



57703

WORKING PAPER NO.3

Normalizing Industrial Policy

Dani Rodrik



WORKING PAPER NO. 3

Normalizing Industrial Policy

Dani Rodrik



DFID Department for
International
Development

Dutch Ministry
of Foreign Affairs

THE WILLIAM AND FLORA
HEWLETT
FOUNDATION



© 2008 The International Bank for Reconstruction and Development / The World Bank
On behalf of the Commission on Growth and Development
1818 H Street NW
Washington, DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org
www.growthcommission.org
E-mail: info@worldbank.org
contactinfo@growthcommission.org

All rights reserved

1 2 3 4 5 11 10 09 08

This working paper is a product of the Commission on Growth and Development, which is sponsored by the following organizations:

Australian Agency for International Development (AusAID)
Dutch Ministry of Foreign Affairs
Swedish International Development Cooperation Agency (SIDA)
U.K. Department of International Development (DFID)
The William and Flora Hewlett Foundation
The World Bank Group

The findings, interpretations, and conclusions expressed herein do not necessarily reflect the views of the sponsoring organizations or the governments they represent.

The sponsoring organizations do not guarantee the accuracy of the data included in this work. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of the sponsoring organizations concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

All queries on rights and licenses, including subsidiary rights, should be addressed to the Office of the Publisher, The World Bank, 1818 H Street NW, Washington, DC 20433, USA; fax: 202-522-2422; e-mail: pubrights@worldbank.org.

Cover design: Naylor Design

About the Series

The Commission on Growth and Development led by Nobel Laureate Mike Spence was established in April 2006 as a response to two insights. First, poverty cannot be reduced in isolation from economic growth—an observation that has been overlooked in the thinking and strategies of many practitioners. Second, there is growing awareness that knowledge about economic growth is much less definitive than commonly thought. Consequently, the Commission’s mandate is to “take stock of the state of theoretical and empirical knowledge on economic growth with a view to drawing implications for policy for the current and next generation of policy makers.”

To help explore the state of knowledge, the Commission invited leading academics and policy makers from developing and industrialized countries to explore and discuss economic issues it thought relevant for growth and development, including controversial ideas. Thematic papers assessed knowledge in areas such as monetary and fiscal policies, climate change, and equity and growth and highlighted ongoing debates. Additionally, 25 country case studies were commissioned to explore the dynamics of growth and change in the context of specific countries.

Working papers in this series were presented and reviewed at Commission workshops, which were held in 2007–08 in Washington, D.C., New York City, and New Haven, Connecticut. Each paper benefited from comments by workshop participants, including academics, policy makers, development practitioners, representatives of bilateral and multilateral institutions, and Commission members.

The working papers, and all thematic papers and case studies written as contributions to the work of the Commission, were made possible by support from the Australian Agency for International Development (AusAID), the Dutch Ministry of Foreign Affairs, the Swedish International Development Cooperation Agency (SIDA), the U.K. Department of International Development (DFID), the William and Flora Hewlett Foundation, and the World Bank Group.

The working paper series was produced under the general guidance of Mike Spence and Danny Leipziger, Chair and Vice Chair of the Commission, and the Commission's Secretariat, which is based in the Poverty Reduction and Economic Management Network of the World Bank. Papers in this series represent the independent view of the authors.

Acknowledgments

This is a paper prepared for the Commission on Growth and Development. I thank Michael Spence for suggestions and guidance, Roberto Zaghera for inspiration and detailed comments, and Ricardo Hausmann and Chuck Sabel for many lengthy conversations that substantially influenced my thinking on these matters.

Abstract

The theoretical case for industrial policy is a strong one. The market failures that industrial policies target—in markets for credit, labor, products, and knowledge—have long been at the core of what development economists study. The conventional case against industrial policy rests on practical difficulties with its implementation. Even though the issues could in principle be settled by empirical evidence, the evidence to date remains uninformative. Moreover, the conceptual difficulties involved in statistical inference in this area are so great that it is hard to see how statistical evidence could ever yield a convincing verdict. A review of industrial policy in three nonAsian settings—El Salvador, Uruguay, and South Africa—highlights the extensive amount of industrial policy that is already being carried out and frames the need for industrial policy in the specific circumstances of individual countries. The traditional informational and bureaucratic constraints on the exercise of industrial policy are not givens; they can be molded and rendered less binding through appropriate institutional design. Three key design attributes that industrial policy must possess are embeddedness, carrots-and-sticks, and accountability.

Contents

About the Series	iii
Acknowledgments	iv
Abstract	v
I. Introduction.....	1
II. The Strong Case for Industrial Policy (in Theory).....	3
III. The Ambiguous Case for Industrial Policy (in Practice)	7
IV. Can Empirical Work Help Us Sort It Out?	8
V. Industrial Policy in Practice: Some Country Vignettes.....	17
VI. Institutional Design Features for Industrial Policy	25
VII. Concluding Remarks.....	31
References	33

Normalizing Industrial Policy

*Dani Rodrik*¹

I. Introduction

Consider a set of policy interventions targeted on a loosely defined set of market imperfections that are rarely observed directly, implemented by bureaucrats who have little capacity to identify where the imperfections are or how large they may be, and overseen by politicians who are prone to corruption and rent-seeking by powerful groups and lobbies. What would your policy recommendations be?

You might be excused for thinking that I am referring to industrial policy and if you react by saying “these are all reasons why governments should stay away from industrial policy.” But in fact what I have in mind are some of the traditional, long-standing areas of government intervention such as education, health, social insurance, and macroeconomic stabilization. All of these policy areas share the features described in the previous paragraph. Yet, curiously in light of the skepticism that attaches to industrial policy, almost no one questions whether they properly belong in the government’s arsenal.

Consider the parallels with industrial policy. Interventions in each one of the conventional areas I just listed are justified by market failures that are widely felt to exist, although rarely documented with any precision. So education and health interventions are motivated by human capital externalities, social insurance by asymmetric information, and stabilization policy by aggregate-demand (Keynesian) externalities (to list just some of the more prominent market failures). Systematic empirical evidence on these market imperfections is sketchy, to say the least, which is why there continue to be vibrant academic debates on their role and magnitude. Even the least controversial among them, positive externalities associated with schooling, have proved difficult to pin down convincingly (Acemoglu and Angrist 2001).

Moreover, in each one of these areas bureaucrats have wide latitude in implementing policies, while remaining in the dark about the nature of the root problems. Spending ministries make budget allocations with little capacity to evaluate the impact of their decisions. Bureaucratic routine rather than economic logic determine much of the behavior on the ground. And powerful groups and lobbies typically exert significant influence on the policy process. In education, teachers’ unions have a loud voice on what should be done (or cannot be done). In health policy, it is often insurance firms and the medical doctors’ association

¹ Dani Rodrik is Professor of International Political Economy at Harvard University’s John F. Kennedy School of Government.

who get their say. Tax and spend decisions are similarly subject to influence from organized lobbies

All these shortcomings notwithstanding, the debates in these policy areas are rarely ever about *whether* the government should be involved; they are about *how* the government should go about running its policies. For example, the policy discussion on education focuses these days largely on reforming the incentive systems for parents and teachers. Doing away with public funding for education or eliminating the ministry of education are not part of the discussion—and only an ideologue would consider recommending them. The appropriate mix between public and private pension systems, or the correct approach to counter-cyclical fiscal policy, are similarly hotly debated issues. But joining these discussions while holding the maintained assumption that the government should have no role in education, pensions, or macroeconomic stabilization would be considered an ideological, rather than a well-informed stance.

My purpose in this paper is to suggest that the discussion on industrial policy should be similarly “normalized.” The market failures that provide a role for industrial policy are the bread-and-butter of development economists. They are widely perceived to be pervasive, even if systematic evidence is sketchy and hard to come by. Informational and political problems in administering industrial policy are legion—but in that respect too industrial policy is no different from many other areas of policy. Moreover, most governments do carry out various forms of industrial policy already, even if they call it by other names (“export facilitation,” “promotion of foreign investment,” “free-trade zones,” and so forth). Consequently, it is far more productive for the discussion to focus on how industrial policy should be carried out than on whether it should be carried out at all.

Because most of the discussion to date has focused on the *whether* of industrial policy, the debate on industrial policy has reached diminishing returns and has become stale. Another purpose of this paper is to show that by focusing on the *how* of industrial policy we can move the debate forward. In particular, we can help design institutions that take into account and ameliorate the informational and political problems that have preoccupied industrial policy skeptics. We can start seeing these problems not as insurmountable obstacles, but as difficulties that any sensible policy framework has got to tackle. Political capture or lack of information do not require governments to give up social or macroeconomic policies, where there are similar difficulties. They simply make it imperative that we come up with institutional solutions to those agency problems. It’s hard to see why it shouldn’t be the same with industrial policy, and I will present some ideas along these lines here.

A word about the meaning of “industrial policy.” I will use the term to denote policies that stimulate specific economic activities and promote structural change. As such, industrial policy is not about *industry* per se. Policies targeted at nontraditional agriculture or services qualify as much as incentives on

manufactures. Public subsidies for high-yielding varieties of traditional agricultural products, for new crops such as pineapple or avocados, for call centers, or for tourism are some examples. As the next section will make clear, the market failures that justify industrial policy can be found virtually in all kinds of nontraditional activities, and not just in manufacturing.

I will begin by discussing the theoretical case for industrial policy and argue that it is a very strong one. The market-failures that industrial policies target—in markets for credit, labor, products, and knowledge—have long been at the core of what development economists study. Next, I turn to the practical difficulties with industrial policy and present the conventional case against industrial policy. Even though the issues could in principle be settled by empirical evidence, I will argue in section IV that the evidence to date is uninformative. In fact the conceptual difficulties involved in statistical inference in this area are so great that it is hard to see how statistical evidence could ever yield a convincing verdict.

Section V presents some country vignettes, discussing the present context of industrial policy in three nonAsian settings: El Salvador, Uruguay, and South Africa. This discussion frames the need for industrial policy in the specific circumstances of these countries, describes the extensive amount of industrial policy that is already being carried out (in two out of three countries), and highlights the challenges policy makers face. In section VI, I focus on some of the key design features of industrial policy that are needed to maximize its contribution and minimize its potential adverse effects. In short-hand, these can be characterized as embeddedness, carrots-and-sticks, and accountability. My objective is to show that the traditional informational and bureaucratic constraints on the exercise of industrial policy are not givens; they can be molded and rendered less binding through appropriate institutional design. Finally, I offer some concluding thoughts in section VII.

II. The Strong Case for Industrial Policy (in Theory)

It is if anything too easy to make the case for industrial policy. Few development economists doubt that the market imperfections on which the theoretical arguments for industrial policy are based *do* exist, and that they are often pervasive. Collateral constraints combined with asymmetric information result in credit market imperfections and incomplete insurance. Problems with monitoring efforts result in labor-market arrangements that are less than efficient. Learning spills over from producers who adopt new processes. Labor can move from employer to employer, taking their on-the-job training with them. Many projects tend to be lumpy relative to the size of the economy, requiring coordination. And so on. The “new” growth theory, which is often used to elucidate the performance of developing countries, is based heavily on

externalities in knowledge and in new-good creation (Rodriguez-Clare and Klenow 2005). It is not an exaggeration to say that contemporary development theory is built around the view that markets work poorly in developing countries.

These market imperfections have been studied in a number of different contexts and adorn the syllabi of courses on development economics. Foster and Rozensweig (1995) provide the classic study of how learning-by-doing and spillovers affected the pattern of adoption of high-yielding varieties in Indian agriculture. Shaban (1987) and the subsequent literature has analyzed how costly monitoring and incomplete risk markets shape land tenancy contracts and their consequences in a number of agricultural settings. Morduch (1999) summarizes the financial-market imperfections that have given rise to the spread of microfinance arrangements that do not rely on collateral. Munshi and Rosenzweig (2003) have studied how extramarket social arrangements—the caste system in India—constrain and shape the operation of the labor market. Udry (1996) documents the adverse effects of unequal power and bargaining within the household on labor decisions and the efficiency of resource allocation in African agriculture. Banerjee and Duflo (2005) summarize a wide range of studies that show huge variation in interest rates paid by different borrowers and conclude that these can be explained only by credit-market imperfections. Head, Ries, and Swenson (1994) provide evidence of spillovers associated with geographical agglomeration looking at the location decisions of Japanese multinationals in the United States. Javorcik (2004) finds evidence of productivity spillovers in Lithuania, from subsidiaries of multinationals to their suppliers upstream. A spate of case studies reviewed in Hausmann and Rodrik (2003) yield strong evidence of demonstration effects that are generated by entrepreneurs who engage in new economic activities, with learning transmitted to copycats largely through labor turnover.

These market imperfections have to be seen not as isolated instances, but as part and parcel of what it means to be underdeveloped and as the reason for why economic development is not an automatic process. Development is fundamentally about structural change: it involves producing new goods with new technologies and transferring resources from traditional activities to these new ones. That is the central insight of the classical two-sector models of development (Lewis 1954). It is also a robust empirical fact, which has recently been documented by Imbs and Wacziarg (2003). Structural change is a process that is a fertile ground for many of the market shortcomings listed above. Investment in new industries requires finance, but presents no track record and appears excessively risky to private lenders. It needs complementary services and inputs, which are unlikely to exist absent a substantial scale of operation of the activity in question. It entails training workers and managers, who then become free to circulate to competitors and copycats. It generates learning-by-doing, which others can benefit from. Under these conditions, the deck is stacked

against entrepreneurs who contemplate diversifying into nontraditional areas. Poor countries remain poor because markets do not work as well as they could to foster the structural transformation that is needed.

None of this is to deny that government failures and institutional shortcomings in protecting property rights and enforcing contracts are often also a fundamental stumbling block. Sometimes they can be the major constraint on economic growth. But for all the reasons I have listed, development requires more than a good night watchman. The literature on development gives us good conceptual and empirical reasons to believe that market imperfections hinder the full private appropriability of social returns in growth-promoting investments, and this problem would remain even when institutions are passable. “Good governance” has to be seen in part as the ability to generate and implement the policy initiatives needed to alleviate the consequences of market imperfections. Countries such as the Republic of Korea and economies such as Taiwan, China have developed not by suddenly perfecting their institutions, but by coming up with policies that overcame the market obstacles that their investors faced in modern tradable industries (see Rodrik 1995, 1996).

One of these policies deserves special mention, as it sheds light on the mechanics of economic growth and the rationale for industrial policies. In recent work I have documented a strong positive relationship between the level of the real exchange rate (adjusted for purchasing-power parity) and growth in a large panel of countries (Rodrik 2007). Since the real exchange rate is the price of tradables relative to nontradables, the implication is that countries that manage to raise this relative price grow more rapidly.² Korea and Taiwan, China in the 1960s and 1970s, and China in the 1990s, provide apt illustrations of this process. In all of these cases, growth was preceded and accompanied with a substantial rise in the undervaluation index for their currencies (see Rodrik 2007). Interestingly, this relationship disappears in developed countries, indicating that the growth-promoting role of high real exchange rates applies only in low-income settings. This evidence is suggestive that there is something “special” about tradables in these settings.

What might that be? In Rodrik (2007) I discuss two categories of explanations. In one, tradables are special because they suffer disproportionately from the market failures that block structural transformation and economic diversification. These market failures are the ones that I have just discussed, with the added presumption that they predominate in tradables. In the other explanation, tradables are special because they suffer disproportionately (compared to nontradables) from the institutional weakness and contracting incompleteness that characterize low-income environments. There is some bit of evidence for each one of these explanations, but ultimately it does not greatly matter which one is the dominant factor. In either case, there is a second-best role

² The regression is estimated with a full set of fixed effects, so the results apply to the variation “within” countries.

for subsidizing tradables. The reason currency undervaluation works is that it performs this subsidization function. And regardless of market failures, tradable economic activities are inherently scalable in the sense that small economies can expand output without running into diminishing returns (unlike domestic services). In other words, currency undervaluation acts just like industrial policy, by favoring some (growth-promoting) sectors over others.

This discussion allows me to highlight another misunderstanding. In response to a list of market failures like the one above, the industrial-policy skeptic often accepts the need for policy intervention, but points to the need for “horizontal” policies rather than preferential ones that discriminate across activities. Financial market imperfections, human capital externalities, or learning spillovers are best remedied, the counter-argument goes, by uniform measures that target financial markets, education, and R&D directly. But horizontal interventions need to be thought of as a limiting case, and not as a clear-cut alternative, to sectoral policies. In practice most interventions, even those that are meant to be horizontal, necessarily favor some activities over others. For example, policies targeted at improving financial intermediation by commercial banks are partial to firms in the formal sector that have access to external finance, and discriminate against small and informal firms. Policies targeted at microfinance have the reverse effect. Accelerated depreciation helps capital-intensive activities and discriminates against labor-intensive ones. R&D subsidies and intellectual property protection help firms that undertake patentable innovations, but not those who generate “cost-discovery” externalities (that is, knowledge about what can be profitably produced at home). And the exchange-rate policy I have just discussed, the archetypal horizontal policy if there ever was one, favors tradable activities at the expense of nontradable ones. Thus, policy makers do not have the luxury of neglecting the asymmetric effects of their “horizontal” interventions. They need to ensure that the activities being ultimately favored are those that disproportionately suffer from the market imperfections in question.

In Hausmann and Rodrik (2006), we made the point that the public inputs that producers require tend to be highly specific to the activity in question. There are really very few truly “horizontal” interventions:

Production of a particular good or service requires a set of rather *specific* inputs. By *specificity* we mean that these inputs would be much less productive if deployed in some other activity. Hence, the degree of specificity can be approximated by how much less productive an input would be in its alternative use. These inputs include physical installations and machinery, workers with particular skills, a set of specific intermediate inputs, a logistic system to transport the inputs and deliver the outputs, a procurements and marketing system to acquire information about suppliers and customers, a system of property rights and contracts that society finds legitimate and is willing to respect, a set of standards and regulatory rules on product characteristics, labor

norms, financial rights and consumer protection that affect the behavior of other stakeholders, etc. These inputs or requirements are developed to solve the more or less particular needs of existing activities, but they may or may not be supportive of some other, potentially not yet existing activities. (Hausmann and Rodrik 2006)

Interestingly, governments often act in ways that show they are cognizant of the specificity of private needs and public inputs, even when they maintain the fiction that they do not engage in industrial (read preferential) policies. For example, most Latin American countries officially gave up on industrial policies in the 1980s and 1990s as part of the reorientation of their economic strategy. Yet their policies towards direct foreign investment and export processing zones typically focused not on across-the-board policies, but on providing specific public inputs to these activities (Rodrik 2004). So foreign investors were offered tax incentives (available only to them) to get them to overcome their lack of familiarity with host countries, facilities that help them navigate through domestic laws and regulations, protection against the weakness of the domestic legal regime, subsidies for training workers, and sites with dedicated infrastructure. Firms in export processing zones obtained fast-track customs procedures, good infrastructure, cheap inputs, and flexible labor practices. In both instances, governments engaged in active industrial policies in the sense of providing public inputs that differentially benefited particular economic actors.

III. The Ambiguous Case for Industrial Policy (in Practice)

This is all fine in theory, and many observers are even willing to believe that some countries are able to pull industrial policy off. But aren't the practical difficulties facing most others so great as to be insurmountable? An analogy Larry Summers likes to give puts the skeptical view quite well. We know that there are some stock-market analysts who are very good at picking stocks and making money. But most of us would be terrible at it. It makes little sense for us to try to emulate those investment wizards. We should stick to a diversified portfolio and forget about picking stocks. Similarly, most countries should forget about industrial policy, as they are likely to make a mess of it while trying to emulate Korea. I shall return to the Summers analogy below when I discuss empirical work.

The practical objections to industrial policy are twofold. First there is the informational objection, which states that it is impossible for governments to identify with any degree of precision and certainty the relevant firms, sectors, or markets that are subject to market imperfections. Pack and Saggi (2006), for example, provide a detailed list of informational requirements intended to suggest the impossibility of industrial policy. This critique is often expressed by

saying “governments cannot pick winners,” a highly effective conversation stopper. The implication is that in the absence of omniscience—that is, almost always—an activist government will miss its targets, support economic activities with no positive spillovers, and waste the economy’s resources.

The second objection is that industrial policy is an invitation to corruption and rent-seeking. Once the government is in the business of providing support to firms, it becomes easy for the private sector to demand and extract benefits that distort competition and transfer rents to politically connected entities. Entrepreneurs and businessmen spend their time in the capital asking for favors, rather than looking for ways to expand markets and reduce costs.

The degree to which the debate on industrial policy centers on these two assertions is remarkable. In fact, the debate revolves not around the economic merits of industrial policy, but around sharply conflicting views regarding the relative importance and pervasiveness of these obstacles. Opponents of industrial policy find these objections sufficient grounds to dismiss it. Meanwhile proponents point to East Asia and argue that successful industrial policy obviously has been done.

I have argued in the introduction that neither of these objections is fatal on its face value. Many of the same counterarguments can be made in other areas of government policy where all sides accept a useful public role. On the other hand, the East Asian example, while useful, does not help much. Perhaps those countries were indeed special, as the Summers analogy indicates. We need a more comprehensive answer to the objections that the critics raise. This means taking them seriously and thinking their implications through for the design of industrial policy institutions. I will do precisely that later in the paper. First, I turn to an evaluation of the empirical literature on industrial policy.

IV. Can Empirical Work Help Us Sort It Out?

The answer to the question in the title is, not really. In principle, the debate about the feasibility of industrial policy could be settled by careful empirical study and by ascertaining the circumstances under which, if any, industrial policy seems to work. And in fact there is no shortage of empirical work that tries to do that. Interestingly, both the proponents and the critics believe that they have empirical evidence on their side. Proponents rely on the case evidence, pointing to a number of instances where government support seems to have nurtured successful world-class firms in developing nations. Opponents rely largely on cross-industry econometric studies, which seem to suggest that traditional industrial policy instruments do not generate the productivity benefits they seek to achieve.

I will review these studies here and argue that neither type of evidence should be regarded as reliable. In particular, the econometric work should not move anyone's priors by much, if at all.

(a) Case Evidence

The development landscape is littered with white elephants, products of industrial promotion efforts that resulted in low-productivity, uncompetitive enterprises that never operated at full capacity. One of the astonishing findings of the OECD-World Bank studies of the 1970s on developing country trade policies was a number of industries that were apparently producing negative value added at world prices (Little, Scitovsky, and Scott 1970; Balassa 1971). Shutting these industries down would have increased national output even if their labor and capital were left idle. This evidence, along with the more impressionistic scenes every development practitioner has witnessed first-hand of inefficient state or private enterprises surviving (barely) behind high trade barriers, has reinforced the common view that industrial policy has been a force for ill rather than good.

At the same time, there is no shortage of cases that suggest industrial policies may have worked in some instances. The Korean steel firm, POSCO, is a well-known instance of import substitution under public ownership and behind high walls of protection. POSCO eventually became the most efficient firm in the global steel industry by the 1990s, despite its inauspicious beginnings (Sohal and Ferme 1996). Another instance is Embraer, the Brazilian aircraft company, which was established and promoted through state ownership, benefited from export subsidies, and became a leading global competitor prior to, but especially after, its privatization (Goldstein 2002). Chile's highly successful salmon industry is largely the creation of Fundacion Chile, a quasi-public agency that acted as a venture fund. Fundacion Chile demonstrated the viability of large-scale salmon farming through a firm it founded, undertook R&D and disseminated it to smaller firms, and eventually sold its operation to Japanese investors (UNCTAD 2006). Domestic content requirements, the bane of neoclassical trade economists, have been instrumental in China and India in creating first-tier suppliers to the auto industry that are nearly world class (Sutton 2005). In fact, it is rather difficult to identify instances of nontraditional export successes in Latin America and Asia that did not involve government support at some stage (Rodrik 2004).

Ultimately neither these cases nor the horror stories settle the case. One problem is the lack of an explicit counterfactual. It cannot be ruled out that many of the industries just mentioned would have come out even better in the absence of government support. There is no shortage of economists who believe Korea, the economy of Taiwan (China), China, and other East and Southeast Asian countries would have come out further ahead if their governments meddled less in industry. And conversely, many projects that appear to have been failures can start to look better if the social opportunity cost of labor is deemed to have been

sufficiently low—that is, if we believe that the counterfactual is for the workers to have remained unemployed or employed in very low-productivity activities.³

The case studies with explicit counterfactuals are considerably fewer in number. I cite three examples with different methodologies, with results going in diverse directions. Irwin (2000) has studied the consequences of the infant-industry protection provided to the U.S. tinsplate industry during the 1890s. The United States was a developing economy at the time, catching up with the industrial leader Britain, so the application is of interest in the present context. Irwin treats the entry and exit decisions of producers as endogenous and estimates the probability that domestic production will start as a function of prices of inputs, outputs, and the tariff. This allows him to simulate a counterfactual without the increase in the tariff. His basic result is that tariff protection accelerated the establishment of the tinsplate industry by about a decade, from the early 1900s to the early 1890s. Tariffs on tinsplate imports are a potentially second-best instrument in Irwin's model because they partially counteract the effect of tariffs on imported iron bars, an input into tinsplate manufacturing. Still, Irwin concludes that the net welfare benefits were negative: the costs to downstream users offset the benefits generated by the early onset of the industry. Irwin's calculations do not consider any learning spillovers, so in that sense they are not really a test of the infant-industry argument *per se*.

Another study of an infant industry during the early stages of a now-advanced economy is Ohashi (2005), which focuses on the Japanese steel industry during the 1950s and 1960s. Ohashi builds (and estimates) a partial-equilibrium model of the industry, paying particular attention to both dynamic scale economies (learning-by-doing) and learning spillovers across firms. His results indicate a fairly significant learning curve, with (current) marginal costs lying well above output price into the 1960s. They also indicate few spillovers. The latter may seem a bit surprising in view of the fact that the learning in question is mainly experience embodied in workers (related to temperature controls in blast furnaces) and considering that labor turnover is one of the most important mechanisms of knowledge spillover (Hausmann and Rodrik 2003). But it is reasonable to surmise that the Japanese practice of lifetime employment greatly reduced the scope for this channel. Ohashi also finds that the Japanese government's export subsidies did not have a large effect on the output of the industry, because the steel industry had a fairly inelastic supply schedule. But these subsidies reduced the financial losses that the steel firms incurred due to their high production costs early on.

Banerjee and Duflo (2004) evaluate a directed credit program in India by asking whether it helped alleviate a real credit constraint. They reason that if firms are offered cheaper credit, as with the program under consideration, they will naturally take it up, but that only credit-constrained firms will employ it to

³ Industries that produce negative value added at world prices are an exception of course.

increase their overall use of credit and expand production. Firms that are not credit constrained will simply substitute the cheaper source of credit for financing from the market. Banerjee and Duflo then carry out a difference-in-differences exercise, comparing the behavior of firms that just became eligible for the program with that of the firms that were and remained eligible. They find that total bank lending and revenues went up for firms in the first category, with no evidence that firms were substituting cheap credit for regular bank credit. They conclude that firms must have been severely credit constrained, and that the directed credit program helped alleviate the constraint. The analysis falls just short of a full cost-benefit, however.⁴

Methodologically sound and detailed case studies of specific policies and programs such as the three I have reviewed are obviously quite useful. But even when well done, case studies can take us only so far. In the end, they are just what their name indicates: an examination of a specific policy in a specific setting. They are subject to selection biases—authors are more likely to select and proceed with cases that confirm their priors. And it is not clear that their lessons travel to other locales, let alone to other types of policies. How much confidence does the Indian case study give us that a directed credit program in, say, Kenya, would produce similar results?

For these reasons, some researchers find cross-national or cross-sectoral econometric studies more relevant. But as I will argue below, these suffer from fatal flaws.

(b) Cross-Industry Econometrics

A natural way to test whether industrial policy is effective is to correlate measures of economic performance for individual industries (growth, productivity, investment) with measures of government support (effective rates of protection, subsidies, tax incentives), along with a number of covariates to control for other determinants of sectoral performance. The general approach is to run a regression of the following form:

$$g_i = \gamma s_i + Z_i' \beta + \varepsilon_i$$

where i is a sector index, g_i is a variable measuring performance of the sector (say, growth of TFP), s_i is the industrial policy applied to that sector (tariff protection or subsidy), and Z_i is a vector of other covariates. The effectiveness of industrial policy is ascertained by asking whether $\hat{\gamma} > 0$. Note that effectiveness in this sense—measured by whether the intervention led to improved performance—is a necessary but not sufficient requirement for economic success:

⁴ A full cost-benefit analysis would have to confirm that the net gains to firms with increased access to credit more than offset the losses to banks that were forced to make specific types of loans and to the creditors that were displaced.

a more complete economic evaluation has to ask whether the benefits generated by the intervention were worth the costs.

This is the approach taken in a number of studies, including Krueger and Tuncer (1982), Harrison (1994), World Bank (1993), Lee (1996), Beason and Weinstein (1996), and Lawrence and Weinstein (2001). These studies have focused on industrial policies in Turkey, Korea, and Japan. At first sight, the results do not seem to be encouraging for industrial policy. With few exceptions, industrial policy interventions are either negatively correlated with performance, or not correlated at all. Few studies find $\hat{\gamma} > 0$; the more typical finding is $\hat{\gamma} < 0$.

Econometric studies of this kind have all the problems of cross-sectional growth empirics, including complications arising from the linear specification, omitted variables, measurement issues, and so on (Rodriguez 2006; Durlauf, Johnson, and Temple 2005). But the difficulty runs much deeper. The almost insurmountable flaw in this literature is that the key estimated coefficient $\hat{\gamma}$ cannot discriminate between two radically different views of the world: (a) the government uses industrial policy for political or other inappropriate ends, and its support ends up going to losers rather than winners; (b) the government optimally targets the sectors that are the most deserving of support, and does its job as well as it possibly can in a second-best policy environment. Under (a) governments should commit to a hands-off policy. Under (b) a hands-off approach would leave the economy worse off. A negative value for $\hat{\gamma}$ is taken as confirmation of view (a). In fact, it also confirms view (b)! The empirical analysis leaves us no better informed than when we started.

To see why, let us consider a simple model where the government does indeed optimally target market imperfections in second-best fashion. Let productivity growth in industry i take the simple form

$$g_i = (1 - \theta_i)A$$

where A represents underlying productivity growth rate, and θ_i is a parameter that calibrates the degree of market imperfection in each sector. We suppose that industries differ in their θ_i and that the government has good knowledge about this parameter and its distribution across sectors. (The analyst, by contrast, cannot observe θ_i .) Sectors with larger θ_i have lower growth rates absent government intervention.

The policy instrument available to the government is a sectoral subsidy denoted by s_i . We model the effect of the subsidy by assuming that it reduces the impact of the market failure from θ_i to $\theta_i(1 - s_i)$. But it does so at an agency cost (in growth terms) of $\alpha(s_i)$, which is a positive function of s_i and increases at an increasing rate ($\alpha(0) = 0$, $\alpha'(s_i) > 0$, and $\alpha''(s_i) > 0$). This agency cost can arise from either political-economy or informational reasons, for all the reasons we have discussed previously and are emphasized by the skeptics.

So with industrial policies in place, the modified expression for an industry's growth performance can be written as

$$g(s_i, \theta_i) = (1 - \theta_i(1 - s_i))A - \alpha(s_i)$$

Let's define $\partial g(\cdot) / \partial s_i \equiv g_{s_i}(s_i, \theta_i) = \theta_i A - \alpha'(s_i)$. The growth-maximizing level of policy intervention is denoted by s_i^* , with s_i^* solving $g_{s_i}(s_i^*, \theta_i) = 0$.

Suppose the politician cares only about maximizing growth. Therefore, she sets $s_i = s_i^*$. Under this maintained hypothesis, what is the co-variation between s_i and g_i that we will observe across sectors? Note first that the government's policy intervention is an increasing function of the degree of market imperfection in a sector:

$$\frac{ds_i^*}{d\theta_i} = \frac{A}{\alpha''(s_i^*)} > 0$$

Second, a sector's economic performance is a decreasing function of the degree of its market imperfection, even with the optimal policy response figured in:

$$\frac{dg_i}{d\theta_i} = -(1 - s_i^*)A < 0$$

Therefore, the co-variation we are looking for is:

$$\frac{dg_i / d\theta_i}{ds_i^* / d\theta_i} = -(1 - s_i^*)\alpha''(s_i^*) < 0$$

This result states that we get a *negative* relationship between s and g across industries. Therefore, a cross-sectoral regression of g on s would yield $\hat{\gamma} < 0$. This even though governments are all doing the right thing and using policy intervention only to maximize growth! Hence, under our maintained hypothesis the typical empirical finding that $\hat{\gamma} < 0$ might as well be interpreted as confirming the optimistic view on industrial policy.

The intuition for our result is the following: when market imperfections become larger, the optimal policy response is to increase the level of intervention, but not so much as to fully insulate productivity growth from the impact of the increased market imperfection. The less-than-full insulation arises because the government internalizes the by-product costs of industrial policy (in terms of the informational and other rents that have to be given up). Consequently, higher levels of policy intervention are associated with lower productivity growth rates, even though the policy maker is acting as a social welfare maximizer. It is easy to confirm that under our assumptions a rule that required $s_i = 0$ would reduce growth and welfare.

There is no easy way out of the dilemma that this analysis points to. The usual remedy for endogenous right-hand side variables is to identify the causal

effect through some instrumental variables (IV). In this context, the IV strategy would amount to locating an exogenous source of variation in the use of industrial policies, one that does not respond systematically to the economic features of an industry. As soon as we put it this way, it becomes clear why IV is unlikely to be a solution to our problem. Our interest is precisely in uncovering the consequences of *systematic* use of industrial policies—whether for desirable or undesirable ends. It is not clear what we would learn from identifying the consequences of industrial policies that are used for purposes that are orthogonal to the economic circumstances of industries.

In any case, suitable instruments are extremely rare, which accounts for the paucity of cross-sectional econometric studies using IV. The only paper I am aware of is Criscuolo et al. (2007), which is not on a developing country but on the United Kingdom. These authors exploit the fact that the eligibility of different firms for state aid changed over time not because of U.K. policy, but because of changes in EU rules regarding which regions could be provided with subsidies without violating EU prohibition on state aid. They use this variation as an instrument to identify the causal impact of grants on firm performance. They find sizable positive effects on investment and employment, but no significant impact on TFP. Interestingly, they also find a bias in the OLS estimates that goes exactly in the direction suggested by the model above.

The bottom line is that existing cross-industry studies are uninformative, and are likely to remain so no matter how much we mess with their specification. We can at least learn something from careful case studies, as long as they entail explicit counterfactuals and cost-benefit analysis. But case studies do not yield obvious lessons that are generalizable. We have a very limited ability to answer the question “does industrial policy work in practice?”

(c) Can We Say Anything At All About The Evidence?

But let me not end this section on a totally nihilistic note. The evidence does allow us to rule out some of the more extreme assertions about industrial policy. In particular, it gives us plenty of reason to discount the view that it has had a systematically damaging effect on growth and productivity compared to hands-off strategies, even when it was badly carried out.

Table 1 reproduces the total factor productivity (TFP) growth estimates of Bosworth and Collins (2003) for individual regions of the world. The estimates cover the 1960–2000 period and are broken down by decade. These numbers deserve serious study, as they contradict some of the received wisdom on the adverse effects of the import-substitution strategy. Consider Latin America for example. This region followed classic interventionist policies during the 1960s and 1970s, with a wide range of industrial policies (trade protection, subsidized credit, public ownership, tax incentives, and so on). The Bosworth-Collins numbers indicate that such policies were associated with reasonably good productivity performance: TFP increased at an annual average rate of 1.6 and 1.1

percent during the 1960s and 1970s respectively. These numbers compare quite favorably with those of East Asia (excluding China) in the same period. East Asian countries also undertook industrial policies, but were oriented towards world markets rather than internally.

More importantly, Latin America's productivity growth never recovered to the same levels following the rejection of import-substitution and the adoption of Washington Consensus-style policies with limited role for discretionary interventions. During the 1990s, Latin American TFP growth remained a fraction of what it had been before 1980—despite the boost that the region received due to the recovery from the debt-crisis years. Interestingly, this poor aggregate TFP performance took place despite significant productivity improvements in organized manufacturing. How is that possible? Apparently, the within-industry effects were counter-balanced by resources moving from high-productivity activities to lower-productivity activities (informality and many services), reducing the efficiency of resource use in aggregate. This once again highlights the importance of policies promoting structural change in the right direction.

The numbers for other parts of the world also tell a complicated story. In South Asia, Africa, and the Middle East—regions that followed classic import substitution policies early on—productivity performance ranged from acceptable to stellar during the 1960s. Productivity growth then steadily deteriorated from the 1970s on in Africa (despite the steady “improvement” of the regions' policies), never recovered in the Middle East, and bounced back in South Asia. If there is a clear association between how rampant industrial policies are and how poor productivity growth is, or between adherence to noninterventionism and strong economic performance, it does not show up in the numbers.

These broad-brush comparisons are subject, of course, to the same critique that the adoption of different policy configurations is an endogenous matter. Therefore one should not read too much into the decadal correlations between policy and performance. Nevertheless, it is hard to see how the numbers can be made to square with the view that industrial policies—as bad as their conduct may have been in Latin America and Africa during the 1960s and 1970s by the standards I will enunciate below—were responsible for disastrous economic outcomes.

TABLE 1: Sources of Growth by Region and Period, 1960–2000

Region and Period	Growth in Output (% a year)	Growth in Output per Worker (% a year)	Contribution by Component (percentage points)		
			Physical Capital per Worker	Education per Worker	Total Factor Productivity
Industrial Countries (22)					
1960–70	5.2	3.9	1.3	0.3	2.2
1970–80	3.3	1.7	0.9	0.5	0.3
1980–90	2.9	1.8	0.7	0.2	0.9
1990–2000	2.5	1.5	0.8	0.2	0.5
1960–2000	3.5	2.2	0.9	0.3	1.0
China					
1960–70	2.8	0.9	0.0	0.3	0.5
1970–80	5.3	2.8	1.6	0.4	0.7
1980–90	9.2	6.8	2.1	0.4	4.2
1990–2000	10.1	8.8	3.2	0.3	5.1
1960–2000	6.8	4.8	1.7	0.4	2.6
East Asia except China (7)					
1960–70	6.4	3.7	1.7	0.4	1.5
1970–80	7.6	4.3	2.7	0.6	0.9
1980–90	7.2	4.4	2.4	0.6	1.3
1990–2000	5.7	3.4	2.3	0.5	0.5
1960–2000	6.7	3.9	2.3	0.5	1.0
Latin America (22)					
1960–70	5.5	2.8	0.8	0.3	1.6
1970–80	6.0	2.7	1.2	0.3	1.1
1980–90	1.1	-1.8	0.0	0.5	-2.3
1990–2000	3.3	0.9	0.2	0.3	0.4
1960–2000	4.0	1.1	0.6	0.4	0.2
South Asia (4)					
1960–70	4.2	2.2	1.2	0.3	0.7
1970–80	3.0	0.7	0.6	0.3	-0.2
1980–90	5.8	3.7	1.0	0.4	2.2
1990–2000	5.3	2.8	1.2	0.4	1.2
1960–2000	4.6	2.3	1.0	0.3	1.0
Africa (19)					
1960–70	5.2	2.8	0.7	0.2	1.9
1970–80	3.6	1.0	1.3	0.1	-0.3
1980–90	1.7	-1.1	-0.1	0.4	-1.4
1990–2000	2.3	-0.2	-0.1	0.4	-0.5
1960–2000	3.2	0.6	0.5	0.3	-0.1
Middle East (9)					
1960–70	6.4	4.5	1.5	0.3	2.6
1970–80	4.4	1.9	2.1	0.5	-0.6
1980–90	4.0	1.1	0.6	0.5	0.1
1990–2000	3.6	0.8	0.3	0.5	0.0
1960–2000	4.6	2.1	1.1	0.4	0.5

Source: Bosworth and Collins (2003).

So let me return now to the Summers analogy. Are countries really better off sticking with the “diversified-portfolio” strategy and not emulating East Asia’s policies of “picking stocks”? Given the numbers we have just seen, it is not at all clear. When countries in Latin America, Africa, and the Middle East were “picking stocks” they were actually doing mostly fine; and when they stopped, they did not do better. So the Summers analogy doesn’t quite work. The choice that developing country governments face is perhaps more akin to that between handing over their portfolio to Nick Leeson and managing it themselves. Governments may not be the greatest stock-pickers, but it beats being taken to the cleaners.

V. Industrial Policy in Practice: Some Country Vignettes

There is no shortage of descriptions of industrial policies in East Asian countries during their heyday of the 1960s and 1970s. In this section I focus on recent experience in three nonAsian countries, El Salvador, Uruguay, and South Africa, relying on my joint work with Ricardo Hausmann, Andres Rodriguez-Clare, and Charles Sabel.⁵ One of my purposes is to show the diversity of approaches that are on display in different countries. El Salvador is an instance of a country that had forsaken industrial policy until very recently, but which is badly in need of one. Uruguay is a country that maintains the fiction that it has no industrial policies, although its public sector provides key inputs to certain industries and its tax code is full of incentives that are hard to make sense of. Finally, South Africa is in the midst of self-consciously constructing a new program of industrial policies under very difficult circumstances. I will discuss briefly the challenges that each of these countries face in designing industrial policies that are appropriate to their needs and that do not greatly strain existing institutions. Another objective is to show that industrial policy is very much a live issue in many countries. The challenge in countries like Uruguay and South Africa is not to embark on industrial policies anew, but to channel what exists in a better direction.

Figure 1 shows the growth performance of the three countries. Strikingly, El Salvador and South Africa have yet to reach their peak income levels from the late 1970s/early 1980s, and in view of the long decline their economies have experienced, their growth since the early 1990s looks truly anemic. Uruguay had more rapid growth in the 1990s, alongside its neighbor and major economic influence Argentina, but accompanied Argentina into a tailspin in 1999–2002. Its fortunes have since recovered, alongside Argentina’s once again.

⁵ See in particular Hausmann and Rodrik (2005), Hausmann, Rodriguez-Clare, and Rodrik (2005), and Hausmann, Rodrik, and Sabel (2007 forthcoming).

FIGURE 1: Growth Experience

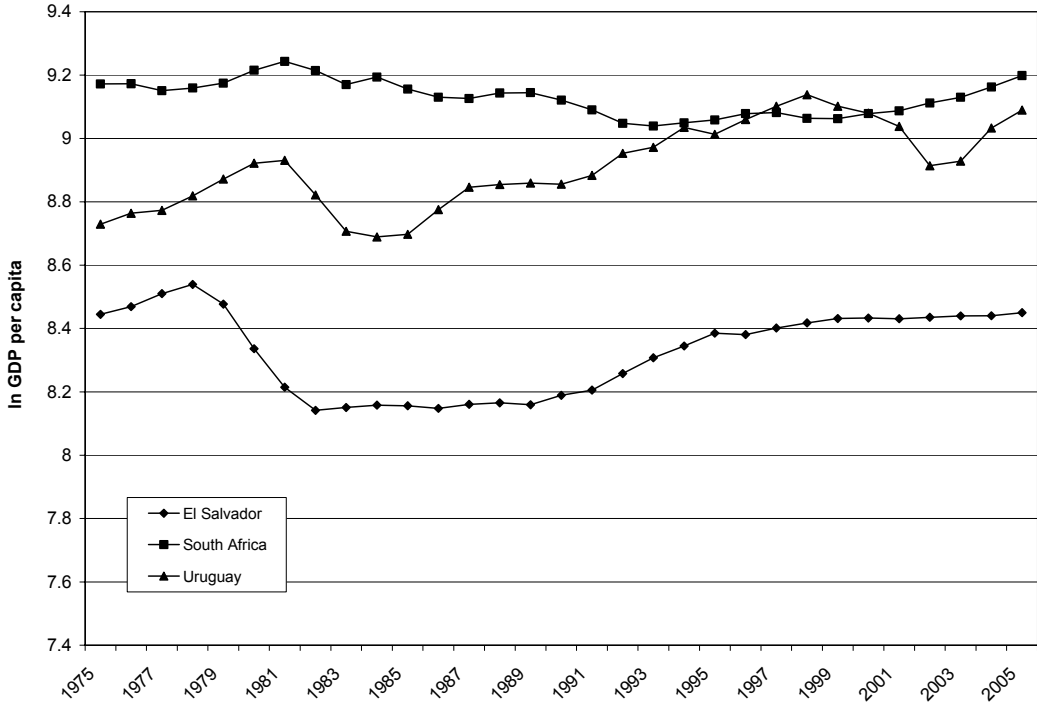


FIGURE 2: Investment as a Share of GDP

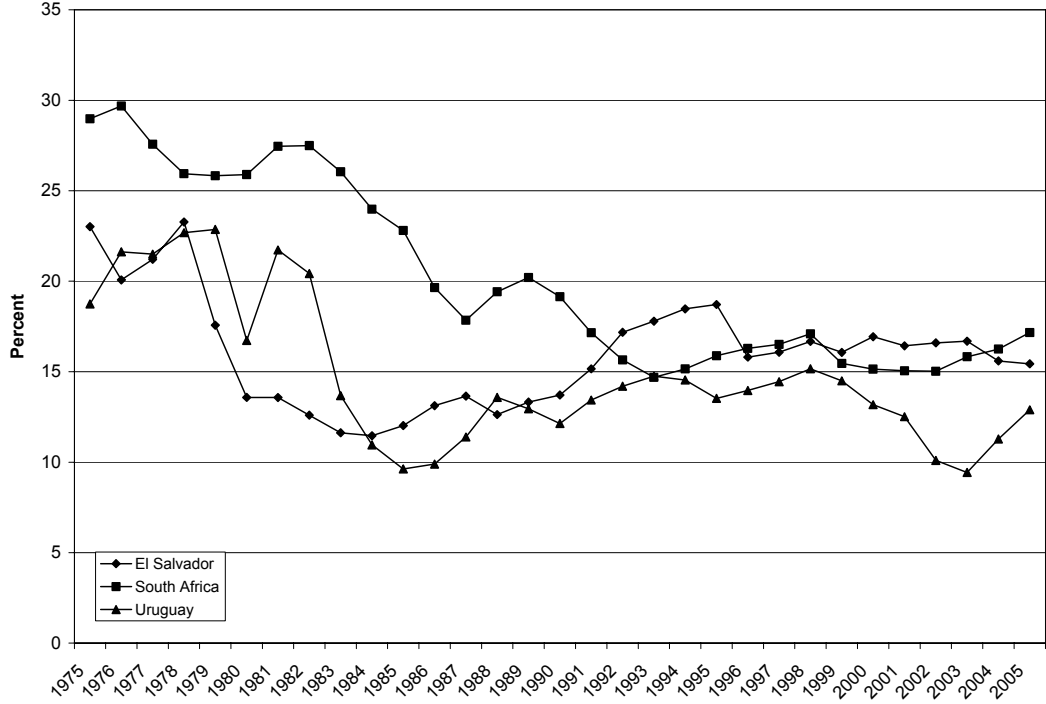


Figure 2 is a good indicator of the problems these economies face. In all three economies, investment remains quite low: below 15 percent of GDP in Uruguay, and barely above that in the other two countries. This is substantially below the levels these countries experienced in their own recent past and nowhere near what is required for sustained and rapid economic growth. Despite the considerable reform these economies undertook during the 1990s, the investment response has remained muted. The evidence suggests that the animal spirits of entrepreneurs can remain quite depressed in liberalized market environments, particularly where investments in modern tradable sectors are concerned

(a) El Salvador

The Salvadoran puzzle is why a substantial reform effort during the early 1990s—involving a complete opening up of the economy to trade and finance, an impressive macroeconomic stabilization including dollarization, a significant dose of privatization and deregulation, and the establishment of democracy supported by a large influx of remittances—has failed to pay off economically. As Figure 1 shows, an early growth spurt has fizzled out. As we argued in Hausmann and Rodrik (2005), it is difficult to attribute this outcome to the usual culprits—a poor investment climate or macroeconomic instability.

Instead the problem seems to be the disjuncture between an economy that is badly in need of diversification—given its traditional reliance on coffee and other commodities whose prices are depressed—and the inadequacy of entrepreneurial incentives to invest in new areas. El Salvador seems to be caught in a classic self-discovery trap (Hausmann and Rodrik 2003). The problem is aggravated by a currency that is overvalued (thanks to remittances) and the unavailability of exchange-rate policy to engineer an increase in competitiveness (given dollarization). The only success in recent years has been the *maquila* sector, which operates under a special tax regime and benefits from trade preferences granted by the United States (an industrial policy in all but name). But the *maquila* have been insufficient to make up for the loss in traditional exports on their own.

Until very recently, Salvadoran economic strategy was based on the idea that stimulating economic growth requires nothing more than getting the fundamentals in order. This is a view that takes growth to be an automatic process, coming into its own in full force once the government removes certain distortions that are the result largely of its own policies. The disappointing outcomes have forced the present administration to re-evaluate this view and take a more pragmatic, hands-on attitude. What might an appropriate industrial policy framework look like in such a setting?

We listed in Hausmann and Rodrik (2005) a number of “design features” that we thought any new industrial policy arrangements must possess: the need to limit incentives to “new” activities, the use of automatic sunset provisions, the establishment of clear benchmarks for success (or failure) of programs, the

reliance on agencies with demonstrated competence and a degree of autonomy from daily politics, the identification of a high-ranking political principal with “ownership” of the industrial policy effort as a whole, and the systematic use of deliberation bodies that engage the private sector.

We then recommended a number of concrete programs, while emphasizing that these were meant to be illustrative of the type of activities the government might engage in following proper deliberation within itself and with the private sector. Some examples:

- One proposal is a co-financing facility to subsidize the costs of “self-discovery.” This would be a contest in which private-sector entrepreneurs bid for public resources by proposing potential investment proposals. Proposals would have to relate to substantially new activities in El Salvador, have the potential to provide learning spillovers, and be subject to oversight and performance audits. The facility would co-finance feasibility studies.
- A second proposal is to redeploy the public Multisectoral Investment Bank (BMI) as a public venture fund engaged in risky investment finance. The BMI has traditionally played a passive role, and has not sought new economic activities. The BMI is staffed with good talent, and operates relatively autonomously.
- A third recommendation is to establish (or strengthen existing) forums where businesses and sectoral associations come into regular dialogue with the government, with the purpose of identifying investment opportunities that might otherwise fall prey to coordination failures.

In settings like El Salvador, where the government has long been hostile to industrial policy,⁶ what is perhaps most important in the early stages is the change in attitudes itself and its signaling to the private sector. If entrepreneurs and investors are led to believe that they now face a government that is willing to give them an ear and help finding solutions to their problems, the benefits can be larger than any specific program of support.

(b) Uruguay

One surprise in Uruguay is the extent of industrial policy that takes place under the radar screen. Precisely because it is hidden from view or not talked about much by policy makers, the result is a mixed bag. Some of the efforts work well while others are designed quite poorly.

Another surprise is the apparent absence of the rent-seeking that we normally associate with industrial policy. This is important as it suggests that East Asian states are not the only ones that are immune to capture by private

⁶ The WTO’s 2003 survey of trade practices in El Salvador says: “The Salvadoran authorities have pointed out that there are no programmes of assistance either for individuals or enterprises or for regions or specific factors to facilitate modernization and adjustment to structural change” (p. 61).

interests. Uruguay is a democratic country with a social democratic tradition, and therefore its political setting is quite different from that in East Asia. A “hard,” authoritarian state may not be necessary for running industrial policies cleanly.

As Figure 1 shows, Uruguay has been recovering nicely from its recent crisis. Aided by a more competitive exchange rate, the animal spirits of entrepreneurs appear to have revived. Unlike in El Salvador, the private sector is keenly aware of and interested in investment opportunities in a wide variety of tradable sectors: meat, rice, soybeans, forestry, pulp and paper, ports, tourism, software, and business services.

The public sector has played an identifiable and important role in providing key inputs and support for each one of these new economic activities. As we put it in Hausmann, Rodriguez-Clare, and Rodrik (2005, p. 4):

Meat has reappeared in the scene thanks to the capacity of Uruguay to control foot and mouth disease through improved animal sanitation and tracking techniques. Rice has benefited from a public-private partnership in seed development through INIA that has increased productivity to the highest global standards. Forestry has benefited from a consistent policy of investment subsidies and of the perceived commitment to the sector in terms of attracting the complementary investments in pulp and paper and in port infrastructure. Tourism has benefited from a consistent policy to broaden destinations, diversify markets and provide the needed infrastructure, advertisement and security. Software has benefited from the high level of public education in the country as well as from an adequate tax treatment.

A key question for Uruguay is whether a combination of significantly improved macroeconomic fundamentals (including a more competitive currency) together with these successful instances of public-private partnerships to foster new economic activities can put the country on a growth path that delivers much better results over the long term.

Uruguay is comparatively good at providing a range of public goods: a competent and honest bureaucracy, public safety, law and order, health and sanitary standards, research and extension services in some agricultural areas, functioning democratic procedures, and social cohesion. In Hausmann, Rodriguez-Clare, and Rodrik (2005) we argued that these assets can be deployed more effectively in the service of productive renewal and economic diversification. Sustaining growth requires targeting Uruguay’s considerable institutional strengths more closely on productive transformation.

Uruguay’s industrial policy regime suffered from a number of shortcomings (as of around 2005). First, the government had no systematic, proactive strategy for going after investments in new areas. Investment promotion was a passive, ad hoc, idiosyncratic affair. For example, the Investors’ Attention Office, the one-stop shop for investment incentives, did not actively recruit investors; it simply

waited for them to come. Second, while there were plenty of investment incentives, these incentives were not targeted at self-discovery proper. Most critically, the existing tax-incentive scheme made no distinction between pioneer firms and copy cats or between tradables (and therefore scalable activities) and nontradables. The logic of self-discovery is that it is pioneer, scalable investments that provide the valuable information externalities. Subsidizing others is a waste of resources, unless there exists additional market imperfections. And third, the economy lacked a source of public risk capital. The Corporacion Nacional para el Desarrollo (CND) had not fulfilled its potential promise in this area. In sum, the Uruguayan incentives were not well targeted on the market imperfections that matter. In addition, they were not based on performance standards, and tended to employ a restricted range of instruments that were specified ex ante regardless of the nature of problems (mainly tax incentives, tariff exemptions, and free zones.)

Perhaps the greatest weakness of the Uruguayan approach is that it lacks a unifying, politically salient “vision.” This is due in part to being in denial that the government is already extensively engaged in industrial policies. A concrete indication of this is that there is no high-ranking political official (say a government minister) who views economic restructuring and diversification to be his primary objective. No one feels accountable for the low level of private investment in the country—in the same manner that the Central Bank feels accountable for inflation or the finance minister feels accountable for debt dynamics. Yet investment is as much a product of the policy environment as inflation and public finances are. The end result is that existing programs are not always well targeted, are of varying effectiveness, and are not regularly evaluated to see whether their goals are being met.

(c) South Africa

South Africa made a transition to democracy under auspicious conditions. The governing coalition that took power represented the aspirations of the historically excluded and disadvantaged black population, and the pressures for redistribution and populism were strong. In its first decade in power, the African National Congress managed to steer a prudent course, emphasizing monetary and fiscal prudence, steady, if not dramatic (by Latin American standards) trade liberalization, and social transfers targeted at the poor. The economy avoided the worst prognostications, but also fell short of achieving rapid growth. In particular, it generated too few low-skill jobs, with the consequence that unemployment rose to very high levels.

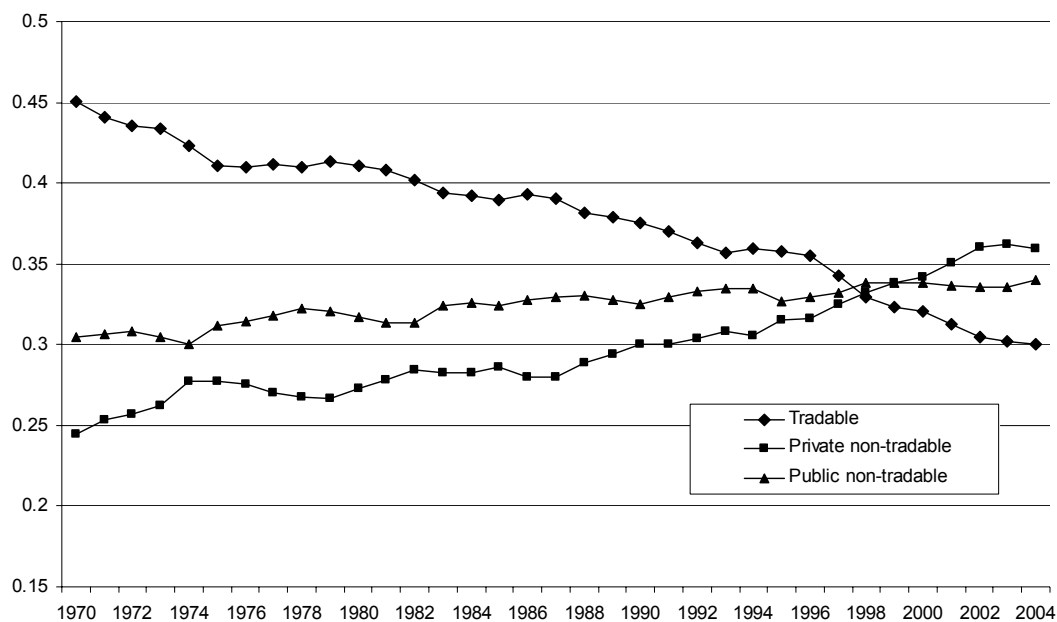
Behind the unemployment problem in South Africa lies the structural change pictured in Figure 3 (Rodrik 2006b). The tradable sector has steadily shrunk, driven by the loss of employment in mining and the slow increase in demand for labor in manufactures. The tradable sector (including manufactures) was the traditional absorber of low-skill labor in South Africa. Therefore, this

pattern of structural change implied a collapse of demand for unskilled labor. The fall in real wages required to maintain low unemployment was politically and institutionally unacceptable in a democratic, post-apartheid South Africa. A sizable (and sustained) real currency depreciation could have helped revive demand for labor. But even though the currency did experience some depreciation in real terms, the effect on tradables was largely nullified by trade liberalization and other competitive forces (China among them) acting on them.

Spurred by low growth and the employment imperative, the South African government recently embarked on a new growth strategy, dubbed the Accelerated and Shared Growth Initiative for South Africa (ASGI-SA). A key departure from the past (and a striking difference from the other cases I have discussed) is that ASGI-SA places industrial policy squarely at the center of the agenda. The government is currently engaged in a self-conscious formulation of an industrial policy that, along with reforms in other areas, will counter the negative trends discussed above. A particular challenge is to reinvigorate the manufacturing sector and expand other nontraditional tradables, in view of their employment-absorbing and growth-promoting role.

This effort has several planks. First, the Department of Trade and Industry (DTI) is engaged in developing so-called Customized Sector Programs (CSPs) with the objective of formulating policy initiatives for individual sectors. The CSPs revolve around dialogues between DTI and private-sector associations, and they cover a wide range of sectors from call centers to capital equipment.

FIGURE 3: Employment Shares in South Africa



Source: Rodrik (2006b).

One of the most important initiatives concerns the auto industry, which has been promoted to date through incentives that enable multinational firms to import parts or assembled vehicles in return for exports. The Motor Industry Development Program (MIDP) has served to create a solid base of vehicle assembly, but the domestic supplier links remain weak. The main challenge here can be viewed as one of coordinating investments upstream and downstream. The OEMs are hesitant to expand operations in the absence of a strong complement of local first-tier suppliers, given the transport and logistical costs of importing parts. The suppliers themselves are wary of becoming dependent on a single OEM, and need the assurance that their services will be in demand from a diversified downstream industry. That is why there remains a useful government role here. The MIDP is now being reviewed by the DTI. In view of the argument just made, the most important task will be to replace the existing incentive scheme—which favors exports of assembled vehicles—with support targeted at strengthening domestic supplier industries directly.

Other parts of the public sector are involved as well. The Department of Public Enterprises (DPE) has a supplier development program, aimed at enhancing the productive and technological capacity of suppliers to the state-owned transport and electricity enterprises. The Department of Minerals and Energy seeks to create incentives for “beneficiation” (that is, domestic processing) of minerals such as diamonds and titanium. The departments of Labor and Education are reviewing vocational training programs to make them more demand-driven. The Industrial Development Corporation (IDC) is financing SMEs and some self-discovery activities. In addition, many provincial governments have their own investment promotion agencies, engaged in providing small-scale support and facilitation services to enterprises in their region. Some of these policies make more sense than others. For example, promoting beneficiation does not seem a good idea in general, as it is hard to make the case that forward linkages from mining to processing generate greater externalities than other kinds of inter-industry relationships (such as sideways linkages from mining to mining equipment). By contrast, it would seem desirable for the IDC to expand its role as venture capitalist in financing new tradable activities.

There is a tension in these ongoing efforts between two different modes of carrying out industrial policy. One is the traditional, East Asian style where the government picks certain sectors and provides incentives to get them off the ground. This approach is defined by a collection of policy instruments (tax credits, subsidies, directed credit) and a range of sectoral priorities (call centers, biofuels, autos, and so on). An alternative one, which I will discuss more fully in the next section, views industrial policy as a *process*, without a preconceived list of sectors and policy instruments. In this conception, the emphasis is on constructing an institutional framework that elicits the problems to be addressed and the remedies to be employed through dialog and deliberation with the

private sector. The South African industrial policy regime has been slowly gravitating towards the second model.

The new model overcomes some of the traditional problems of industrial policy, but poses new ones. The institutional framework must be designed carefully to ensure that there is a productive dialog between the private sector and the government, information flows adequately in both directions, needs are well identified, policy instruments are appropriately targeted, and self-correction mechanisms are in place. The good news for South Africa is that the seeds of this new approach are already in place and need not be planted anew. What is needed is a rebalancing of the portfolio of existing industrial policies, along with institutional changes designed to deepen them.

Another issue that the South African case highlights is the tension between the conduct of monetary policy and the health of the tradables sector. While South Africa has not gone to the Salvadoran extreme of dollarizing, its inflation-targeting framework tends to deliver an appreciated currency—especially during a commodity boom. This increases the premium on appropriate industrial policies. In effect, the less room for maneuver there is on the exchange rate front, the greater the need for a compensating industrial policy.

VI. Institutional Design Features for Industrial Policy

As we have seen, the theoretical justification for industrial policy interventions is fairly strong. By contrast, the empirical evidence on whether industrial policy works “on average”—or on what kind of industrial policy works—is inconclusive. In addition, the literature raises a number of well-placed worries about the likely shortcomings of industrial policy in practice. As I have argued, none of this makes this area of policy different from conventional areas of government responsibility such as education, health, social insurance and safety nets, infrastructure, or stabilization. In each one of these areas, it is recognized that the market-failure arguments for intervention can be exploited by powerful insiders and overwhelmed by informational asymmetries. But policy discussions typically focus on how to make it work, not on *whether* the government should do it in the first place. Making progress with the debate on industrial policy requires a similar shift. Only then can we provide adequate guidance to countries that are in fact already doing it, whether they recognize it or not. The poverty of the economics discussion on these issues is in fact striking. It can be overcome only by going beyond stale existential debates.

As the discussion in the previous section suggests, the specifics of industrial policy depend heavily on the circumstances and institutional capabilities of a country. Still, there are some general principles we can articulate about how institutions carrying out industrial policy should be designed. These principles follow from these considerations:

1. The requisite knowledge about the existence and location of the spillovers, market failures, and constraints that block structural change are diffused widely within society.
2. Businesses have strong incentives to “game” the government.
3. The intended beneficiary of industrial policy is neither bureaucrats nor business, but society at large.

The first of these requires that industrial policy be “embedded” within society. The second calls for strong safeguards against bureaucratic capture. And the third necessitates accountability. I discuss each one of these in turn.

(a) Embeddedness

Economists tend to think of policy design as a top-down process. Formally, it is typically modeled in principal-agent terms: the principal (government) designs a rule that provides the incentive to the agent (the firms) to act in a socially desirable manner in view of the private information (for example, costs) that the agent (but not the principal) has. This approach takes the informational asymmetry as given, while keeping the private sector at arms’ length. The bureaucrats simply have to issue the rules and then step aside. It has the advantage that it gives bureaucrats autonomy and facilitates resistance to private sector rent-seeking.

While useful in some settings, this model is unhelpful, and in fact counter-productive in the industrial policy context. The standard model assumes the principal’s objective function is well-defined and known *ex ante*, and that the space of policy instruments, action types, and informational incompleteness is low-dimensional. In practice, none of this is likely to be true. The government has only a vague idea at the outset about whether a set of activities is deserving of support or not, what instruments to use, and what kind of private-sector behavior to condition these instruments on. The information that needs to flow from the private sector to the government in order to make appropriate decisions on these are multidimensional and cannot be communicated transparently through firms’ actions alone. A thicker bandwidth is needed.

An industrial policy that is cognizant of the government’s lack of omniscience has to be constructed as a system of discovery about all those sources of uncertainty. It requires mechanisms for eliciting information about the constraints markets face, and hence close collaboration between the government and the private sector. This is what the sociologist Peter Evans (1995) has called “embeddedness.” The success of Korean industrial policies is often ascribed to the “autonomy” of the state. Evans showed that it was in fact due to an autonomy qualified by being embedded in private-sector networks—in other words, due to “embedded autonomy.” The capacity to design and implement industrial policy requires both autonomy and embeddedness:

The internal organization of developmental states comes much closer to approximating a Weberian bureaucracy. Highly selective meritocratic

recruitment and long term career rewards create commitment and a sense of corporate coherence. Corporate coherence gives these apparatuses a certain kind of “autonomy.” They are not, however, insulated from society as Weber suggested they should be. To the contrary, they are embedded in a concrete set of social ties which binds the state to society and provides institutionalized channels for the continually negotiation and renegotiation of goals and policies. Either side of the combination by itself would not work. A state that was only autonomous would lack both sources of intelligence and the ability to rely on decentralized private implementation. Dense connecting networks without a robust internal structure would leave the state incapable of resolving “collective action” problems, of transcending the individual interests of its private counterparts. Only when embeddedness and autonomy are joined together can a state be called developmental.

This apparently contradictory combination of corporate coherence and connectedness, which I call “embedded autonomy,” provides the underlying structural basis for successful state involvement in industrial transformation. (Evans 1995, chap. 1)

The right model for industrial policy therefore lies in between the two extremes of strict autonomy, on the one hand, and private capture, on the other. It is a model of *strategic collaboration and coordination* between the private sector and the government with the aim of uncovering where the most significant bottlenecks are, designing the most effective interventions, periodically evaluating the outcomes, and learning from the mistakes being made in the process.

What are some of the specific mechanisms that can serve to achieve these ends? Deliberation councils are the classic institution for this purpose, but we can add supplier development forums, “search networks,” investment advisory councils, sectoral round-tables, and private-public venture funds as additional examples. Contests that allow private sector firms to bid for public resources (whether to fund feasibility studies or provide specific public inputs) can be particularly useful for eliciting private-sector needs and priorities.

An interesting idea for an institutional arrangement that deals with the issues I have highlighted comes from Romer (1993).⁷ Romer’s proposal is to set up “self-organizing industry investment boards.” These boards are collective organizations of firms aimed at providing specific public input to their industry. These inputs could be an R&D lab for the industry or an infrastructure project. The proposal is submitted to the government, and is subject to its approval. Once approved, the project is paid for by a tax levied on the sales of the industry. Firms are free to set up alternative boards, serving different needs, and allocate their tax dollars appropriately. While Romer had the United States in mind, such boards could be even more useful in developing country settings.

⁷ I thank Ricardo Hausmann for bringing Romer’s paper to my attention.

This way of thinking about industrial policy ensures that we view it not as a list of policy instruments, as in the traditional model, but as a *process of discovery*. The process focuses on learning where the binding constraints lie and on eliciting information on the private sector's willingness to invest subject to the removal of those obstacles. The government's choice over policy instruments—tax breaks, R&D subsidies, credit incentives, or other specific instruments—emerges from the process. The appropriate way to judge the success of the policy is then to ask: have we set up the institutions that engage the bureaucrats in an ongoing conversation with the private sector, and do we have the capacity to respond selectively, but also quickly and using a range of policies, to the economic opportunities that these conversations are helping identify?

(b) Carrots and Sticks

A central insight that goes back to Schumpeter is that innovation requires rents. Without rents for entrepreneurs, there is too little investment in cost discovery and other activities that promote structural change. Rents are in effect a second-best mechanism for alleviating the market failures discussed previously. The tradeoff is that open-ended rents bottle up resources in unproductive activities and allow producers to live the "easy life of the monopolist."

The contrasting experiences of East Asia and Latin America are illuminating in this respect. During the heyday of their industrial policies (1960–90), East Asian countries were well known for relying on both incentives and discipline. While tax incentives (Taiwan) and credit subsidies (Korea) were generous, they were conditioned on performance, and especially on export performance. Nonabiding firms were penalized by withdrawal of subsidies and in other ways. This generated lots of new economic activities, while allowing failures to wither away. Under its traditional import-substitution policies (1950–80), Latin America also provided considerable incentives (trade protection and cheap credit), but failed to exert discipline on the beneficiaries. This too generated many successes, as I have already discussed, but it also kept alive many unproductive firms. The latter were finally disposed of when the stick in the form of market discipline arrived on the scene in the late 1980s and 1990s (assisted by sharp business cycle downturns). Arguably today Latin America has too much market discipline and too few carrots to encourage firms to invest in transforming industries. That is one way to understand the comparatively low investment and growth of the region.

Hence the conduct of industrial policy has to rely on both prongs: it needs to encourage investments in nontraditional areas (the carrot), but also weed out projects and investments that fail (the stick). Conditionality, sunset clauses, built-in program reviews, monitoring, benchmarking, and periodic evaluation are desirable features of all incentive programs. Bringing discipline to bear on incentive programs does not require a hard state. Relatively minor details of how programs are designed can make a big difference in practice. Requiring that an

incentive expire unless a review recommends that it be continued is much more likely to generate phase-out than simply promising a review x years from now. Being very explicit ex ante about the criteria by which a program will be judged a success—so many jobs and so much exports after x years—is helpful to distinguish between hits and flops ex post and guards against the tendency to scale down expectations when things do not work out.

And bringing the discipline of the market to bear on incentive programs is always a good idea, whenever practical. For example, one of the most attractive features of export subsidies is that it conditions the reward on performance in world markets. Unproductive firms are unlikely to export much, even with the subsidy, and therefore do not receive any benefits. Both Korea and Taiwan greatly benefited from export subsidies during the 1960s and 1970s. By making incentives conditional on export performance, these countries set up the right incentives for firms to enhance productivity. While export subsidies are now illegal in the World Trade Organization, the least-developed countries are still permitted to use them. Co-financing is another mechanism to bring in the discipline of markets. It allows screening between firms that are willing to risk their capital and those that aren't.

This discussion on the need to combine sticks with carrots highlights an important point about the appropriate yardstick for judging success in industrial policy. Remember the claim that governments cannot pick winners, which is often used to argue against industrial policy. If industrial policy is in part about self-discovery, which is inherently uncertain, many promoted enterprises will necessarily fail. Optimal policy under these conditions requires acceptance of a certain failure rate (Hausmann and Rodrik 2003). Conducting policy in a manner that would ensure zero failure would make as much sense as a pharmaceutical company investing only in drugs that are guaranteed to be profitable from the outset. As the analogy suggests, if none of the promotion efforts produces duds, this is as good an indication as any that the promotion did not go far enough. It is said that the top few successes of Fundacion Chile, including most notably salmon, paid for the entire budget of the organization, including its many failures.

The appropriate question therefore is not whether a government can always pick winners—it shouldn't even try—but whether it has the capacity to let the losers go. The trick is having mechanisms of the sort just described that can recognize when things are turning sour and the ability to phase out the support. This is still hard to do, but orders of magnitude less demanding of the government than full omniscience.

(c) Accountability

The considerations up to now are mostly concerned about getting the relationship between the private sector and the policy makers/bureaucrats right. But if bureaucrats monitor business, the question is who monitors the

bureaucrats? The ultimate “principal” here is the general public and we need to ensure that the industrial policy apparatus is responsive to it. This is good both for economic reasons—to keep the bureaucracy honest—and for legitimacy. The public deserves an accounting of how decisions are made in this domain and why certain activities or firms are favored—especially since industrial policy may often seem to privilege large and politically connected firms rather than SMEs or poorer parts of the economy.

One response to this challenge is raise the political profile of industrial policy activities and to associate a high-level champion with them. The virtue of this is that it identifies a person who has the job of explaining why the agenda looks as it does, and who can be held politically responsible for things going right or wrong. If there is a minister of education who is responsible for education policy and a central bank governor who is accountable about monetary policy, why not accord similar treatment to industrial policy? Many governments do have a minister of industry (or trade and industry) of course. But as saw in the South African case, a lot of industrial policy actually takes place in other parts of the public sector—in other ministries and in development banks. In such circumstances, it is not clear that any particular person bears responsibility for failure.

Accountability can also be fostered at the level of individual agencies by giving them clear mandates and then asking them to report and explain any deviations that occur from the targets set in the mandate. The model to follow is that of central bank independence and inflation targeting. Under this model, the central bank is fairly autonomous in selecting the instruments it uses to achieve its inflation target, but is expected to provide a good accounting for missed targets. Following a similar approach, we could imagine, say, the industrial development bank being given quantitative targets for a range of venture-fund type activities: completed prefeasibility studies in nontraditional activities, volume of cofinancing generated, divestments from old projects, and so on. The bank would periodically report on its activities and explain reasons for any deviations in the outcomes.

Another fundamental tool for accountability is transparency. Publication of the activities of the deliberation councils and periodic accounting of the expenditures made under industrial policies would greatly help. Any request made by firms for government assistance should in principle be public information. And ensuring that government-business dialogs remain open to new entrants would assuage worries about the process being monopolized by incumbents.

VII. Concluding Remarks

Industrial policy is one of the most misunderstood areas of government policy. Even though many of its critics recognize the positive contribution it has made in some East Asian cases (see, for example, Wolf 2007), there remains large amounts of skepticism about its relevance or usefulness in other contexts. This skepticism is grounded in a number of interrelated and mutually enforcing views on economic development and bureaucratic capacity:

1. What constrains economic development and growth is hardly ever the kind of market failures on which industrial policy is targeted, so that there is little need for governments to resort to industrial policy in order to stimulate development in the first place.
2. Even if there is a theoretical case for industrial policy, governments do not possess the kind of fine-grained information that would enable them to target their interventions appropriately.
3. Moreover, industrial policy is an invitation to corruption and rent-seeking, and it opens the door to preferential policies whose main purpose is to transfer income to politically connected groups.
4. Empirically, it has been very difficult to demonstrate that industrial policy actually works in practice; most published econometric estimates in fact suggest otherwise.
5. Governments already have their hands full with a wide range of reforms in other, more pressing areas such as fiscal policy and anti-corruption; it would be unwise to burden them with an additional, highly demanding reform agenda.

Each one of these difficulties is worthy of serious consideration. And taken as a whole they appear to constitute a formidable and nearly fatal set of objections.

Yet upon closer look these objections are less powerful than they seem at first sight. They are based on unexamined assumptions about the nature of economic development and the capacity of governments. They misrepresent what the empirical evidence really shows. They ignore the fact that many (if not most) developing countries are already engaged in industrial policies, even if they do not call them by that name. And they overlook the fact that many of these same points are not specific to industrial policy and could be made for other areas of government policy as well. At the end of the day, it is difficult to understand why industrial policy is held in such disdain.

What I have proposed here is an approach that recognizes the potential problems in the conduct of industrial policy, but does not take the informational and rent-seeking constraints to be immutable. In many other areas, such as monetary policy, fiscal policy, or development banking, experience has shown that it is possible to design institutional arrangements that achieve social objectives reasonably well while keeping agency problems in check. Policy

advice in some of the most conventional areas of government responsibility, such as trade and financial reform, is increasingly predicated on a similar view about the malleability of institutions. It acknowledges that reaping the benefits of openness on trade and finance requires a battery of accompanying institutional reforms, and pushes for those reforms as a necessary complement (see IMF 2007 and World Bank 2006).

The debate on industrial policy remains in an impoverished state—still hung up on the question “should we or should we not?”—because economic analysts and development professionals have not fully come to grips with this point. The way to move forward is to understand that industrial policy is not that special: it is just another government task that can vary from routine to urgent depending on the nature of growth constraints a country faces. Once this point is grasped, it becomes easier to contemplate the institutional experimentation that its successful implementation will necessarily entail.

References

- Acemoglu, Daron, and Joshua Angrist, "How Large Are the Social Returns to Education? Evidence from Compulsory Schooling Laws," in *NBER Macroeconomics Annual 2000*, Ben Bernanke and Kenneth Rogoff, eds. Cambridge: MIT Press, 2001.
- Balassa, Bela, *The Structure of Protection in Developing Countries*. Baltimore, MD, Johns Hopkins University Press, 1971.
- Banerjee, Abhijit V., and Esther Duflo, "Do Firms Want to Borrow More? Testing Credit Constraints Using a Directed Lending Program," CEPR Discussion Paper No. 4681, October 2004.
- , "Growth Theory Through the Lens of Development Economics," in Aghion, P. and S Durlauf, eds., *Handbook of Economic Growth*, Vol. 1a. Amsterdam: Elsevier, 2005, pp. 473–552.
- Beason, Richard, and David E. Weinstein, "Growth, Economies of Scale, and Targeting in Japan (1955–1990)," *Review of Economics and Statistics* 78(2), 1996, 286–95.
- Bosworth, Barry P., and Susan M. Collins, "The Empirics of Growth: An Update," *Brookings Papers on Economic Activity*, Vol. 2003, No. 2. (2003), pp. 113–179.
- Criscuolo, Chiara, Ralf Martin, Henry Overman, and John Van Reenen, "The Effect of Industrial Policy on Corporate Performance: Evidence from Panel Data," Centre for Economic Performance, London School of Economics, July 16, 2007.
- Durlauf, Steven N., Paul A. Johnson, and Jonathan Temple, "Growth Econometrics," in P. Aghion and S.N. Durlauf, eds., *Handbook of Economic Growth*, Volume 1A, North-Holland, 2005, pp. 555–677.
- Evans, Peter B., *Embedded Autonomy: States and Industrial Transformation*, Princeton, NJ: Princeton University Press, 1995.
- Foster, Andrew and Mark Rosenzweig, "Learning by Doing and Learning from Others: Human Capital and Technical Change in Agriculture," *Journal of Political Economy*, Vol. 103, 1995, pp. 1176–1209.
- Goldstein, Andrea, "EMBRAER: From National Champion to Global Player," *CEPAL Review* 77, August 2002.
- Harrison, Ann E., "An Empirical Test of the Infant Industry Argument: Comment," *The American Economic Review*, Vol. 84, No. 4 (Sep. 1994), pp. 1090–1095.

- Hausmann, Ricardo, Andres Rodriguez-Clare, and Dani Rodrik, "Towards a Strategy for Economic Growth in Uruguay," Inter-American Development Bank, Economic and Social Study Series, February 2005.
- Hausmann, Ricardo, and Dani Rodrik, "Economic Development as Self-Discovery", *Journal of Development Economics*, Vol. 72, December 2003.
- , "Self-Discovery in a Development Strategy for El Salvador," *Economia: Journal of the Latin American and Caribbean Economic Association*, 6(1), Fall 2005, 43–102.
- , "Doomed to Choose: Industrial Policy as Predicament," John F. Kennedy School of Government, Harvard University, September 2006.
- Hausmann, Ricardo, Dani Rodrik, and Charles F. Sabel, "Reconfiguring Industrial Policy," John F. Kennedy School of Government, Harvard University, 2007, forthcoming.
- Head, K., J. Ries, and D.L. Swenson, "Agglomeration Benefits and Location Choice: Evidence from Japanese Manufacturing Investment in the United States," NBER Working Paper 4767, June 1994.
- Imbs, Jean, and Romain Wacziarg, "Stages of Diversification," *American Economic Review*, Vol. 93, no. 1, March 2003, pp. 63-86.
- IMF, *Reaping the Benefits of Financial Globalization*, Washington, DC, June 2007.
- Irwin, Douglas A., "Did Late Nineteenth Century U.S. Tariffs Promote Infant Industries? Evidence from the Tinplate Industry," *The Journal of Economic History*, Vol. 60, No. 2 (Jun., 2000), pp. 335-360.
- Javorcik, Beata Smarzynska, "Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers through Backward Linkages," *The American Economic Review*, Vol. 94, No. 3 (Jun. 2004), pp. 605–627.
- Krueger, Anne O., and Baran Tuncer, "An Empirical Test of the Infant Industry Argument," *American Economic Review*, Vol. 72, Issue 5, 1982, pp. 1142–52.
- Lawrence, Robert Z., and David E. Weinstein, 2001, "Trade and Growth: Import Led or Export Led? Evidence from Japan and Korea," in Joseph E. Stiglitz and Shahid Yusuf, eds., *Rethinking the East Asian Miracle*. Oxford: Oxford University Press, 2001.
- Lee, Jong-Wha, "Government Interventions and Economic Growth," *Journal of Economic Growth*, 1(3), September 1996.
- Lewis, W. Arthur, "Economic Development with Unlimited Supplies of Labor," *Manchester School of Economic and Social Studies* 22, 1954, 139–91.
- Little, I.M.D., T. Scitovsky, and M.F.G. Scott, *Industry and Trade in Some Developing Countries*, London, Oxford University Press, 1970.

- Morduch, Jonathan, "The Microfinance Promise," *Journal of Economic Literature*, Vol. 37(4), December 1999, pp. 1569–1614.
- Munshi, Kaivan, and Mark R. Rosenzweig, "Traditional Institutions Meet the Modern World: Caste, Gender and Schooling Choice in a Globalizing Economy," BREAD Working Paper No. 038, July 2003.
- Ohashi, Hiroshi, "Learning by Doing, Export Subsidies, and Industry Growth: Japanese Steel in the 1950s and 1960s," *Journal of International Economics*, Vol. 66(2), pp. 297–323, July 2005.
- Pack, Howard, and Kamal Saggi, "Is There a Case for Industrial Policy? A Critical Survey," *The World Bank Research Observer*, 21(2), 2006, 267–297.
- Rodríguez, Francisco, "Cleaning Up the Kitchen Sink: On the Consequences of the Linearity Assumption for Cross-Country Growth Empirics," Wesleyan University, Department of Economics, Working Paper 2006-004, 2006.
- Rodriguez-Clare, Andres, and Peter J. Klenow, "Externalities and Growth," *Handbook of Economic Growth*, Vol. 1A, P. Aghion and S. Durlauf, eds., North-Holland, 2005, 817–86.
- Rodrik, Dani, "Industrial Policies for the Twenty-First Century," John F. Kennedy School of Government, Harvard University, September 2004.
- , "Getting Interventions Right: How South Korea and Taiwan Grew Rich," *Economic Policy* 20, 1995.
- , "Coordination Failures and Government Policy: A Model with Applications to East Asia and Eastern Europe," *Journal of International Economics* 40 (1-2), February 1996, 1–22.
- , "What's So Special About China's Exports?" *China & World Economy*, 14 (5), September-October, 2006, 1–19. (2006a)
- , "Understanding South Africa's Economic Puzzles," John F. Kennedy School of Government, Harvard University, August 2006. (2006b)
- , "The Real Exchange Rate and Economic Growth: Theory and Evidence," John F. Kennedy School of Government, Harvard University, July 2007. (2007)
- Romer, Paul M, "Implementing a National Technology Strategy with Self-Organizing Industry Investment Boards," *Brookings Papers on Economic Activity*, 1993: 2.
- Shaban, Radwan, "Testing Between Competing Models of Sharecropping," *Journal of Political Economy*, Vol. 95, 1987, pp. 893–920.
- Sohal, Amrik S., and Bill Ferme, "An Analysis of the South Korean Automotive, Shipbuilding and Steel Industries," *Benchmarking: An International Journal*, 3(2), 1996, 15–30.

- Sutton, John, "The Auto-component Supply Chain in China and India: A Benchmark Study," in Francois Bourguignon and Boris Pleskovic, eds., *Annual Bank Conference on Development Economics 2005: Lessons of Experience*, Washington D.C., World Bank, 2005.
- Udry, Christopher, "Gender, Agricultural Productivity and the Theory of the Household," *Journal of Political Economy* 104, 1996, pp. 1010–1046.
- UNCTAD, *A Case Study of the Salmon Industry in Chile*, New York and Geneva, 2006.
- Wolf, Martin, "The Growth of Nations," *Financial Times*, July 21, 2007.
- World Bank, *The East Asian Miracle*, Washington, D.C.: The World Bank, 1993.
- , *Assessing World Bank Support for Trade 1987-2004: An IEG Evaluation*, Washington, D.C.: The World Bank, 2006.
- World Trade Organization, "Trade Policy Review El Salvador—Report by the Secretariat," WT/TPR/S/111, Geneva, January 6, 2003.

Eco-Audit

Environmental Benefits Statement

The Commission on Growth and Development is committed to preserving endangered forests and natural resources. The World Bank's Office of the Publisher has chosen to print these Working Papers on 100 percent postconsumer recycled paper, processed chlorine free, in accordance with the recommended standards for paper usage set by Green Press Initiative—a nonprofit program supporting publishers in using fiber that is not sourced from endangered forests. For more information, visit www.greenpressinitiative.org.

The printing of all the Working Papers in this Series on recycled paper saved the following:

Trees*	Solid Waste	Water	Net Greenhouse Gases	Total Energy
48	2,247	17,500	4,216	33 mil.
*40 inches in height and 6–8 inches in diameter	Pounds	Gallons	Pounds CO ₂ Equivalent	BTUs



The Commission on Growth and Development Working Paper Series

1. *Perspectives on Growth: A Political-Economic Framework (Lessons from the Singapore Experience)*, by Tan Yin Ying, Alvin Eng, and Edward Robinson, March 2008
2. *Exchange Rate Economics*, by John Williamson, March 2008
3. *Normalizing Industrial Policy*, by Dani Rodrik, March 2008
4. *The Real Exchange Rate and Economic Growth*, by Barry Eichengreen, March 2008
5. *Globalization, Growth, and Distribution: Framing the Questions*, by Ravi Kanbur, March 2008

Forthcoming Papers in the Series:

Growth Strategies and Dynamics: Insights from Country Experiences, by Mohamed A. El-Erian and Michael Spence (March 2008)

Political Competition, Policy Making, and the Quality of Public Policies in Costa Rica, by Fabrice Lehoucq (April 2008)

The theoretical case for industrial policy is a strong one. The market failures that industrial policies target—in markets for credit, labor, products, and knowledge—have long been at the core of what development economists study. The conventional case against industrial policy rests on practical difficulties with its implementation. Even though the issues could in principle be settled by empirical evidence, the evidence to date remains uninformative. Moreover, the conceptual difficulties involved in statistical inference in this area are so great that it is hard to see how statistical evidence could ever yield a convincing verdict. A review of industrial policy in three non-Asian settings—El Salvador, Uruguay, and South Africa—highlights the extensive amount of industrial policy that is already being carried out and frames the need for industrial policy in the specific circumstances of individual countries. The traditional informational and bureaucratic constraints on the exercise of industrial policy are not givens; they can be molded and rendered less binding through appropriate institutional design. Three key design attributes that industrial policy must possess are embeddedness, carrots-and-sticks, and accountability.

Dani Rodrik, *Professor of International Political Economy, John F. Kennedy School of Government, Harvard University*

Commission on Growth and Development

Montek Ahluwalia
Edmar Bacha
Dr. Boediono
Lord John Browne
Kemal Derviş
Alejandro Foxley
Goh Chok Tong
Han Duck-soo
Danuta Hübner
Carin Jämtin
Pedro-Pablo Kuczynski
Danny Leipziger, *Vice Chair*
Trevor Manuel
Mahmoud Mohieldin
Ngozi N. Okonjo-Iweala
Robert Rubin
Robert Solow
Michael Spence, *Chair*
Sir K. Dwight Venner
Ernesto Zedillo
Zhou Xiaochuan

The mandate of the Commission on Growth and Development is to gather the best understanding there is about the policies and strategies that underlie rapid economic growth and poverty reduction.

The Commission's audience is the leaders of developing countries. The Commission is supported by the governments of Australia, Sweden, the Netherlands, and United Kingdom, The William and Flora Hewlett Foundation, and The World Bank Group.



Dutch Ministry of Foreign Affairs



www.growthcommission.org
contactinfo@growthcommission.org