Coordination Failures, Clusters and Microeconomic Interventions

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Abstract

This paper discusses coordination failures, their relevance to developing countries, and the circumstances under which they occur, arguing that 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. Subsequently presented is a model of a small economy plagued by sector or cluster-specific coordination failures, which demonstrates that policy should foster cooperation in sectors where the economy already shows comparative advantage. In regard to innovation, general policies that aim to increase innovation across the board are likely to be inferior to policies that take a more selective approach by trying to induce the development of innovation clusters in areas of comparative advantage. The paper concludes with suggestions on how an understanding of coordination failures and clusters can form the basis for a set of effective microeconomic interventions for middle-income countries.

1. Introduction

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 additional policies (Stiglitz, 1998; Williamson, 2003). Such policies fall within three strategies: 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 the market economy to generate 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 shall henceforth refer to as "microeconomic interventions."

Countries have engaged in these types of interventions for decades. Since the mid-1980s, with the switch to outward-oriented development strategies, the main set of microeconomic interventions has been aimed at promoting exports, attracting foreign direct investment, and implementing programs to support small and medium-size enterprises (SMEs). Recently, there has also been new interest in promoting innovation (IDB, 2001; De Ferranti et al., 2003). These types of microeconomic interventions enjoy wide support, and are even encouraged by international institutions such as the World Bank and the Inter-American Development Bank. However, as discussed in Rodríguez-Clare (2004a), the conceptual and empirical foundation for some of these interventions is not as solid as most believe. In some other cases, such as that of innovation policy, the particular way in which they are commonly implemented is likely to prove ineffective.

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 (Hausmann and Rodrik, 2002). The second is associated with coordination failures in taking the necessary actions to increase sector-wide 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.

Section 3 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. Section 4 explains that, although clusters may alternatively be thought of as resulting from agglomeration economies, the notion of coordination failures is more useful to derive appropriate policies to encourage clustering. This issue is explored formally in Section 5, which presents a model of a small economy that is plagued by sector or cluster-specific coordination failures. This section shows that instead of import substitution, which aims to reallocate resources toward sectors that are seen as offering higher clustering possibilities, policy should foster cooperation in sectors where the economy already shows comparative advantage. Section 6 discusses a particular application of these ideas to innovation policy. It argues that general policies that aim to increase innovation across the board are likely to be inferior to policies that take a more selective approach by trying to induce the development of innovation clusters in areas of comparative advantage. Finally, Section 7 offers a series of remarks about how these ideas about coordination failures and clusters can form the basis for a set of effective microeconomic interventions for middle-income countries.

2. Coordination Failure

A firm's productivity depends not only on its own efforts and abilities and general economic conditions (e.g., the macroeconomic environment and the legal system), but also on the actions of other firms, infrastructure, regulation, and other public goods. The problem is that due to economies of scale, thick market effects, knowledge spillovers, and other problems of nonexcludability, the provision of these inputs and services is plagued by market failures. A vast literature explores these market failures, which often give rise to a multiplicity of equilibria. Most famously, Rosenstein-Rodan (1943) argued that investment by one firm could have a positive effect on the profitability of investment by other firms. That is, higher investment gives rise to an increase in aggregate demand, which under economies of scale increases the profitability of investment elsewhere in the economy (see Murphy, Shleifer, and Vishny, 1989 for a modern formalization). In these circumstances, there can be multiple equilibria: a low-investment and a high-investment equilibrium. Everybody would be better off at the high-investment equilibrium, but there are no market forces taking 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, there is a coordination failure.

There are many other instances under which interdependence among economic agents leads to coordination failure. Hoff (2000) surveys this literature and discusses policy implications in areas ranging from corruption to legal reform and the environment. Here I am interested in a narrower 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, which have significantly improved their institutions and macroeconomic environment and yet have failed to experience significant growth acceleration.

Coordination failures are usually formalized in a model with a 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 that it suffers from a coordination failure. But there may be coordination failures even in the absence of multiple equilibria. This is because there may be activities that are never profitably provided by firms. The classic example is a public good that suffers from a problem of nonexcludability: the provider cannot exclude anyone from enjoying the benefits of this good. Clearly in this case there is no equilibrium where the "market" delivers the good. This is, of course, one of the classic justifications for government action. But my point here is that if the government is seen as another agent (with the distinction that it has access to taxation), then an equilibrium where the government does not deliver a socially profitable public good is characterized by a coordination failure.[1]

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

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[1] This case, where the coordination failure involves the government, is usually referred to as a "government failure."

Economies of Scale and Thick Market Effects

It is well known that economies of scale lead to all kinds of market failures. Here I present an example of how they can lead to coordination failures. I then discuss how similar effects arise under thick market effects.

The presence of economies of scale in the production of inputs leads to the 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 (e.g., producer services such as consulting, machine repair, accounting, and 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 industry-wide level.[2] This is because as the industry expands there will be room for more specialization among intermediate good producers, and this will lead to higher productivity in the industry.[3]

The problem with this story is that it suggests that simple industry agglomeration (i.e., 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. Then there are multiple equilibria: if all firms use the backward technology, the market for inputs will be small, and hence there will be only a few specialized inputs, in turn making the modern technology uncompetitive. By contrast, if firms use the modern technology, the market for inputs will be large, and this will create incentives for many firms to enter into the production of specialized inputs. As a result, there will be many varieties of specialized inputs, and this will make it profitable to use the modern technology (see Rodríguez-Clare, 1996, and Rodrik, 1996a).

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

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[2] 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) and Romer (1990).

previous argument is that there are significant transportation costs or other costs associated with having to rely on suppliers that are far away.[4] An obvious nontradable input is labor. Similar to the story above, coordination failure may arise between workers thinking about investing in training and firms thinking about investing in technologies that require trained workers. In this case, the bad equilibrium is one where low productivity arises due to lack of specialized workers, which pushes firms to adopt backward, low-productivity technologies. In this case economies of scale do not lead to multiple equilibria but thick market effects due to search costs do.

Acemoglu (1997) formalizes this idea. 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 and technology and split the realized surplus, a problem arises because of the risk of separation. At that point, 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, there is a risk that a productive match will not materialize, in which case firms and workers will have lost their investment. There are multiple equilibria: in the bad equilibrium, firms and workers do not invest, and hence it is not profitable for any firm-worker pair to invest because in case of separation it is likely that their investment will be wasted. In the good equilibrium, due to thick market effects, firms and workers do not care about separation because in spite of search costs, it is likely that they will be properly matched with modern firms or trained workers.[5]

Another obvious nontradable input is infrastructure. As Murphy, Shleifer, and Vishny (1989) show, there are two types of market failure related to investment in infrastructure. First, there is the classic problem of the monopolist that introduces a good to the economy but cannot appropriate the whole consumer and producer surplus generated. It may then happen that

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[3] Note how 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.
[4] The relevance of high transportation costs is clear for producer services (see Rodríguez-Clare, 1996). For other inputs, Steinberg (2002) shows that even for a very open and small economy, such as Singapore, domestic demand drives domestic production even for tradable inputs, something at odds with a frictionless world. Michael Porter's 1990 book presents many arguments for why transportation costs, broadly conceived, may be high for intermediate goods.
[5] Marshall (1920) proposed a similar idea. He pointed to three sources of externalities that could give rise to industry-level agglomeration: knowledge spillovers, input sharing, and labor market pooling. Krugman (1991) formalized the idea of labor market pooling by showing how it generates externalities because a larger industry

although it would be socially optimal to introduce the good—or to undertake the infrastructure project—the investor does not make adequate profits to compensate the related set-up and fixed costs. Second, it may be that once the infrastructure project is built there are multiple equilibria, with the bad (good) equilibrium characterized by low (high) demand for the infrastructure project. Some conditions would generate negative profits from undertaking the project if the bad equilibrium prevails, and positive otherwise. A cautious investor may choose not to invest, although it would be socially optimal for the investment to take place and 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 any other means, it is likely that it will spill over and benefit other firms. Abundant evidence shows that such knowledge spillovers are important (Audretsch and Feldman, 2003). If they arise between two firms, then it is likely that they would find a way to internalize the externalities and solve the market failure. The problem arises when there are many firms 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: 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: an equilibrium where no firm invests in the modern technology and another where all firms do. To see this, note that if $n = 0$ then net output with the modern technology is $-C$, clearly lower than with the backward technology. By contrast, if $n = 1$ then net output with the modern technology is $A - C$, which is higher than net output with the backward technology.

Market failure generated by knowledge spillovers arises because the benefit generated by investing in knowledge is nonexcludable. A firm cannot prevent another firm from benefiting

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concentrated in one location allows workers to specialize in the skills that are specific to that industry, thus allowing a "greater division of labor" and higher productivity.

from the knowledge it generates. Spillovers may lead to coordination failures even when there is no multiplicity of equilibria. To see this, 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, imagine that output with the backward technology is $1 + An$. Then there is a unique equilibrium, with $n = 0$. The case $n = 1$ 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 $1 + A$. But although there are no multiple equilibria, there is a coordination failure, since everybody would be better off with $n = 1$.

The more standard case when there are problems of nonexcludability is the case of public goods. For example, imagine an export industry where firms can produce with low quality or high quality, and where foreign consumers cannot differentiate between exporting firms. In other words, there is a country brand and firms cannot create their own firm-specific brand.[6] In that case, it would be impossible to sustain a situation where all firms invest in producing high-quality goods. In such a case 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 a situation with 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 there is some collective action).[7]

Another example of this type of problem is offered by Uruguay's efforts to eradicate foot and mouth disease in cattle, a requirement for exporting beef to the United States. This is a case where there is no equilibrium in which individual firms spend the first-best level in prevention and eradication. That is, an individual firm would always be tempted to spend a bit less because it would capture the full savings, whereas the cost in higher risk of the disease is spread among all producers. Ultimately, collective action was organized, funding was secured from international financial institutions, and foot and mouth disease was eradicated, with significant gains to the industry and the country.

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[6] In the real world, of course, there is such a thing as a company brand, but it is inevitably linked to a country brand. Think of cars coming from Japan in the 1960s and 1970s.

[7] 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.

3. Clusters

Coordination failures can happen at the economy-wide level or at the sector level. In Murphy, Shleifer and Vishny's (1989) 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. But most examples of coordination failure take place at a narrower level. For example, in the case of economies of scale and benefits of specialization in the production of nontradable inputs, there are multiple equilibria at the level of firms using a common set of inputs. For example, this could be the textile and apparel sector, the microelectronics sector, or something broader such as nontraditional agriculture.

Consider also the case of coordination failure involving investment in infrastructure. Murphy, Shleifer, and Vishny (1989) provide the example of railroad construction and overall industrialization across multiple sectors. Other examples may be more relevant for developing countries today, and may apply at the sector level. For example, building an airport in a region that has no hotels would not lead to any traffic, but hotels without a regional airport may not be profitable. A large-scale irrigation project may not be profitable if only a few farms use modern technology; however, using such technology may be profitable only if there is adequate irrigation. 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.

The examples above illustrate that in coordination failures at the sector level, it is not completely clear what is meant by "sector." It is clearly not to be interpreted as an industry in the traditional sense of a group of firms engaged in the same activity. This is because several different industries share the use of some inputs, infrastructure, skilled workers, and knowledge. Moreover, the coordination required to reach the best outcome also 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, etc. Following common practice, I will use the word *cluster* to refer to this collection of related industries and public and private agents.

An 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.[8] In this sense, a cluster is 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 with the rest of the world are unimportant. Moreover, it does not mean that such relations and flows should be restricted to give way to stronger local interactions. The point is rather that if a cluster is concentrated in one region, it makes sense to think of a regional-level strategy for achieving superior coordination in that cluster.

The argument so far is that because of economies of scale, thick market effects, knowledge spillovers, and public goods, some kind of coordination among the participants of a cluster is required to reach high levels of performance. At this point, readers may be thinking of examples of high-performing clusters where there was no evident policy leading to coordination. What kind of collective action, it may be asked, was implemented in Silicon Valley or in the many examples of clusters provided in Michael Porter's book, *The Competitive Advantage of Nations*? 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 with no formal policy required. Coordination can also be achieved thanks to the strategic actions of a large player (e.g., a university or a multinational). For example, research has established that Stanford University was a key player in the emergence of the information technology cluster in Silicon Valley (Saxenian, 1994).

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. There is a significant difference between the concepts of coordination failures I have discussed above and agglomeration economies. The notion of agglomeration economies suggests that an increasing geographic concentration of related firms and industries *necessarily* leads to higher productivity. However, 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.[9] An appealing feature of this second way of thinking

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[8] I am aware that there are many who believe that knowledge spreads easily and instantaneously across the globe, but evidence reveals that in fact knowledge spillovers are mostly a local phenomenon (see Audretsch and Feldman, 2003).

[9] This does not mean, of course, that there is no relationship between the two concepts. Imagine a cluster in the bad equilibrium (i.e., 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

about clusters is that it may explain the existence of cases of geographic concentration of sectors that failed to experience significant agglomeration economies (e.g., concentrations of footwear and textile producers). Perhaps these are cases of clusters that failed to achieve coordination (see Altenburg and Meyer-Stamer, 1999).

4. Agglomeration Economies or Coordination Failures?

It is worth pausing to explore at a deeper level the various 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, which in turn are generally seen to justify policies that reallocate resources toward the "special" sectors that exhibit such features (Wade, 1990; Amsden, 1989). This is a version of the infant industry argument, which is usually formulated in the context of a model where there are 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. Under 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.

To understand this, note that if the economy specializes in the traditional sector, the absence of resources devoted to the advanced sector prevents the economy from reaping agglomeration economies there. Low productivity in the advanced good would then lead to a comparative advantage in the traditional sector, trapping the economy in specialization in this sector. There is another, superior equilibrium, however, where the economy specializes in the advanced good, 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 the 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.

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increase productivity, and—as long as this entails some *local* advantages, as assumed here—this is likely to bring in more firms (both in the core industries as well as upstream and downstream). This will further increase productivity both through pure agglomeration economies (if they exist) and through new opportunities for coordination (if they

There are two problems with this story. The first problem is that it is likely that developed countries have already reaped the benefits of agglomeration economies in the advanced sector. Thus, international prices for this good would be lower, reflecting the higher productivity associated with the realization of agglomeration economies in rich countries. From the point of view of a small economy, it is the same to be specialized in an industry with strong agglomeration economies and a low international price, or weak agglomeration economies and a high international price (see Rodríguez-Clare, 2004b).

The second problem with the story is that it assumes that production in the advanced sector *always* leads to clustering. This does not seem consistent with the experience of many countries that have implemented import substitution and achieved expansions of their modern sectors without benefiting from agglomeration economies.[10] Perhaps the reason for this is that there are different ways of producing a good, some of which may lead to agglomeration economies and some of which may not. Consider for example the case of knowledge spillovers generating agglomeration economies. Recent evidence suggests that knowledge-intensive industries exhibit stronger knowledge spillovers (Audretsch and Feldman, 2003). Based on the infant industry argument, this suggests gains from inducing specialization in these industries. The problem with this argument, however, is that knowledge intensity is not an immutable characteristic of an industry. The same good could be produced with a backward, nonskill-intensive technology in a developing country and a modern, skill-intensive technology with high R&D in a developed country.

In fact, this is precisely what happens according to the popular product cycle hypothesis, where goods are introduced in the North and then, after progressive standardization and simplification, are produced in the South. More generally, an industry can exhibit agglomeration economies in one place but not in another; it can exhibit agglomeration economies at a certain stage in its development but not later. In other words, "what matters is not what a nation (location) competes in, but how" (Porter, 1998, p. 249). Along the same lines, the World Bank's Latin America and Caribbean office has convincingly pushed the argument that countries have achieved high productivity and high growth clusters in sectors that are intensive in natural

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are realized), hence allowing the process to continue. Thus, to some extent, the original solution of a coordination failure leads to agglomeration economies.

resources, which traditionally have been regarded as sectors with low potential for agglomeration economies.[11]

Accepting that production in the advanced sector can take place using backward technologies or modes of production, it becomes clear that import substitution does not necessarily lead to externalities and clustering. Instead, import substitution could simply push resources toward what are regarded in rich countries as advanced sectors. But developing countries could organize those sectors in ways that do not generate externalities.

This reasoning has broader implications. Not only import substitution, but also any other policy (even export promotion) that distorts prices so as to push resources into so-called advanced sectors would face the same problem.[12] Instead of policies to reallocate resources across sectors, it would be better to implement policies to promote clustering in sectors that already show some comparative advantage. This implies that, as generally accepted by proponents of cluster-based policies, governments should not try to create clusters from scratch, but rather focus on sectors that already exist and where there is the opportunity to benefit from clustering. It also implies that industrial policy is not about creating comparative advantage, but rather about achieving the high productivity that comes from clustering in sectors where the country has a comparative advantage.[13]

5. 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. In this section, I present a model that I think is more useful for this purpose. The model deviates from the standard infant-industry model in two respects. First, international prices are determined in

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[10] 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).

[11] See de De Ferranti et al. (2002).

[12] In fact, distorting prices so as to have a cluster in a sector where the country does not have a comparative advantage could even generate a lower welfare level than an allocation where there is specialization in a nonclustered sector that exhibits comparative advantage (see Rodríguez-Clare, 2004a).

[13] 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 (2004a), however, such policies are better interpreted as promoting clustering in sectors where the country has a natural comparative advantage. Alternatively, Hausmann and Rodrik (2002) would argue that industrial policy is about discovering rather than creating a country's comparative advantage.

the North, and hence already reflect any benefits of agglomeration economies. Second, all sectors have clustering potential, but this does not happen automatically; 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. The sources of coordination failures, which were discussed in Section 2, are not explicitly modeled here both to keep the presentation simple and because the goal is to explore 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.[14] Coordination is captured in the model 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 λ_{ji} with coordination failure and $\theta_j \lambda_{ji}$ if coordination is achieved. λ_{ji} captures raw productivity while $\theta_j - 1 > 0$ captures gains from coordination.[15]

A full model would specify the actions that bring about coordination, and how coordination is part of equilibrium. The interested reader can consult Rodríguez-Clare (2004b), where such a model is constructed for the case where sector-level coordination is the result of Marshallian economies associated with the use of modern technologies. Here I take a more agnostic approach and 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 would have productivity λ_{ki} (i.e., some level of agglomeration is required before coordination becomes a possibility).

Goods are ordered in such a way that South has raw comparative advantage in low-indexed goods. That is, $\lambda_{jS}/\lambda_{jN}$ is decreasing in j. θ_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

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[14] 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 clusters, which is more consistent with the notion of coordination failures as discussed above.

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

South does not, South still has comparative advantage in low-indexed goods. Note that a sufficient condition for this is that θ_j be nondecreasing in j.

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

To think about equilibria in South, note that given the linearity assumptions of the model (fixed international prices and the Ricardian production structure), there is 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: first, the cost of good j must be equal to the international price, and second, producing some other good (with no coordination) must generate zero or negative profits. Letting w denote the wage in South, the cost of good j in South is w/λ_{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 $k \neq j$. Instead, 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 the assumptions above, there are multiple equilibria: first, there is an equilibrium with specialization in good 1 with coordination; second, there is an equilibrium with specialization in good 1 without coordination; and finally, there is a set of equilibria with specialization in good k with coordination as long as the following condition is satisfied:

(*) $$(\lambda_{1S}/\lambda_{1N})/(\lambda_{kS}/\lambda_{kN}) < \theta_1$$

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

It might be expected that the condition (*) should be stated in terms of the benefits of coordination in sector k rather than sector 1. But 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 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 $\theta_k=1$ so that there are no benefits of coordination in sector k. Rather, when a single producer deviates from full

specialization in sector k to produce good 1, there is a gain in relative productivity but there is a loss associated with the production of a good where North has and South does not have coordination. This loss is given by θ_1. For specialization in k to be an equilibrium, it is necessary that this loss be greater than the benefits from higher relative productivity, as stated in condition (*).

How do the equilibria rank in terms of the equilibrium wage in South? The best equilibrium is the one with coordination in good 1. If (*) is satisfied for $j = 1,...,k$ then the wage is declining with movement to equilibria with specialization in higher-indexed goods (all of which entail coordination). This is because South has a lower relative productivity in higher-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 higher θ does not necessarily lead to higher equilibrium wages. The reason for this is simply that higher θ leads to higher productivity in North and lower international prices. Thus, although higher-indexed goods may entail higher benefits of coordination, perhaps because of stronger knowledge externalities, this does not imply that South should push for specialization in these sectors.[16] Simply stated, the goal of policy is not to reallocate resources toward sectors with large benefits of coordination.

In fact, this last proposition can be stated more generally: policy should not strive to reallocate resources across sectors. Rather, the goal should be to induce coordination in the sectors where the economy has revealed a comparative advantage. To see this, imagine that South is specialized in sector 1 without coordination. Policies such as import substitution that induce resources to move toward other sectors would only decrease the wage.[17] Of course, if policy were to move the economy from specialization in 1 to specialization in a sector k,

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[16] A dramatic way to see this is by noting that if (*) is not satisfied, then the wage would be *lower* with specialization *and coordination* in sector k than with specialization in sector 1 without coordination.

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

satisfying condition (*) *while simultaneously* achieving coordination in that sector, then the wage would increase. But this seems overly ambitious. Moreover, if the 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 (*) 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. Hence, a general implication that emerges from the model is that, if unaccompanied by policies to induce coordination, import substitution or any other policy that distorts prices to induce a reallocation of resources will reduce welfare.

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, it is also likely that the pattern of comparative advantage will evolve given changes in international prices and domestic endowments. Hence, it is likely that at any point in time the economy will find itself with coordination in a sector where it does not enjoy the strongest comparative advantage.[18] The model shows that under these circumstances there are interventions that could increase the wage. However, it seems unreasonable to expect the government to be able to detect the new sectors where 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 also it may be unnecessary since it would be expected that the coordination achieved in one sector would give producers some ability to adapt to changing circumstances, prices, preferences, and endowments.

As an illustration of this idea, consider a country that has a comparative advantage in nonskill-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

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[18] If the structure of comparative advantage changes significantly, then it may be that condition (*) ceases to be satisfied for the sector where 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.

to certify quality, labor, and environmental standards, so that the sector can upgrade to higher-end, more skill-intensive processes and thereby remain competitive at higher wages than emerging countries. In terms of the model above, with this process the coordination achieved in one sector is transferred to another sector with a stronger comparative advantage.

There is another case that merits some discussion. Imagine that for whatever reason (perhaps the sequels of a policy of import substitution) a country ends up with specialization and coordination in a sector where it does not have the strongest comparative advantage (but condition (*) is satisfied). According to the model above, the government could improve efficiency by pushing toward an equilibrium with specialization and coordination in good 1. It would then appear that at least in this particular case there is justification for a policy of sector reallocation of factors of production toward new sectors where the country has a stronger comparative advantage. But is this a reasonable argument for a policy of picking winners? Again, I believe that this is neither reasonable nor necessary. The most realistic scenario is that the sector where the country in question has the strongest comparative advantage did not disappear altogether but simply shrank. Thus, a policy of promoting coordination in existing sectors should cover it as well. This point is discussed further in the last section.

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

6. Innovation Clusters

There is plenty of evidence showing 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; in other words, the coordination failure consists of 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 too diffuse to generate a significant effect. In this section, I will argue that it would be more effective to think of innovation policies as ways to solve 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 Audretsch and Feldman (2003) argue, in order to design effective interventions, it is necessary to move beyond the simple idea that innovation activities generate positive spillovers. In particular, it is necessary to understand better the types of innovation activities that generate such spillovers, and the mechanisms through which they arise. Although research on these issues is still in its infancy, there are a few conclusions that appear robust (see Audretsch and Feldman 2003). This section lists such conclusions and for each one briefly discusses the related policy implications.

First, knowledge spillovers are attenuated by distance. Thus, firms that are close together would benefit more from spillovers than firms that are far apart. For large countries, this implies that it would not make sense to promote innovation in firms that are located in remote or isolated regions. Second, spillovers are stronger for firms that are engaged in similar or related activities. In a sense, knowledge spillovers are attenuated by economic distance between firms. A reasonable conjecture is that it would then be more effective to concentrate innovation policies on a few sectors where innovation activities appear relevant and feasible.

Finally, spillovers depend on *how* innovation activities are undertaken, and on the context in which they take place. In other words, innovation can occur in a manner that leads to only small spillovers. For example, smaller spillovers arise when research takes place in corporations than in universities or specialized research centers.[19] Another interesting example is offered by the comparison of innovation clusters in Silicon Valley and along Boston's Route 128. According to Saxenian (1994), the open and interactive way in which innovation takes place in Silicon Valley is more conducive to spillovers than Boston's Route 128, where innovation is carried out in R&D departments in large corporations. A policy to support innovation should strive to induce the *kind* of innovation that takes place in Silicon Valley, rather than the one that takes place along Boston's Route 128.

In sum, rather than a general policy aiming at increasing innovation across the board, it would be more effective to focus on nurturing the development of innovation clusters around sectors where the country has a comparative advantage. This requires a more sophisticated policy characterized by the *selective* support of innovation in certain areas, coordination of innovation projects with private sector organizations, and support for institutions such as universities and

research centers that appear to be essential components of innovation clusters. Altenburg and Mayer-Stamer (1999) point out that a realistic strategy for the promotion of innovation clusters should follow a step-by-step approach. The first step should be 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 third 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.

7. Toward a Set of Effective Microeconomic Interventions

The main argument in this paper is that there should be a shift in Latin America 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 more typical heterodox mantra that countries should strive to create comparative advantage in advanced sectors, but more interventionist and selective than the standard approach to competitiveness policies currently in fashion.

An alternative approach to industrial policy, proposed by Hausmann and Rodrik (2002), suggests that the goal of policy should be to promote the discovery of activities where the economy has comparative advantage. Although the two approaches appear quite different, in some instances lack of discovery might be a 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 dealing with research to discover higher-quality versions of goods currently produced.

Leaving this consideration aside, it is quite natural to think that 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 (2003) reveals that growth is first associated with export diversification and later with increasing concentration. This finding suggests that growth in the poorest countries is related to the discovery of activities

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[19] 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

where the country has a strong comparative advantage (Hausmann and Rodrik, 2002). Such countries should thus 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, as argued by Porter (1990). These countries should thus focus on policies to promote coordination.[20] The reader interested in policies to induce self-discovery should consult Hausmann and Rodrik (2002). In the rest of this section I focus mostly on policies to induce clustering.

There are several issues that merit additional discussion. First, what are appropriate policies to promote clustering? Second, should specific sectors be chosen for special support? Third, what is the relationship between these policies and the industrial policy pursued in East Asia and Latin America since the 1960s? Fourth, what are appropriate mechanisms and institutions to carry out these policies? And finally, is this strategy realistic for Latin America?

Policies to Induce Clustering

The specific policies that should be pursued to promote clustering depend, of course, on the particular coordination failures that affect a cluster. Given the variety of coordination failures, there is a need for a wide set of instruments or policies. An exhaustive list is therefore impossible. Here I present some examples to give an idea about the types of instruments that may be appropriate.

Export promotion would be appropriate for a case where there is insufficient investment in discovering new export markets. A more sophisticated approach entails pecuniary rewards to firms that discover new export markets; the rewards should vary in proportion to the total exports in these new markets by other local firms.[21] Regulation to enforce higher 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 to exploit tourism opportunities, or irrigation projects for modern agriculture. Attraction of foreign direct investment may be an effective way to bring in foreign technology, or to increase

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and the process of technology transfer from research universities" (p. 19).

[20] In principle, one could imagine that discovery could lead to concentration of exports in the newly discovered sectors. But realistically this is unlikely to occur because discovery of new export sectors would most likely lead to increased use of resources for exporting, rather than to withdrawal of resources from existing exporting sectors. Thus, in practice discovery would likely be associated with export diversification rather than concentration.

[21] I thank Ernesto Stein for proposing this idea.

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 growth and diversification of a cluster would be appropriate in cases where thin markets prevent individuals from making such investments. Alternatively, where the lack of local education centers results from coordination failures caused by investment complementarities, the appropriate response may entail grants for the creation of training institutes or specialized higher-education centers. A related issue is the need to coordinate supply and demand of specialized human resources, a process where the organized private sector should play a key role. As stated by Altenburg and Meyer-Stamer (1999): "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."

As a final example, consider the case when coordination failures lead to low levels of research and innovation in a cluster. Appropriate policies 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 allow long-term collaborative strategies for education and research between business associations and universities. The ultimate goal is to promote the development of innovation clusters.

It is unreasonable to expect governments to be able to identify the coordination failures affecting different sectors or clusters. A more realistic approach is to invite sector and cluster organizations to come forward with well-justified proposals for government support. A common reaction is that cluster organizations should be able to solve coordination failures without government support. But this implicitly assumes that cluster organizations effectively represent the whole cluster; it assumes that such organizations can mobilize support from all the cluster participants behind a proposal to solve a coordination failure. This is clearly unrealistic. A reasonable compromise is for government and private organizations to share in 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, however, 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 (1999): "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, both in terms of 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 (e.g., employing more and better-qualified professionals) and the implementation of mechanisms to ensure ongoing organizational development." Perhaps the government should provide support to sectors that want to start or improve their level of organization.[22] This would be the first line of action in countries where private sector organizations are weak or designed for rent seeking or confrontation rather than constructive work.

A good example of a successful policy of collaboration between the public and private sectors is offered by the experience of innovation in the rice sector in Uruguay.[23] A key player here has been INIA (Instituto Nacional de Investigación Agropecuaria), an institute for agricultural research created by law in 1990.[24] During the 1990s, INIA developed new rice seeds that are better adapted to Uruguay's soil and climatic conditions. The new seeds allow productivity and exports to grow at a dramatic pace: in 2000, productivity reached 6,400 kilograms per hectare, one of the highest in the world, with 96 percent of the seed used being of national origin. Today, INIA's rice program, which takes place in experimental stations in several parts of the country, includes studies to identify and treat plagues (biotechnology), to improve irrigation systems and planting methods, and for ongoing evaluation of pesticides and fertilizers. Many of these projects take place with close interaction and collaboration with Uruguayan and regional universities, and always with strong coordination with private sector associations.

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

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

[24] Although INIA is a public institution, it operates outside the sphere of the state, giving it much more flexibility.

Should Specific Sectors Be Targeted?

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 with proposals for government support. An interesting example is the R&D Matching Grant System (FRC, for its Spanish initials for Fondo de Recursos Concursables) launched by the Ministry of Science and Technology (MICIT) in Costa Rica in 2000.[25] The yearly sum devoted to the system since it was launched has been approximately US$1.3 million.

The yearly selection of projects consists of two phases. In the first phase, individual firms and industry associations submit proposals for evaluation by MICIT according to their quality, clarity of objectives, justification of the technological need of the sector, promised financial contribution, creativity and novelty of the proposal, and potential impact of the technology on the environment and the country's economy. Qualifying projects are then assigned a contribution share according to their perceived externality. In the second phase, certified research units present their 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, there is a list of projects each of which is assigned a research unit, a total cost, and the percentage of the cost that the government has promised to pay. The production unit or association that presented the proposal is then called on to put forward its share of the cost in a trust fund. Once this is done, the government makes its contribution to the trust fund and the project starts. MICIT conducts periodic monitoring of the projects to make sure that the resources are being spent according to the plan and to evaluate the results.[26]

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

What is the correct approach? Chile's recent launching of a program to coordinate its multiple actions to support innovation provides an interesting setting to conduct this discussion. In light of Chile's reputation for an orthodox approach to economic policy, it is surprising to read

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[25] The methodology of the FRC and other details can be found at www.conicit.go.cr.
[26] For a broader discussion, see Rodríguez-Clare (2003).

about its recently launched *Chile Innova* program, which appears to favor the second, more aggressive and selective approach to microeconomic interventions. The documentation for the loan received by Chile from the IDB for this program states the following:

"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." (IDB 2000)

Chile Innova conducts prospective studies to identify economic activities that present the greatest competitive potential in the medium term. The program's website (www.innovacion.cl) states that this is done to foresee the activities that offer the best prospects, knowledge that is necessary to optimize decisions about public-private investments. Prospective studies are done through consultations with the main actors involved in each area, including the government, the private sector, the academic community, workers, and civil society.

There are different ways to interpret these statements. One possibility is to focus on the phrase "a set of areas where competitive advantages can be created… must be identified…" Sections 4 and 5 of this paper argued that this is an incorrect approach: it is not necessary to pick winners, and it is not necessary to create winners. Instead, policy should pick clusters that are revealed winners in the sense of having comparative advantage.

A different interpretation is that a selective approach may be desirable and even necessary given the existence of several activities with comparative advantage. To simplify the exposition and make the main point as clear as possible, the model presented in Section 5 used a set of assumptions that led to complete specialization in a single sector. But clearly this is not realistic. Imagine for example that due to the existence of specific factors or strict concavity in the production possibilities set, a free trade equilibrium entails specialization in several sectors,

not just one. The conclusion of the model carries through in the sense that policy should focus on promoting coordination in these sectors, rather than on inducing resources to reallocate to other supposedly more advanced sectors. But how would policy choose between proposals for collective action among the active sectors? Even if a neutral competitive process is designed for such sectors to come forward with proposals for collective action and government support, there is a need to choose which proposals to support. Collective action in a cluster can be seen as an investment that yields higher productivity and hence higher rewards for factors employed in that cluster. Thus, at least in principle, it would be possible to calculate a social return for such an investment. With limited resources, the obvious approach would be to invest in the proposals that entail the highest social returns. The problem, of course, is the difficulty of calculating such social returns. One (perhaps limited) way to interpret prospective studies is as a way to facilitate this calculation.

An alternative interpretation of prospective studies, also consistent with the framework presented in the previous sections, is that given the difficulty and complexity of identifying coordination failures and areas for collective action, especially in learning and innovation, business organizations will not be able to do this on their own. It may be necessary for the government to support the private sector at this stage as well, so that it will conceive better proposals that later compete for government support. Thus, there may be 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 (in case the strategy was 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 (see Rodrik, 1996b), most economists believe the industrial policy pursued in Latin America during the 1960s and 1970s failed (Krueger, 1993). Recent empirical research (see Noland and Pack, 2003) even calls into question the effectiveness of the industrial policies pursued in East Asia, which for a time were considered successful according to revisionist observers (Amsden, 1989; Wade, 1990). Thus, the question arises as to whether the proposed strategy is doomed to fail, just as previous attempts apparently failed.

Noland and Pack (2003) survey a series of studies showing that, contrary to popular belief, industrial policy in East Asia was not successful in supporting high-growth sectors. The sectors that received most support in terms of subsidies, tax breaks, and protection in Japan, Korea, and Taiwan were not the ones that later showed the highest growth. This provides further support for valid skepticism regarding policies that attempt to "pick winners." But this is different from the kind of strategy discussed in this paper. There is no need for the government to distort prices so as to reallocate resources toward certain sectors. Since the sectors where the strategy would be implemented are those exhibiting comparative advantage, it is not necessary to distort prices. Moreover, as shown in Rodríguez-Clare (2004b), even in the presence of externalities and clustering, distorting prices would likely reduce welfare. Instead of import tariffs, export subsidies, and other tax breaks and fiscal incentives, the proposal calls for the implementation of other policies consisting mainly of fixed grants, infrastructure investments, and sector-specific regulatory reforms aimed at promoting clustering. Thus, the current proposal would be a soft industrial policy, rather than the hard industrial policy implemented in previous decades, which entailed distorting prices so as to reallocate resources to certain sectors as a way to generate a new pattern of comparative advantage. This is important not only because today's international rules (the World Trade Organization and bilateral and regional trade agreements) do not permit many of these hard policies, but also because soft policies are likely to be more transparent and less costly.[27]

Mechanisms and Institutions

This paper has argued that, due to numerous market failures, productivity can be increased through coordination and collective action within clusters of economic activity. Given that the government is not likely to have the specific information to identify the areas where collective action would be useful, business associations must play an active role in the process. One interesting approach would be for the government to create a mechanism whereby business associations representing different clusters would submit proposals that identify areas for collective action and public support. A panel of experts would review the proposals, ranking

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[27] An interesting point here is that 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. In any case, this is something that countries have to do anyway as part of their commitments under the WTO.

them according to the estimated social return for the public investment. The best projects would be selected for support.

As with any process, the quality of the results would depend on the incentives and capacity of the participants. Business associations that are weak or are created for rent-seeking and confrontation rather than constructive work would clearly derail the process. A "panel of experts" that is merely a group of political appointees would lead to waste and possibly even corruption. Clearly, then, part of the challenge of making the mechanism work appropriately entails working on strengthening business associations and filling the panel with people that have a reputation at stake.

An additional challenge is that even for private participants in the cluster, it may be difficult to identify the areas where collective action would have the highest payoff. Similarly, it may be difficult for the panel of experts to evaluate the proposals and rank them according to their social returns. As exemplified by the experience of Northern European countries (see Blomstrom et al., 2002), it may be useful to conduct prospective studies to identify opportunities for investments with high social returns. Although this is more controversial, one could go even further and argue that such studies may also serve to identify areas where collective action may be particularly profitable. Grants and technical assistance could be used to encourage and support the relevant clusters to organize and prepare proposals for participation in the competitive mechanism.

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 appropriate functioning of these institutions is important for the proper operation of the whole strategy. Developing countries clearly have much work to do in this area, but there are several examples of public and semi-public agencies in developing countries that show positive results (e.g., CINDE in Costa Rica, CORFO and NAFIN in Mexico, BNDES in Brazil, and BANCOLDEX in Colombia).

Moreover, experience over the last decades has led to certain 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 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 elimination if they fail to perform

according to some minimum standard. Third, programs that require public financing should start small and increase only to the extent that evaluations reveal their good performance. Finally, the whole strategy should be designed in a way that allows both the government and private sector organizations to accumulate expertise and thereby carry out more sophisticated policies.[28]

Is This Strategy Realistic for Latin America?

A natural question is whether Latin American countries can successfully engage in the kind of development strategy just described. The general presumption is that most countries in the region suffer from a weak state that "has little capability of transforming the economy and social structure over which it presides" (Evans 1995, p. 45). In other words, even when government policy is correctly designed, it is difficult to implement due in part to a weak bureaucracy, where "rule-governed behavior immersed in a larger structure of careers that creates commitments to corporate goals is notable by its absence" (Evans, 1995, p. 46). For example, a strong state would be able to 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.

Although the absence of a strong state is clearly a problem in the region, it is not true that all countries suffer from this problem. For example, Chile has a strong state. The same applies, although with less force, to other countries, such as Mexico, Costa Rica, Uruguay, and Brazil. On the other end, there are countries such as Haiti, which does not have the conditions in place for a sophisticated set of microeconomic interventions. It would be incorrect to generalize for the Latin American region. There are countries that can follow a sophisticated cluster-oriented strategy, and others that under present conditions cannot.[29]

The widespread concern about the dangers of implementing microeconomic interventions in Latin America derives in large part from the experience of import substitution. In most countries this policy was captured by the protected firms, which pushed for wider and lengthier protection without taking the necessary actions to improve productivity and reduce dependence on high tariffs. Although more research is needed to fully understand the conditions necessary to

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

[29] Another issue that could be seen as a problem for the implementation of a strategy like the one recommended here is the associated fiscal cost. In my view, this should not be a significant problem because the associated cost is not likely to be large, and—more importantly—because most countries already spend significant amounts on microeconomic interventions, so that only a reshuffling of existing spending is probably needed.

prevent this from happening again, it seems that the microeconomic interventions advocated in the previous sections are not nearly as likely to provoke capture. This is because these interventions do not entail protection or tax breaks, which can easily become permanent, and whose total budgetary costs are usually hidden; instead, these interventions involve one-time grants whose fiscal cost is more difficult to hide. Although this point certainly requires more research, it seems intuitive that the political economy of tax breaks (which are usually not included explicitly in the budget) is different from the political economy of one-time grants for collaborative projects, particularly if a policy of accountability and evaluation is implemented. Moreover, the experience with import substitution provided valuable lessons, such as the importance of open dialogue, transparency, accountability, and constant evaluation. Adherence to these principles should minimize corruption and capture in future efforts.

In any case, at least in the short run, possible action depends on government capabilities. Usually, there are islands of efficiency—government agencies or nongovernmental organizations—that 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. In the medium run, countries should work on improving government capabilities in key areas.

A final consideration concerns the redistributive consequences of the recommended interventions. In a region such as Latin America with high inequality and the widespread perception that riches are associated with corruption and past privileges, this is a critical issue. If the economic elite dominate the sectors where the country has a comparative advantage, there could be a political backlash against this kind of intervention. The backlash could be avoided by making it clear from the outset that these policies are not elaborate schemes for transferring rents to certain groups, that beneficiaries are paying for 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 the government and where all public actions generate a suspicion of corruption, *any kind* of microeconomic intervention that is not completely general and neutral will be difficult to implement.

References

Acemoglu, D. 1997. "Training and Innovation in an Imperfect Labour Market." *Review of Economic Studies* 64: 445-464.

Altenburg, T., and J. Meyer-Stamer. 1999. "How to Promote Clusters: Policy Experiences from Latin America." *World Development* 27.

Amsden, A. H. 1989. *Asia's Next Giant: South Korea and Late Industrialization*. Oxford, United Kingdom: Oxford University Press.

Audretsch, D., and M. Feldman. 2003. "Knowledge Spillovers and the Geography of Innovation." Forthcoming in the *Handbook of Urban and Regional Economics*. Volume 4. Amsterdam, The Netherlands: North-Holland.

Blomström, M., A. Kokko, and F. Sjöholm. 2002. "Growth and Innovation Policies for a Knowledge Economy: Experiences from Finland, Sweden, and Singapore." Stockholm, Sweden: Stockholm School of Economics. Manuscript.

De Ferranti, D., P. Perry, D. Lederman, and W. Maloney. 2002. *From Natural Resources to the Knowledge Economy*. Washington, DC, United States: World Bank.

De Ferranti, D., G. Perry, I. Gill, L Guasch, W. Maloney, C. Sánchez-Páramo, and N. Schady. 2003. *Closing the Gap in Education and Technology*. Washington, DC, United States: World Bank.

Ethier, W. 1982. "National and International Returns to Scale in the Modern Theory of International Trade." *American Economic Review* 73: 389-405.

Evans, P. 1995. *Embedded Autonomy*. Princeton, United States: Princeton University Press.

Hausmann, R., and D. Rodrik. 2002. "Economic Development as Self-Discovery." NBER Working Paper 8952. Cambridge, United States: National Bureau of Economic Research.

Hausman, R., and D. Rodrik. 2003. "Economic Development as Self-Discovery." *Journal* of *Development Economics* 72(2): 603-633.

Hausmann, R., A. Rodríguez-Clare, and D. Rodrik. 2005. "Towards a Strategy for Economic Growth in Uruguay." Working Paper RE1-05-003. Washington, DC, United States: Inter-American Development Bank.

Hoff, K. 2000. "Beyond Rosensetein-Rodan: The Modern Theory of Coordination Problems in Development." *Proceedings of the Annual World Bank Conference on Development Economics*. Washington, DC: World Bank.

Inter-American Development Bank (IDB). 2000. "Technology Development and Innovation Program, CH-160, Loan Proposal." Washington, DC: Inter-American Development Bank.

----. 2001. *Competitiveness: The Business of Growth*, 2001 Economic and Social Progress Report (IPES). Washington, DC: Inter-American Development Bank.

Imbs, J., and R. Wacziarg. 2003. "Stages of Diversification." *American Economic Review* 93: 63-86.

Krueger, A. 1993. *Political Economic of Policy Reform in Developing Countries*. Cambridge, United States: MIT Press.

Krugman, P. 1991. *Geography and Trade*. Cambridge, United States: MIT Press.

Lall, S. 2004. "Reinventing Industrial Strategy: The Role of Government Policy in Building Industrial Competitiveness." G-24 Discussion Paper. UNCTAD.

Marshall, A. 1920. *Principles of Economics*. London, United Kindgom: MacMillan.

Murphy, K. M., A. Shleifer, and R. W. Vishny. 1989. "Industrialization and the Big Push." *Journal of Political Economy* 97.

Noland, M., and H. Pack. 2003. *Industrial Policy in an era of Globalization: Lessons from Asia*. Washington, DC: Institute for International Economics.

Porter, M. 1990. *The Competitive Advantage of Nations*. New York, NY: Free Press.

----. 1998. *On Competition*. Boston, MA: HBS Press.

Rodríguez-Clare, A. 1996. "The Division of Labor and Economic Development." *Journal of Development Economics* 49: 3-32.

----. 2003. "Innovation and Technology Adoption in Central America." Washington, DC, United States: Inter-American Development Bank. Manuscript.

----. 2004a. "Microeconomic Interventions after the Washington Consensus." Washington, DC, United States: Inter-American Development Bank. Manuscript.

----. 2004b. "Clusters and Comparative Advantage: Implications for Industrial Policy." Washington, DC, United States Inter-American Development Bank. Manuscript.

Rodrik, D. 1996a. "Coordination Failures and Government Policy: A Model with Applications to East Asia and Eastern Europe." *Journal of International Economics* 40: 1-22.

---. 1996b. "Understanding Economic Policy Reform." *Journal of Economic Literature* 34: 9-41.

Romer, P. 1990. "Endogenous Technological Change." *Journal of Political Economy* 78: 71-102.

Rosenstein-Rodan, P.N. 1943. "Problems of Industrialization of Eastern and South-eastern Europe." *Economics Journal* 53: 202-11.

Saxenian, A. 1994. *Regional Advantage*. Cambridge, United States: Harvard University Press.

Steinberg, C. 2002. "Does the Neighborhood Matter?" Washington, DC, United States: International Monetary Fund. Manuscript.

Stiglitz, J. 1998. "More Instruments and Broader Goals: Moving toward the Post Washington Consensus." 1998 WIDER Annual Lecture.

Wade, R. 1990. *Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization*. Princeton, United States: Princeton University Press.

Williamson, J. 2003. "An Agenda for Restarting Growth and Reform." In: P-P Kuczynski and J. Williamson, editors. *After the Washington Consensus*. Washington, DC, United States: Institute for International Economics.