. This can be shown to happen, for instance, in the model studied by Romer [1986].
7. Of course, this is not true if the multiple equilibria under consideration are not Pareto-ranked. Sometimes this is indeed the case, as in the model of child labor studied by Basu and Van [1999].
8. On the convergence postulate and studies stemming from it, see, e.g., Barro and Xala-i-Martin [1995], Jones [1997] and Ray [1998].

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