ANDRÉS RODRÍGUEZ-CLARE

# Coordination Failures, Clusters, and Microeconomic Interventions

The failure of market-oriented reforms to generate high and sustained growth in Latin America has led to the widespread agreement that such reforms should be complemented by other policies.[1] The strategies to complement market-oriented reforms fall into three categories: macroeconomic policies to reduce the region's high vulnerability to crises; institutional and microeconomic reforms to improve the business climate and provide better foundations for growth; and microeconomic or competitiveness policies that include a broad range of government interventions to allow markets, sectors, and companies to take advantage of the opportunities afforded by market-oriented reforms. This paper focuses on the third strategy, which I henceforth refer to as one of microeconomic interventions.

Countries have engaged microeconomic interventions for decades. Since the switch to outward-oriented development strategies in the mid-1980s, the main such interventions have been aimed at promoting exports, attracting foreign direct investment (FDI), and supporting small and medium-sized enterprises (SMEs). Another strategy that is receiving renewed interest is promoting innovation.[2] These types of microeconomic intervention enjoy wide support and are encouraged by international institutions such as the World Bank and the Inter-American Development Bank.

But the conceptual and empirical foundation for some of these interventions is not as solid as many people believe.[3] For instance, it is hard to find a convincing

Rodríguez-Clare is with Pennsylvania State University.

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1. Stiglitz (1998); Williamson (2003).
2. IDB (2001); de Ferranti and others (2003).
3. See the discussion in Rodríguez-Clare (2004).

theoretical argument in favor of policies to support SMEs. On the contrary, recent research suggests that such policies may have significant negative effects on aggregate productivity under some circumstances.[4] Empirical research also fails to find evidence for the positive externalities from exports and FDI that form the basis for policies to promote these activities.

A more effective set of microeconomic interventions should specifically address the market failures that are important in the development process. Recent research suggests two kinds of market failures that may seriously hamper development. The first is related to externalities in the entrepreneurial process of discovering new profitable investment opportunities.[5] The second is associated with coordination failures in taking the necessary actions to increase sectorwide productivity. This paper explores the latter market failures, their relation to clusters and agglomeration economies, and the set of microeconomic interventions that could be followed to deal with them.

The paper is organized as follows. The next section introduces the notion of coordination failures, their relevance to developing countries, and the circumstances under which they occur. The following section then argues that clusters can be seen as agglomerations of firms and organizations in related economic activities among which coordination failures are likely to arise. In other words, clusters provide opportunities for microeconomic interventions that promote coordination and collective action to improve productivity. The paper goes on to explain that although one may alternatively think of clusters as resulting from agglomeration economies, the notion of coordination failures is more useful for deriving appropriate policies to encourage clustering.

I explore this issue formally in a subsequent section, which presents a model of a small economy that is plagued by sector- or cluster-specific coordination failures. This section shows that, rather than trying to reallocate resources toward sectors that are seen as offering high clustering possibilities (as is the case with import substitution), policy should aim at fostering cooperation in sectors in which the economy is already showing comparative advantage.

Next, I discuss a particular application of these ideas to innovation policy. I argue that general policies to increase innovation across the board are likely to be inferior to policies that take the more selective approach of trying to induce the development of innovation clusters in areas of comparative advantage. Finally, I offer some suggestions on how these ideas about coordination failures

4. Guner, Ventura, and Yi (2005).
5. Hausmann and Rodrik (2003).

and clusters can form the basis for a set of effective microeconomic interventions for middle-income countries.

## Coordination Failures

A firm's productivity depends not only on its own efforts and abilities and on general economic conditions (such as the macroeconomic environment and the legal system), but also on the actions of other firms, infrastructure, and regulation and other public goods. The problem is that the provision of these inputs and services is plagued by market failures as a result of economies of scale, thick market effects, knowledge spillovers, and other problems of nonexcludability. A vast literature explores these market failures, which often give rise to a multiplicity of equilibria. Rosenstein-Rodan argues that investment by one firm can have a positive effect on the profitability of investment by other firms, because higher investment leads to an increase in aggregate demand, which under economies of scale raises the profitability of investment elsewhere in the economy.[6] Multiple equilibria are possible in these circumstances: namely, a low-investment and a high-investment equilibrium. Everybody would be better off at the high-investment equilibrium, but market forces do not take an economy from the low-investment to the high-investment equilibrium. Some kind of coordination is required to move from the bad to the good equilibrium. Thus, when an economy is in the bad equilibrium, it is experiencing a coordination failure.

Interdependencies among economic agents frequently lead to coordination failures. Hoff surveys this literature and discusses policy implications in areas ranging from corruption to legal reform and the environment.[7] Here I am interested in a more narrow set of cases in which coordination failures affect productivity in economies that are otherwise identical in terms of their institutions and macroeconomic conditions. This is particularly relevant to the formulation of effective competitiveness strategies for countries, such as those in Latin America, that have significantly improved their institutions and macroeconomic environment and yet have failed to experience significant growth accelerations.

6. Rosenstein-Rodan (1943). See Murphy, Shleifer, and Vishny (1989) for a modern formalization.

7. Hoff (2001).

Coordination failures are usually formalized in a model with multiplicity of equilibria, where one equilibrium Pareto dominates the others. In this case, if an economy fails to coordinate expectations to achieve the best equilibrium, it is said to experience a coordination failure. Coordination failures may occur even in the absence of multiple equilibria, however, because some activities might never be profitably provided by firms. The classic example is a public good, which suffers from a problem of nonexcludability: the provider cannot exclude anyone from enjoying the benefits of this good. In this case, there is no equilibrium in which the market delivers this good. This is one of the classic justifications for government action. My point, however, is that if the government is seen as another agent (with the distinction that it has access to taxation), then an equilibrium in which the government does not deliver a socially profitable public good is characterized by a coordination failure.[8]

The following paragraphs discuss models in which economies of scale, thick market effects, knowledge spillovers, and other problems of nonexcludability give rise to coordination failures.

### *Economies of Scale and Thick Market Effects*

Economies of scale lead to all kinds of market failures. This section presents an example of how they can lead to coordination failures. I then discuss how similar effects arise under thick market effects.

When economies of scale are present in the production of inputs, one can easily arrive at a formalization of Adam Smith's proposition that the division of labor is limited by the extent of the market. The simplest formalization of this idea relies on three assumptions: benefits from specialization or division of labor among input suppliers, economies of scale in the production of intermediate goods, and gains from the proximity of suppliers and users of such goods. Consider the extreme case of nontradable intermediate goods (for example, producer services such as consulting, machine repair, accounting, or insurance) that are produced with increasing returns. Given benefits from specialization, so that firms using these intermediate goods benefit when such goods become more specialized, there will be economies of scale at the aggregate industrywide level.[9] The industry expansion creates room for increased

8. This case, in which the coordination failure involves the government, is usually called a government failure.

9. The presence of such benefits of specialization is usually captured formally by assuming a production function that exhibits love of variety for inputs. See Ethier (1982); Romer (1990).

specialization among intermediate goods producers, which leads to higher productivity in the industry.[10]

The problem with this story is that it suggests that simple industry agglomeration (that is, increasing industry size in a single location) is enough to generate the benefits of increased specialization. This may not be so automatic. Imagine that a good can be produced with two technologies: a backward technology that is labor intensive and a modern technology that is intensive in specialized intermediate goods. This creates multiple equilibria. If all firms use the backward technology, the market for inputs will be small and hence only a few inputs will be specialized, making the modern technology uncompetitive. If firms use the modern technology, however, the market for inputs will be large, which will create incentives for many firms to enter into production of specialized inputs. As a result, a wide variety of inputs will be specialized, and this will make it profitable to use the modern technology.[11]

If intermediate goods could be traded at no cost, then the productivity of firms that rely on such inputs would not be affected by their local availability. Thus, a key assumption in the previous argument is that having to rely on suppliers that are far away implies significant transportation costs or other costs.[12] One obvious nontradable input is labor. In this case, coordination failures can arise between workers thinking about investing in training and firms thinking about investing in technologies that require trained workers. The bad equilibrium is characterized by low productivity, which results when the lack of specialized workers pushes firms to adopt backward, less productive technologies. Here, multiple equilibria arise not from economies of scale, but from thick market effects related to search costs. Acemoglu formalizes this idea.[13] In his model, firms can choose to invest in modern technology and workers can choose to invest in training. The training is useful only with the modern technology, which in turn conveys higher productivity only if operated by a trained worker. Although a firm can contract with a worker so that they both invest in training

10. Economies of scale are essential for this story. If intermediate goods were not produced with increasing returns, then there would be no limits to specialization: all input varieties could be produced irrespective of demand.

11. See Rodríguez-Clare (1996); Rodrik (1996a).

12. The relevance of high transportation costs is clear for producer services (see Rodríguez-Clare, 1997). For other inputs, Steinberg (2002) shows that even for a very open and small economy such as Singapore, domestic demand drives domestic production for tradable inputs, something that is at odds with a frictionless world. Porter (1990) presents many arguments for why transportation costs, broadly conceived, may be high for intermediate goods.

13. Acemoglu (1997).

and technology and then split the realized surplus, a problem arises because of the risk of separation. Should that occur, the firm would have to look for a trained worker, and the trained worker would have to look for a job in a firm with modern technology. Given search costs, however, a productive match may not materialize, in which case both the firm and the worker will have lost their investment. There are multiple equilibria. In the bad equilibrium, firms and workers do not invest, so it is not profitable for any firm-worker pair to invest, because their investment is very likely to be wasted if separation occurs. In the good equilibrium, thick market effects are such that firms and workers do not care about separation, because they are very likely to be properly matched with modern firms or trained workers despite search costs.[14]

Another obvious nontradable input is infrastructure. As shown by Murphy, Shleifer, and Vishny, two types of market failure are related to investment in infrastructure.[15] The first is the classic problem of the monopolist who introduces a good to the economy but cannot appropriate the whole consumer and producer surplus generated. Even though it would be socially optimal for the good to be introduced (or, for our purposes, for the infrastructure project to be undertaken), the investor's profits do not compensate for the related setup and fixed costs. The second type of market failure involves the possibility of multiple equilibria once the infrastructure project is built, with the bad (good) equilibrium characterized by low (high) demand for the infrastructure project. Under some conditions, profits from undertaking the project are negative if the bad equilibrium prevails, and positive otherwise. A cautious investor may choose not to invest, even though it would be socially optimal for the investment to take place and for coordination to take the economy to the good equilibrium.

### *Knowledge Spillovers and Other Problems of Nonexcludability*

Whether knowledge is accumulated through learning by doing, purposeful research and development (R&D), or other means, it will probably spill over and benefit other firms. Abundant evidence shows that such knowledge spillovers

14. A similar idea is proposed by Marshall (1920), who points to three sources of externalities that could give rise to industry-level agglomeration: knowledge spillovers, input sharing, and labor market pooling. Krugman (1991a) formalizes the idea of labor market pooling by showing how it generates externalities because a larger industry concentrated in one location allows workers to specialize on the skills that are specific to that industry, thus generating a greater division of labor and higher productivity.

15. Murphy, Shleifer, and Vishny (1989).

are important.[16] If such spillovers occur between two firms, then they are likely to find a way to internalize the externalities and solve the market failure. The problem arises when many firms are involved. To see how such diffuse knowledge spillovers can generate coordination failures, imagine that firms can choose to produce with two technologies. The backward technology yields one unit of output, whereas the modern technology—which requires an investment in knowledge that costs $C$—yields output $An$, where $n$ is the proportion of firms that choose the modern technology. This is where spillovers enter the picture: the decisions of other firms to adopt the modern technology and invest in knowledge affect any individual firm's productivity with the modern technology. If $A - C > 1$, then there are multiple equilibria: one in which no firm invests in the modern technology and another in which all firms do. Specifically, if $n = 0$, then net output with the modern technology is $-C$, which is clearly lower than with the backward technology. If $n = 1$, then net output with the modern technology is $A - C$, which is higher than net output with the backward technology.

The market failure generated by knowledge spillovers arises because the benefit from investing in knowledge is nonexcludable. A firm cannot prevent another from benefiting from the knowledge it generates. As discussed above, spillovers may lead to coordination failures even in the absence of multiple equilibria. Consider again the previous example, but now assume that firms benefit from such spillovers even if they use the backward technology. In other words, only the modern technology generates knowledge spillovers, but even firms using the backward technology benefit from such spillovers. In particular, when output with the backward technology is $1 + An$, then the only equilibrium is $n = 0$. The case of $n = 1$ is no longer an equilibrium, since in that case net output with the modern technology is $A - C$, whereas net output with the backward technology is $1 + A$. A coordination failure occurs even without multiple equilibria, however, since everybody would be better off with $n = 1$.

The more standard example of nonexcludability problems is the case of public goods. For example, imagine an export industry in which firms can produce low-quality or high-quality goods, and foreign consumers cannot differentiate among exporting firms. In other words, the industry features a country brand, and firms cannot create their own firm-specific brand.[17] Under such circumstances, it would be impossible to sustain a situation in which all firms invest

16. Audretsch and Feldman (2003).

17. Company brands do exist in the real world, but they are inevitably linked to a country brand. This was the case of cars made in Japan in the 1960s and 1970s.

in producing high-quality goods, since every firm would have an incentive to deviate and produce low-quality goods, thereby getting the same revenue as other firms producing high-quality goods, but at a lower cost. One way to sustain high-quality production would be for the government to enforce a minimum quality standard, although there are surely many other ways around this problem (as long as they involve some collective action).[18] Another interesting example of this type of problem is Uruguay's efforts to eradicate hoof-and-mouth disease in cattle, which is a requirement for exporting beef to the United States. This case does not have an equilibrium in which individual firms spend the first-best level in prevention and eradication: an individual firm will always be tempted to spend a bit less because it captures the full savings, whereas the cost in higher risk of the disease is spread among all producers. In Uruguay, the government and industry were ultimately able to organize collective action, funding was secured from international financial institutions, and hoof-and-mouth disease was eradicated, with very significant gains to the industry and the country.

## Clusters

Coordination failures can happen at the economywide level or at the sector level. In Murphy, Shleifer, and Vishny's model, for example, the big push happens when several sectors in the economy simultaneously invest in modern technologies, thereby increasing aggregate demand and making such investments profitable.[19] Nonetheless, most of the examples of coordination failures presented above take place at a narrower level. For example, the case of economies of scale and benefits of specialization in the production of nontradable inputs presents multiple equilibria at the level of firms using a common set of inputs. This could occur in the textiles and apparel sector, the microelectronics sector, or something broader such as nontraditional agriculture. Another example centers on coordination failures involving investments in infrastructure. Murphy, Shleifer, and Vishny illustrate this point using railroad construction and overall industrialization across multiple sectors.[20] Examples that are more relevant for least-developed countries (LDCs) today and that apply at the sector

18. An interesting example of this is a regulation applied in Costa Rica that prohibited coffee producers from selling high-quality coffee domestically (see Rodríguez-Clare, 2003). The intention was to prevent producers from enjoying the high international price for Costa Rican coffee while selling the high-quality coffee domestically for a higher price than the competition.

19. Murphy, Shleifer, and Vishny (1989).

20. Murphy, Shleifer, and Vishny (1989).

level include the following: building an airport in a region that has no hotels would not lead to any traffic, but hotels may not be profitable without a regional airport; and a large-scale irrigation project would not be profitable if only a few farms use modern technologies, but using such technologies is profitable only if adequate irrigation is available. The case of human resources is similar: creating a university specialized in fashion design would not be reasonable in the absence of firms demanding such human resources, but firms may not evolve toward fashion design in the absence of specialized professionals.

As the above examples illustrate, the definition of a sector is not completely clear in terms of coordination failures at the sector level. The word is certainly not to be interpreted as an industry in the traditional sense of a group of firms engaged in the same activity. Several different industries share the use of some inputs, infrastructure, skilled workers, and knowledge. Moreover, the coordination required to reach the best outcome requires the participation of industries producing intermediate goods, as well as infrastructure providers (public or private), the government (for example, to provide the necessary regulation), training centers, universities, and so forth. Following common practice, I use the word *cluster* to refer to this collection of related industries and public and private agents.

One important issue regarding clusters is the geographic dimension. All the cases of coordination failures discussed above involve an element that makes it a local phenomenon: nontradable inputs, infrastructure, public goods, skilled workers, or knowledge.[21] I thus define a cluster as a group of related industries and agents located in the same region or country. This does not imply that the input-output relations and knowledge flows between a national or regional cluster and the rest of the world are unimportant. Nor does it suggest that such relations and flows should be restricted to strengthen local interactions. The point is rather that if a cluster is concentrated in one region, it makes sense to think of a regional strategy for achieving superior coordination in that cluster.

The argument so far is that economies of scale, thick market effects, knowledge spillovers, and public goods create the need for some kind of coordination among the participants of a cluster if they are to reach high levels of performance. At this point, readers may be thinking of examples of high-performing clusters in which there was no evident policy leading to coordination. What kind of collective action, it may be asked, was implemented in Silicon Valley

21. Many people believe that knowledge spreads easily and instantaneously across the globe, but evidence reveals that knowledge spillovers are mostly a local phenomenon (see Audretsch and Feldman, 2003).

or in the many examples of clusters provided in Michael Porter's book?[22] The answer is that government action or formal policy is not needed to achieve coordination. When there are multiple equilibria, optimistic entrepreneurs can spontaneously coordinate on the good equilibrium without any formal policy. Coordination can also be achieved through the strategic actions of a large player (such as a university or a multinational organization). For example, research has established that Stanford University was a key player in the emergence of the information-technology cluster in Silicon Valley.[23]

An alternative way to think about clusters is that they are the result of agglomeration economies, which lead to increasing productivity as a result of the geographic concentration of related industries. Agglomeration economies differ significantly from the concepts of coordination failures discussed above. The notion of agglomeration economies suggests that an increasing geographic concentration of related firms and industries necessarily leads to higher productivity, whereas the argument presented here is that such a geographic concentration offers only the possibility of higher productivity—a possibility that will only be realized through some kind of coordination.[24] The latter way of thinking about clusters may explain cases of geographic concentration of sectors that failed to experience significant agglomeration economies (for example, concentrations of footwear and textile producers). Perhaps these are cases of clusters that failed to achieve coordination.[25]

## Agglomeration Economies versus Coordination Failures

This section explores the different policy implications that emerge from agglomeration economies and coordination failures. According to standard models in development economics, market failures caused by economies of scale, thick market effects, and knowledge spillovers lead to agglomeration economies,

22. Porter (1990).

23. Saxenian (1994).

24. This does not mean that there is no relationship between the two concepts. Imagine a cluster in the bad equilibrium (that is, with coordination failure). Since it has low productivity, it may be small, with low wages and low dynamism. If the cluster solves some of the coordination failures and invests in key collective action, then it will increase productivity, and—as long as this entails some local advantages, as we have assumed—then this is likely to bring in more firms, both in the core industries and upstream and downstream. This will further increase productivity through pure agglomeration economies (if they exist) and through new opportunities for coordination (if they are realized), hence allowing the process to continue. The original solution of a coordination failure thus leads, to some extent, to agglomeration economies.

25. See Altenburg and Meyer-Stamer (1999).

which in turn are generally seen to justify policies that reallocate resources toward the sectors that exhibit such features.[26] This is a version of the infant-industry argument, which is usually formulated in the context of a model with two sectors that differ only by the fact that one sector (the "advanced" sector) exhibits agglomeration economies, while the other (the "traditional" sector) does not. In these circumstances, an economy may exhibit multiple equilibria: a low-income equilibrium with specialization in the traditional sector and a high-income equilibrium with specialization in the advanced sector. Specifically, if the economy specializes in the traditional sector, the absence of any resources devoted to the advanced sector prevents the economy from reaping any agglomeration economies there. Low productivity in the advanced good would then lead to a comparative advantage in the traditional sector, thereby trapping the economy in specialization in this sector. If the economy specializes in the advanced good, however, it reaps the benefits of agglomeration economies and achieves a comparative advantage in the advanced good. In this context, a policy of import substitution could lead an economy stuck in the low-income equilibrium toward the high-income equilibrium. This happens because import substitution encourages a reallocation of resources from the traditional to the advanced sector, allowing the economy to benefit from the higher productivity associated with clustering in this sector.

There are two problems with this story. The first problem is that developed countries have probably already reaped the benefits of agglomeration economies in the advanced sector. International prices for this good will thus be low, reflecting the high productivity associated with the realization of agglomeration economies in rich countries. From the point of view of a small economy, specializing in an industry with strong agglomeration economies and a low international price is not superior to specializing in an industry with weak agglomeration economies and a high international price.[27]

The second problem with the story is that it assumes that production in the advanced sector always leads to clustering. This is not consistent with the experience of many countries that implemented import substitution and achieved expansions of their modern sectors without benefiting from agglomeration economies.[28] The explanation may lie in the fact that a good can be produced

26. Wade (1990); Amsden (1989).

27. See Rodríguez-Clare (forthcoming).

28. An alternative explanation is that protection failed because it was not accompanied by other policies to increase domestic competition (and thereby avoid complacency among protected companies) and encourage factor markets to respond to the needs of the protected sectors (see Lall, 2004).

in different ways, some of which may lead to agglomeration economies and some of which may not. Consider, for example, the case of agglomeration economies generated by knowledge spillovers. Recent evidence suggests that knowledge-intensive industries exhibit strong knowledge spillovers.[29] Based on the infant-industry argument, this suggests gains from inducing specialization in these industries. The problem with this argument is that knowledge intensity is not an immutable characteristic of an industry. The same good could be produced both in an LDC using a backward technology intensive in unskilled labor and in a developed country using a modern, skill-intensive technology with high R&D. In fact, this is central to the popular product cycle hypothesis, whereby goods are introduced in the Northern Hemisphere and then, after progressive standardization and simplification, are produced in the Southern Hemisphere. More generally, an industry can exhibit agglomeration economies in one place, but not in another; and it can exhibit agglomeration economies at a certain stage in its development, but not later. In other words, as Porter states, "what matters is not what a nation (location) competes in, but how."[30] Along the same lines, the World Bank convincingly pushes the argument that Latin American countries have achieved clusters, high productivity, and high growth in sectors that are intensive in natural resources, which traditionally have been regarded as sectors with low potential for agglomeration economies.[31]

If production in the advanced sector can take place using backward technologies or modes of production, then import substitution clearly does not necessarily lead to externalities and clustering. Instead, it could simply push resources toward what are regarded in rich countries as advanced sectors, which may be organized in ways that do not generate any externalities in LDCs.

This reasoning has broad implications. Not only import substitution, but also any other policy (even export promotion) that distorts prices so as to push resources into advanced sectors would face the same problem.[32] Instead of reallocating resources across sectors, policies should promote clustering in sectors that already show some comparative advantage. This implies that, as is generally accepted by proponents of cluster-based policies, governments should not try to

29. Audretsch and Feldman (2003).

30. Porter (1998, p. 249).

31. See de Ferranti, Perry, Lederman, and Maloney (2002).

32. Distorting prices to promote a cluster in a sector in which the country does not have a comparative advantage is likely to generate a lower welfare level than allocating resources to support specialization in a nonclustered sector that exhibits comparative advantage (see Rodríguez-Clare, forthcoming).

create clusters from scratch, but rather should focus on sectors that already exist and that offer the opportunity to benefit from clustering. It also implies that industrial policy is not about creating comparative advantage, but about achieving the high productivity that comes from clustering in sectors in which the country has a comparative advantage.[33]

## Coordination Failures and Comparative Advantage: A Model and Policy Implications

In the previous section, I argued that the simple notion of sector-specific agglomeration economies in a small economy is not appropriate for thinking about industrial policy. This section presents a model that is more useful for this purpose. The model deviates from the standard infant-industry model in two respects: first, international prices are determined in the north, and hence already reflect any benefits of agglomeration economies; and second, all sectors have clustering potential, but a sector can exist without realizing its clustering potential. Formally, the model assumes that all sectors can experience sector-specific coordination failures, although such coordination failures can vary in magnitude across sectors. I do not explicitly model the sources of coordination failures, both to keep the presentation simple and to allow me to focus on the consequences of such coordination failures rather than their causes.

### *The Model*

There are $J$ sectors (indexed by $j$) and two countries (indexed by $i$): North and South.[34] The model captures coordination in the simplest possible way by assuming that labor productivity is higher with coordination than without. In particular, productivity in sector $j$ in country $i$ is $\lambda_{ji}$ with coordination failure and

33. Some readers may be taken aback by the statement that industrial policy is not about creating comparative advantage, since it is often stated that this was precisely what East Asian countries did (Wade, 1990; Amsden, 1989). As I argue in Rodríguez-Clare (forthcoming), however, such policies are better interpreted as promoting clustering in sectors in which the country has a natural comparative advantage. Alternatively, Hausmann and Rodrik (2003) argue that industrial policy is about discovering rather than creating a country's comparative advantage.

34. Here I use the term *sector* rather than *cluster* because this is the standard terminology in this class of models. Below I revert to the use of the term *cluster,* which is more consistent with the notion of coordination failures as discussed above.

$\theta_j\lambda_{ji}$ if coordination is achieved. $\lambda_{ji}$ captures raw productivity, while $\theta_j - 1 > 0$ captures gains from coordination.[35]

A full model would specify the actions that bring about coordination and how coordination is part of equilibrium. In an earlier work, I construct a model in which sector-level coordination is the result of Marshallian economies associated with the use of modern technologies.[36] Here I simply assume that if the economy specializes in a sector, then there are two possible equilibria: one with coordination and one without coordination. If an economy is specialized in sector *j,* then an individual worker producing in sector *k* would not be able to achieve coordination, and that worker's productivity would be $\lambda_{ki}$. In other words, some level of agglomeration is required before coordination becomes a possibility.

Goods are ordered in such a way that South has a raw comparative advantage in low-indexed goods. That is, $\lambda_{jS}/\lambda_{jN}$ is decreasing in *j.* $\theta_j$ can vary across sectors, but I assume that $\lambda_{jS}/\theta_j\lambda_{jN}$ is decreasing in *j.* This implies that even if North has coordination in all sectors and South does not, South still has a comparative advantage in low-indexed goods. A sufficient condition for this is that $\theta_j$ be nondecreasing in *j.*

I focus on equilibria in which North has coordination in all sectors. Since South is small, international prices are simply the unit cost in North. I use labor in North as the numeraire, so such prices are given by $p_j^* = 1/\theta_j\lambda_{jN}$.

With regard to equilibria in South, the linearity assumptions of the model (namely, fixed international prices and the Ricardian production structure) imply a natural tendency for complete specialization. Consider a possible equilibrium with specialization in good *j.* For this to be an equilibrium, two conditions must be satisfied: the cost of good *j* must be equal to the international price, and producing an alternative good (with no coordination) must generate zero or negative profits. If *w* denotes the wage in South, the cost of good *j* in South is $w/\lambda_{jS}$ without coordination and $w/\theta_j\lambda_{jS}$ if coordination is achieved. Hence, specialization in good *j* without coordination is an equilibrium if $w/\lambda_{jS} = 1/\theta_j\lambda_{jN}$ and $w/\lambda_{kS} \geq 1/\theta_k\lambda_{kN}$ for all $k \neq j$. On the other hand, specialization in good *j* with coordination is an equilibrium if $w/\lambda_{jS} = 1/\lambda_{jN}$ and $w/\lambda_{kS} \geq 1/\theta_k\lambda_{kN}$ for all $k \neq j$. Given our assumptions above, then there are multiple equilibria: namely, an equilibrium with specialization in good 1 with coordination; a second

35. To simplify, I assume that either coordination is achieved fully or not at all. Also, the higher productivity that arises from coordination could be reflected either in a higher quantity produced with the same resources or in a higher quality of the good, which commands a higher international price.

36. Rodríguez-Clare (forthcoming).

equilibrium with specialization in good 1 without coordination; and finally a set of equilibria with specialization in good $k$ with coordination, as long as the following condition is satisfied:

$$\frac{\lambda_{1S} / \lambda_{1N}}{\lambda_{kS} / \lambda_{kN}} < \theta_1. \quad (1)$$

This simply states that for complete specialization in good $k$ with coordination to be an equilibrium, the comparative advantage in sector 1 relative to sector $k$ must not be too strong relative to the benefits of coordination in sector 1.

The reader may have expected condition 1 to be stated in terms of the benefits of coordination in sector $k$, rather than sector 1. Recall, however, that since there is coordination in North, the international price of good $k$ reflects productivity gains from coordination in that sector. Thus, it is not because the gains of coordination in $k$ more than compensate for the loss in relative productivity that specialization and coordination in sector $k$ can be an equilibrium. In fact, specialization with coordination in good $k$ can be an equilibrium even if $\theta_k = 1$, such that coordination in sector $k$ carries no benefits. Rather, when a single producer deviates from full specialization in sector $k$ to produce good 1, the result is a gain in relative productivity but a loss associated with the production of a good for which North has coordination and South does not. This loss is given by $\theta_1$. For specialization in $k$ to be an equilibrium, this loss must be greater than the benefits from higher relative productivity, as stated in condition 1.

How do the different equilibria rank in terms of the equilibrium wage in South? The best equilibrium is the one with coordination in good 1. If condition 1 is satisfied for $j = 1, \ldots, k$ then the wage is declining as the economy moves to equilibria with specialization in high-indexed goods (all of which entail coordination). This is because South has a lower relative productivity than North in high-indexed goods. The worst equilibrium is the only one without coordination, which entails specialization in good 1.

### *Policy Implications*

An important result of the model is that the ranking of equilibria does not depend on the benefits that can be attained with coordination: specialization with coordination in sectors with a high $\theta$ does not necessarily lead to high equilibrium wages. The reason for this is simply that a high $\theta$ raises productivity in North and lowers international prices. Thus, even if high-indexed goods were thought to entail high benefits of coordination (perhaps because of strong knowledge

externalities), this does not imply that South should push for specialization in these sectors.[37] Put simply, the goal of policy is not to reallocate resources toward sectors with large coordination benefits.

This last proposition can be stated more generally: policy should not strive to reallocate resources across sectors at all. Rather, the goal should be to induce coordination in the sectors in which the economy has revealed a comparative advantage. For example, if South is specialized in sector 1 without coordination, then policies such as import substitution that induce resources to move toward other sectors would only decrease the wage.[38] Of course, the wage would increase if policy were to move the economy from specialization in sector 1 to specialization in a sector $k$ satisfying condition 1 while simultaneously achieving coordination in that sector. This seems overly ambitious, however. Moreover, if government were able to induce coordination, it would be better to do so in sector 1, thereby reaching the highest possible wage.

Similarly, if condition 1 were satisfied for $k$ and South were specialized in sector $k$ with coordination, then inducing reallocation toward other sectors without simultaneously pushing for coordination would lead to lower wages. A general implication that emerges from the model is that import substitution—or any other policy that distorts prices to induce a reallocation of resources—will reduce welfare if unaccompanied by policies to induce coordination.

A somewhat less formal interpretation of the model suggests additional implications. Imagine an economy with institutions that allow it to achieve coordination. It is reasonable to expect such coordination to develop slowly, as coordination failures are identified and specific policies and agreements emerge to deal with them. Once coordination is achieved, however, the pattern of comparative advantage will evolve in response to changes in international prices and domestic endowments. Hence, at any point in time the economy is likely to find itself with coordination in a sector in which it does not enjoy the strongest comparative advantage.[39] Although the model shows that some interventions could increase the wage under these circumstances, it seems unreasonable to

37. For example, if condition 1 is not satisfied, then the wage would be lower with specialization and coordination in sector $k$ than with specialization but not coordination in sector 1.

38. This does not mean that the country will remain specialized in sector 1 forever. One would expect that coordination would be accompanied by innovation and factor accumulation that would lead to upgrading and a potential shift in comparative advantage toward more sophisticated goods.

39. If the structure of comparative advantage changes significantly, then condition 1 may cease to be satisfied for the sector in which the economy had previously achieved coordination. In that case, the economy would switch to the equilibrium with specialization in the sector with the strongest comparative advantage, but no coordination. At that point, it would again be necessary to promote coordination.

expect the government to be able to detect the new sectors in which the economy has the strongest comparative advantage and then induce the economy to specialize in these sectors and achieve coordination. Not only is this too much to ask of the government, but it may also be unnecessary since the coordination achieved in one sector should give producers some ability to adapt to changing circumstances, prices, preferences, and endowments.

Consider a country that has a comparative advantage in unskilled-labor-intensive textile processes. If producers in this sector achieve coordination, then the institutions that evolved to implement joint action may also serve to deal with the competitive challenge posed by increased exports from lower-wage countries. For instance, a public-private partnership in the textile sector may launch programs to train workers and implement regulation to certify quality, labor, and environmental standards, so that the sector can upgrade to higher-quality, more skill-intensive processes and thereby remain competitive at higher wages than emerging countries. In terms of the model above, the coordination achieved in one sector is transferred to another sector with a stronger comparative advantage.

Another case merits some discussion. If, for whatever reason (perhaps the consequences of an import substitution policy), a country ends up with specialization and coordination in a sector in which it doesn't have the strongest comparative advantage (but condition 1 is satisfied), then, according to the model above, the government could improve efficiency by pushing toward an equilibrium with specialization and coordination in good 1. This particular case, at least, appears to justify a policy of sectoral reallocation of factors of production toward new sectors in which the country has a stronger comparative advantage. This is not, however, a argument for a policy of picking winners. The most realistic scenario is that the sector in which the country has the strongest comparative advantage didn't disappear altogether, but simply shrank. Thus, a policy of promoting coordination in existing sectors should cover it as well. I discuss this point further in the last section.

In short, the general implication that emerges is that policy should strive to build and strengthen coordination in existing sectors and clusters rather than worry about the economy's pattern of specialization.

## Innovation Clusters

As stated above, plenty of evidence shows the existence of positive (local) externalities generated by innovation activities. This implies that the market

will lead to a lower-than-optimal investment level in this area; the coordination failure consists in producing the good without sufficient efforts aimed at innovation to improve productivity (including quality upgrading). Hence, there is a good rationale for policies aimed at increasing innovation. The problem, however, is that the standard approach to innovation policy is too timid and diffuse to generate a significant impact. It would be more effective for innovation policies to aim at solving cluster-specific coordination failures that lead to low innovation. The ultimate goal is to promote the development of clusters of innovation activity, or innovation clusters, around areas of comparative advantage.

As argued by Audretsch and Feldman, designing effective interventions in this area requires moving beyond the simple idea that innovation activities generate positive spillovers.[40] In particular, it requires a clear understanding of the types of innovation activities that generate such spillovers and the mechanisms through which they arise. While research on these issues is still in its infancy, a few conclusions appear robust.[41] The remainder of this section briefly discusses these conclusions and the related policy implications.

First, knowledge spillovers are attenuated by distance: firms that are close together benefit more from spillovers than firms that are far away. For large countries, this implies that a policy to promote innovation in firms that are located in remote or isolated regions would yield few benefits. Second, spillovers are strongest among firms that are engaged in similar or related activities. In a sense, knowledge spillovers are attenuated by the economic distance between firms. A reasonable conjecture is that concentrating innovation policies on a few sectors in which innovation activities appear relevant and feasible would be an effective strategy. Finally, spillovers depend on how innovation activities are undertaken and on the context in which they occur. In other words, innovation can occur in a manner that leads to only small spillovers. For example, smaller spillovers arise from research in corporations than from research in universities or specialized research centers.[42] The open and interactive innovation taking place in Silicon Valley is more conducive to spillovers than that occurring in Boston's Route 128, where innovation is carried out in R&D

40. Audretsch and Feldman (2003).

41. See Audretsch and Feldman (2003).

42. As stated by Audretsch and Feldman (2003), "The ability of research universities to create benefits for their local economies has created a new mission for research universities, and a developing literature examines the mechanism and the process of technology transfer from research universities" (p. 19).

departments within large corporations.[43] A policy to support innovation should strive to induce the kind of innovation prevalent in Silicon Valley, rather than on Boston's Route 128.

In sum, a policy that focuses on nurturing the development of innovation clusters around sectors in which the country has a comparative advantage will be more effective than a general policy aiming at increasing innovation across the board. This requires a sophisticated effort characterized by the selective support of innovation in certain areas, coordination of innovation projects with private sector organizations, and support of institutions such as universities and research centers, which appear to be essential components of innovation clusters. Altenburg and Mayer-Stamer argue that a realistic strategy for the promotion of innovation clusters should follow a step-by-step approach. The first step is to establish communication between firms and technology institutions. The second step is to "deal with the misunderstandings and conflicts that may arise as cooperation actually takes place; business associations may play an important role as moderators and facilitators in this respect." The final step is to establish "more ambitious cooperation projects and to consider founding new institutions, for instance in fields like technology extension, product and process R&D, logistics, and design."[44]

## Toward a Set of Effective Microeconomic Interventions

The main argument in this paper is that Latin America needs to shift away from the current set of microeconomic interventions, which often have no clear economic rationale, toward policies aimed at fostering coordination in existing clusters. This policy advice is less radical than the typical heterodox mantra that countries should strive to create comparative advantage in advanced sectors, but it is more interventionist and selective than the standard approach to competitiveness policies currently in fashion.

An alternative approach to industrial policy suggests that policy should aim to promote the discovery of activities in which the economy has a comparative advantage.[45] Although this approach differs considerably from the one I suggest in this paper, in some instances a lack of discovery might constitute a

43. Saxenian (1994).
44. Altenburg and Mayer-Stamer (1999).
45. Hausmann and Rodrik (2003).

cluster-specific coordination failure. This would be the case, for example, when investments are necessary to discover new export markets for current activities, or when research is needed to improve the quality of goods currently produced.

An appropriate set of microeconomic interventions should include both policies to induce discovery and policies to promote clustering. The mix of these two sets of policies should vary across countries according to their stage of development. Evidence presented by Imbs and Wacziarg reveals that growth is first associated with export diversification and later with increasing concentration.[46] This finding suggests that growth in the poorest countries is related to the discovery of activities in which the country has a strong comparative advantage.[47] Such countries should focus their attention on inducing self-discovery. In contrast, growth in more advanced countries is related to rising productivity, a process that is likely to be related to the development of innovation clusters.[48] These countries should focus on policies to promote coordination.[49] Hausmann and Rodrik explore policies to induce self-discovery.[50] In the rest of this section I focus on policies to induce clustering. Several issues merit additional discussion. The remainder of the section addresses the following: the identification of appropriate policies to promote clustering; whether specific sectors should be chosen for special support; the relationship between these policies and the industrial policy pursued in East Asia and Latin America since the 1960s; the appropriate mechanisms and institutions for carrying out these policies; and whether this strategy is realistic for Latin America.

### *Policies to Induce Clustering*

The specific policies that should be pursued to promote clustering depend on the particular coordination failures that affect a cluster. The variety of coordination failures implies a need for a broad set of instruments or policies. An exhaustive list is impossible. Here I present a list of examples to illustrate the type of instruments that may be appropriate.

46. Imbs and Wacziarg (2003).
47. Hausmann and Rodrik (2003).
48. See Porter (1990).
49. In principle, discovery could lead to concentration of exports in the newly discovered sectors, but this is very unlikely to occur because discovery of new export sectors would probably lead to an increased use of resources for exporting, rather than a withdrawal of resources from existing exporting sectors. Thus, in practice, discovery is likely to be associated with export diversification rather than concentration.
50. Hausmann and Rodrik (2003).

Export promotion would be appropriate in the case of insufficient investment in discovering new export markets. One approach entails pecuniary rewards to firms that discover new export markets, with the rewards varying in proportion to the total exports in these new markets performed by other local firms.[51] Regulation to enforce improved quality standards may be necessary in cases of imperfect information or externalities. Investment complementarities may justify public investment in specific infrastructure projects, such as a regional airport geared toward exploiting tourism opportunities or irrigation projects for modern agriculture. Attracting FDI may be an effective way to bring in foreign technology, to increase the quality of domestic suppliers through backward linkages, or even to induce local production of an advanced intermediate good by a foreign firm.

Scholarships for studies abroad in areas deemed important for the growth and diversification of a cluster would be appropriate when thin markets prevent individuals from making such investments. Alternatively, if the lack of local educational centers results from coordination failures caused by investment complementarities, the appropriate response may entail grants for the creation of training institutes or specialized centers of higher education. A related issue is the need to coordinate the supply and demand of specialized human resources, a process in which the organized private sector should play a key role. As stated by Altenburg and Meyer-Stamer, "Business associations may play an important role in organizing sector exchange between firms and training institutions. In particular, they can make sure that training institutions offer the kind of qualification that firms need most."[52]

Finally, when coordination failures lead to low levels of research and innovation in a cluster, appropriate policies might include grants for innovative projects proposed by single firms or entrepreneurs, prizes to innovative firms, grants for research projects proposed by organized producers and performed by local research centers, and technical assistance to support long-term collaborative strategies for education and research between business associations and universities. The ultimate goal, as mentioned above, is to promote the development of innovation clusters.

Governments cannot reasonably be expected to identify the coordination failures affecting different sectors or clusters. A more realistic approach is to invite sector and cluster organizations to present well-justified proposals for

51. I thank Ernesto Stein for proposing this idea.
52. Altenburg and Meyer-Stamer (1999).

government support. A common reaction here is that cluster organizations should be able to solve coordination failures without government support. This implicitly assumes, however, that cluster organizations effectively represent the whole cluster and that they can mobilize support from all the cluster participants to solve a coordination failure. This is clearly unrealistic. A reasonable compromise is for government and private organizations to share the cost of policies; a system of matching grants, selected through a competitive process, may be a simple and transparent way to achieve this.

As with more specific interventions in promoting innovation and coordinating supply and demand of specialized human resources, this requires strong and constructive participation from the organized private sector. Here again, it is instructive to reproduce the practical advice of Altenburg and Meyer-Stamer: "To meet the demands of globalized competition, intra-firm efforts are not sufficient. The business sector has to be able to organize collective action for self-help, and it must be able to articulate its demands vis-à-vis political actors. This places great demands on business associations, in terms of both service provision and lobbying. It implies a fundamental upgrading process and the creation of a learning organization. Key features are a professionalization of business associations (for example, employing more and better qualified professionals) and the implementation of mechanisms to ensure ongoing organizational development."[53] Perhaps the government should provide support to different sectors that want to improve their level of organization.[54] This would be the first line of action in countries where the private sector organizations are weak or are designed for rent seeking or confrontation rather than constructive work.

Innovation in the Uruguayan rice sector offers a good example of a successful policy of collaboration between the public and private sectors.[55] A key player in the case is the Uruguayan agricultural research institute (INIA), created by law in 1990.[56] In the 1990s, INIA developed new rice seeds that

53. Altenburg and Meyer-Stamer (1999).

54. An interesting example of such support is the program implemented by the Inter-American Development Bank's Multilateral Investment Fund (MIF) in Costa Rica to strengthen the country's association of software producers through its program Pro-Software, launched in 1999 with the support of Costa Rica's export promotion board. The aim of such a program was precisely to create the capacities in this association to undertake collaborative projects in such areas as improving education, upgrading quality, and exporting.

55. This example is adapted from Hausmann, Rodríguez-Clare, and Rodrik (2005).

56. Although INIA is a public institution, it operates outside the sphere of the state, which gives it much more flexibility.

are adapted to Uruguay's soil and climatic conditions, allowing productivity and exports to grow at a dramatic pace: productivity reached 6,400 kilograms per hectare in 2000, one of the highest rates in the world, with 96 percent of the seed used being of national origin. Today, INIA's rice program, which is carried out in experimental stations in several parts of the country, includes studies to identify and treat plagues (biotechnology), projects to improve irrigation systems and planting methods, and the continuous evaluation of pesticides and fertilizers. Many of these projects feature close interaction and collaboration with Uruguayan and regional universities, as well as strong coordination with private sector associations.

### *Targeting Specific Sectors*

The strategy specified above may be approached in two different ways. The more cautious or conservative approach entails a neutral process whereby different sector and cluster organizations compete for government support through proposals. An interesting example is the R&D matching grant system (FRC, by its Spanish acronym) launched by the Ministry of Science and Technology in Costa Rica in 2000.[57] The system has received about U.S.$1.3 million a year since it was launched. The yearly selection of projects takes place in two phases. In the first phase, individual firms and industry associations submit proposals for evaluation by the ministry, based on their quality, clarity of objectives, justification of the sector's technological need, the promised financial contribution, creativity and novelty of the proposal, and the potential impact of the technology on the environment and the country's economy. Qualifying projects are assigned a contribution share according to their perceived externality. In the second phase, certified research units present offers for the projects that qualified in the first phase. The winning offer is selected according to quality and price criteria. At the end of the second phase, the ministry issues a list of projects identifying the assigned research unit, the total cost, and the percentage of the cost that the government promises to pay. The production unit or association that presented the proposal must then place its share of the cost in a trust fund, after which the government makes its contribution to the trust fund and the project starts. The ministry monitors the projects periodically to ensure that the resources are spent according to the plan and to evaluate the results.[58]

57. The FRC's methodology and other details can be found at www.conicit.go.cr.
58. For a broader discussion, see Rodríguez-Clare (2003).

The second, more aggressive approach entails the government picking certain sectors for more intensive support. For example, the government may select a small number of clusters that would receive special support for strengthening their organization, studying their specific problems, identifying coordination failures, and implementing simultaneous interventions in different areas.

Chile's recent launching of a program to coordinate its multiple actions to support innovation provides an interesting setting for analyzing which approach is the correct one. The *Chile Innova* program appears to favor the second, more aggressive approach to microeconomic interventions, despite Chile's reputation for pursuing an orthodox approach to economic policy. The documentation for the loan that Chile received from the Inter-American Development Bank for this program states that "an appropriate technological policy must combine instruments that offer general promotion and technological development (the horizontal dimension of technological policy) with specific strategies aimed at stimulating areas that are pillars of the country's productive and competitive development. . . . Therefore, existing horizontal technological, and productive policy instruments must be complemented and enhanced, and even replaced. A set of areas where competitive advantages can be created or expanded must be identified and defined. Once these have been identified, medium- and long-term productive and technological development programs must be designed along these lines."[59] *Chile Innova* conducts prospective studies to identify economic activities that present the greatest competitive potential in the medium term. The program's website claims that the goal of these studies is to foresee the activities that offer the best prospects, and that this knowledge is necessary to optimize decisions about public-private investments.[60] The prospective studies are based on consultations with the main actors involved in each area, including government, the private sector, the academic community, workers, and civil society.

These statements can be interpreted in a number of ways. One possibility is to focus on the phrase stating that "a set of areas where competitive advantages can be created . . . must be identified." As I argued earlier, this is an incorrect approach: it is not necessary to pick or create winners. Instead, policy should center on clusters that are revealed winners in the sense of having a comparative advantage.

A second interpretation is that a selective approach may be desirable and even necessary given the existence of several activities with a comparative

59. IDB (2000).
60. See www.innovacion.cl.

advantage. To simplify the exposition and make the main point as clearly as possible, the model presented earlier used a set of assumptions that led to complete specialization in a single sector. Clearly, this is not realistic. A free-trade equilibrium may entail specialization in several sectors—for example, as the result of the existence of specific factors or strict concavity in the production possibilities set. The conclusion of the model carries through in the sense that policy should focus on promoting coordination in these sectors, rather than inducing resources to reallocate to other, supposedly more advanced sectors. This raises the issue of choosing among proposals for collective action in the different active sectors. Even a neutral competitive process in which sectors present proposals for collective action and government support ultimately leads to a choice of which proposals to support. Collective action in a cluster can be seen as an investment that raises productivity and hence increases the rewards for factors employed in that cluster. At least in principle, one could calculate a social return for such an investment, and the obvious approach would then be to invest in the proposals that entail the highest social returns. The problem, of course, is that calculating such social returns is very difficult. One way to interpret prospective studies is as a mechanism to facilitate this calculation.

An alternative interpretation of prospective studies, which is also consistent with the framework presented in the previous sections, is that identifying coordination failures and areas for collective action, especially in learning and innovation, is too difficult and complex for business organizations to do on their own. The government may need to support the private sector at this stage, so that they conceive solid proposals that later compete for government support. This implies establishing three levels of support for the private sector: for starting or strengthening sector organizations, for the design of clustering strategies that would then be subject to competition, and for strategy implementation (should the strategy be chosen for support).

### *Microeconomic Interventions and Industrial Policy*

A natural question at this point is whether the proposed strategy is a new version of the industrial policy pursued in East Asia and Latin America since the 1960s. This is important because, although there is some disagreement, most economists believe that the industrial policy pursued in Latin America in the 1960s and 1970s failed.[61] Recent empirical research even calls into question the effectiveness of industrial policies pursued in East Asia, which are generally considered

61. Krueger (1993). For another viewpoint, see Rodrik (1996b).

successful by revisionist observers.[62] Thus, the question arises as to whether the proposed strategy is doomed to fail, just as previous attempts apparently failed.

Noland and Pack survey a series of studies showing that, contrary to popular belief, industrial policy in East Asia was not successful in supporting high-growth sectors.[63] The sectors that received the most support in terms of subsidies, tax breaks, and protection in Japan, Korea, and Taiwan were not the sectors that later registered the highest growth. This evidence provides further support for valid skepticism regarding policies that attempt to pick winners. Such policies, however, are very different from the kind of strategy discussed in this paper. As emphasized above, the government does not need to distort prices so as to reallocate resources toward certain sectors, because the strategy would be implemented in sectors exhibiting comparative advantage. Moreover, distorting prices is likely to reduce welfare even in the presence of externalities and clustering.[64] Instead of relying on import tariffs, export subsidies, and other tax breaks and fiscal incentives, the proposal calls for the implementation of policies based on fixed grants, infrastructure investments, and sector-specific regulatory reforms aimed at promoting clustering. To the extent that the current proposal is a sort of industrial policy, it is a soft policy, rather than the hard industrial policy implemented in previous decades, which entailed distorting prices so as to reallocate resources to certain sectors and thereby generate a new pattern of comparative advantage. This is important not only because today's international trade rules do not permit many of these hard policies, but also because soft policies are likely to be more transparent and less costly.[65]

### *Mechanisms and Institutions*

This paper has argued that given numerous market failures, coordination and collective action within clusters of economic activity can raise productivity. Business associations must play an active role in the process, because the government is not likely to have the specific information to identify the areas

62. See Noland and Pack (2003). For the revisionist perspective, see Amsden (1989) and Wade (1990).

63. Noland and Pack (2003).

64. Rodríguez-Clare (forthcoming).

65. This policy advice implies doing away with the main hard industrial policy of the last two decades in many Latin American countries (mainly Mexico, Central America, and the Caribbean)—namely, export-processing zones. This is something that countries have to do anyway as part of their commitments to the World Trade Organization (WTO).

in which collective action would be useful. One approach would be for the government to create a mechanism where business associations representing different clusters would submit proposals that identify areas for collective action and public support. The different proposals would be reviewed by a panel of experts, who would rank them according to the estimated social return for the public investment. Finally, the best projects would be selected for support.

As with any process, the quality of the results depends on the incentives and capacity of the participants. Business associations that are weak or are created for rent seeking and confrontation would clearly derail the process. A so-called panel of experts that is actually a group of political appointees would lead to waste and perhaps even corruption. Making the mechanism work appropriately entails strengthening business associations and filling the panel with people who have a reputation at stake.

An additional challenge is this: even private participants in the cluster may find it hard to identify the areas in which collective action would have the highest payoff. Similarly, the panel of experts may have difficulty evaluating the different proposals and ranking them according to their social returns. The experience of northern European countries suggests that prospective studies can help identify opportunities for investment with high social returns.[66] Such studies may also serve to identify areas in which collective action may be particularly profitable. Governments could then use grants and technical assistance to encourage the relevant clusters to prepare proposals that would participate in the competitive mechanism described above.

Several of the actions needed to deal with coordination failures involve public institutions, such as export promotion agencies, training institutions, and public research centers. The proper operation of the whole strategy thus depends on the appropriate functioning of these institutions. Developing countries clearly have much work to do in this area, but examples of public and semipublic agencies that have achieved positive results include the National Bank for Economic and Social Development (BNDES) in Brazil, the Production Development Corporation (CORFO) in Chile, the Foreign Trade Bank (BANCOLDEX) in Colombia, the Coalition for Development Initiatives (CINDE) in Costa Rica, and *Nacional Financiera* (NAFIN) in Mexico.

Experience over the last few decades suggests four general principles that can guide reform. First, instead of creating bureaucracies with their own guaranteed funding, the government should retain the ability to direct funds

66. See Blomström, Kokko, and Sjöholm (2002).

toward agencies (public or private) that are accomplishing results. This injects a measure of competition into the system. Second, all programs should be continuously evaluated and subject to cancellation if they fail to perform according to some minimum standard. Third, programs that require public financing should start small and grow only to the extent that evaluations reveal their good performance. Finally, the whole strategy should be designed in a way that allows both the state and private sector organizations to accumulate expertise that provides the basis for carrying out more sophisticated policies.[67]

### *Is This Strategy Realistic for Latin America?*

The general presumption among analysts is that most Latin American countries suffer from a weak state that "has little capability of transforming the economy and social structure over which it presides."[68] In other words, even when government policy is correctly designed, its implementation is delayed or impeded by a weak bureaucracy, in which "rule-governed behavior immersed in a larger structure of careers that creates commitments to corporate goals is notable by its absence."[69] A strong state, by contrast, could carry out an import substitution policy without being captured by the entrepreneurs it creates. According to Evans, this is a good description of what happened in East Asia.

The absence of a strong state is clearly a problem in the region. But not all countries suffer from this problem. Chile, for example, has a strong state. The same applies, albeit to a lesser degree, to Brazil, Costa Rica, Mexico, and Uruguay. At the other end of the spectrum are countries like Haiti, where the conditions simply are not in place for a sophisticated set of microeconomic interventions discussed above. The Latin American region thus encompasses both countries that can follow a sophisticated cluster-oriented strategy and others that cannot—at least under current conditions.[70]

The widespread concern about the dangers of microeconomic interventions in Latin America largely derives from the experience of import substitution. In most countries this policy was captured by the protected firms, which pushed

67. See Hausmann and Rodrik (2003) for an excellent discussion of the organization of a sophisticated development strategy.

68. Evans (1995, p. 45).

69. Evans (1995, p. 46).

70. Another potential issue for implementing a strategy like the one recommended here is the associated fiscal cost. This should not be a significant problem, however, because the associated cost is not likely to be large and, more importantly, because most countries already spend significant amounts on microeconomic interventions, so the cost actually represents a reshuffling of existing spending.

for wider and lengthier protection without taking the necessary actions to raise productivity and end their dependence on high tariffs. More research is needed fully to understand the conditions necessary to prevent this from happening again. What is clear, however, is that the set of microeconomic interventions advocated in the previous sections is not nearly as likely to end up in capture. These interventions do not entail protection or tax breaks, which can easily become permanent and whose total budgetary costs are usually hidden; instead, they involve one-time grants whose fiscal cost is harder to hide. The political economy of tax breaks (which are usually not explicitly included in the budget) is clearly different from the political economy of one-time grants for collaborative projects, particularly if a policy of accountability and evaluation is implemented. Moreover, the import substitution experience taught the region some valuable lessons: open dialogue, transparency, accountability, and constant evaluation. Adherence to these principles should minimize corruption and capture in future efforts.

Possible action depends on government capabilities, at least in the short run. Most countries feature so-called islands of efficiency among their government agencies and nongovernmental organizations. Agencies in these islands have a proven record of being able to design and implement policies. Governments should make sure that these agencies are properly funded and try to develop synergies among them.

A final consideration concerns the redistributive consequences of the recommended interventions. This is a critical issue in Latin America, which has not only high inequality, but also the widespread perception that riches are associated with corruption and past privileges. If a country's comparative advantage lies in sectors that are dominated by the economic elite, these interventions could generate perceived transfers to the already rich and therefore a political backlash. For the policy to work, therefore, it must be very clear from the outset that these policies are not elaborate schemes for transferring rents to certain groups, that the beneficiaries are paying a significant part of the costs, and that government support is limited and temporary. Ultimately, however, in deeply divided societies, where the public has little trust in government and where all public actions generate a suspicion of corruption, any microeconomic interventions that are not completely general and neutral will be very difficult to implement.