

# **Coordination Failures, Clusters and Microeconomic Interventions**

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## **I - Introduction**

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). One may distinguish among three strategies to complement the market-oriented reforms: first, macroeconomic policies to reduce the region's high vulnerability to crises; second, institutional and "microeconomic" reforms to improve the "business climate" and provide better foundations for the market economy to generate growth; and third, 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 this type of interventions for decades. Since the mid-1980s, with the switch to outward-oriented development strategies, the main set of microeconomic interventions have been aimed at promoting exports, attracting foreign direct investment, and the implementation of programs to support small and medium-sized enterprises (SMEs). Recently, there has also been new interest in promoting innovation (IADB 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 with 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), and the second is associated

with coordination failures in taking the necessary actions to increase sector-wide productivity. The goal of this paper is to explore the latter market failures, their relation with 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 III 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 IV argues that although one may alternatively think of clusters 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 V, which presents a model of a small economy that is plagued by sector or cluster-specific coordination failures. This section shows that, rather than policies such as Import Substitution that aim to reallocate resources towards sectors that are seen as offering higher clustering possibilities, policy should aim at fostering cooperation in sectors where the economy is already showing comparative advantage. Section VI discusses a particular application of these ideas to innovation policy. It is argued 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 VII 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.

## **II – Coordination failures**

A firm's productivity depends not only on its own efforts and abilities, and on 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 non-excludability, the provision of these inputs and services is plagued by market failures. There is a vast literature exploring these market failures, which often give rise to multiplicity of equilibria. Most famously, Rosenstein-Rodan (1943) argued that investment by one firm can have a positive effect on the profitability of investment by other firms, because higher investment gives rise to an increase in aggregate demand, which under economies of scale increases 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 we say that there is a coordination failure.

There are many other instances under which interdependencies among economic agents lead to coordination failures. 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 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.

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 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 that of a public good, which suffers from a problem of non-excludability: the provider cannot exclude anyone from enjoying the benefits of this good. Clearly, in this case there is no equilibrium where the “market” delivers this 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.<sup>1</sup>

In the following paragraphs, I present examples and references of models where economies of scale, thick market effects, knowledge spillovers and other problems of non-excludability, give rise to coordination failures.

### 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.

When economies of scale are present in the production of inputs, then one can easily arrive at a formalization of Adam Smith's proposition that "the division of labour is limited by the extent of the market." The simplest formalization of this idea relies on three assumptions: benefits from specialization or "division of labour" 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 non-tradable intermediate goods (e.g., producer services such as consulting, machine repair, accounting, 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.<sup>2</sup> This is because as the industry expands, then there will be room for more specialization among intermediate good producers, and this will lead to higher productivity in the industry.<sup>3</sup>

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<sup>1</sup> This case, where the coordination failure involves the Government, is usually referred to as a "Government failure."

<sup>2</sup> 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).

<sup>3</sup> 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.

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 labour 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 not competitive. On the other hand, if firms use the modern technology, the market for inputs will be large, and this will create incentives for many firms to enter into 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 previous argument is that there are significant transportation costs or other costs associated with having to rely on suppliers that are far away.<sup>4</sup> One obvious non-tradable input is labour. One can think of a similar story to the one above, where coordination failures 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, of course, it is not economies of scale that lead to multiple equilibria, but thick market effects due to search costs. 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,

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<sup>4</sup> The relevance of high transportation costs is clear for producer services (see Rodríguez-Clare, 1998). 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.

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 has 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 very 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 very likely that they will be properly matched with modern firms or trained workers.<sup>5</sup>

Another obvious non-tradable input is infrastructure. As shown by Murphy, Shleifer and Vishny (1989), there are two types of market failure related to investment in infrastructure: first, there is the classic problem of the monopolist who introduces a good to the economy but cannot appropriate the whole consumer and producer surplus generated. It may then happen that even though it would be socially optimal for the good to be introduced – or, for our purposes, the infrastructure project to be undertaken – the profits that the investor makes are not enough 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. 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 coordination to take the economy to the good equilibrium.

### Knowledge spillovers and other problems of non-excludability

Whether knowledge is accumulated through learning by doing, purposeful R&D, or any other means, it is likely that it will spill over and benefit other firms. There is

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<sup>5</sup> A similar idea was proposed by Alfred Marshall (1920). Marshall pointed to three sources of externalities that could give rise to industry-level agglomeration: knowledge spillovers, input sharing, and labour market pooling. Krugman (1991) formalized the idea of labour market pooling by showing how it generates

abundant evidence that such knowledge spillovers are important (Audretsch and Feldman, 2003). If such spillovers 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. On the other hand, 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 generated by investing in knowledge is non-excludable. A firm cannot prevent another from benefiting from the knowledge it generates. As discussed above, 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 even though there are no multiple equilibria, there is a coordination failure, since everybody would be better off with  $n = 1$ .

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externalities because a larger industry concentrated in one location allows workers to specialize on the skills that are specific to that industry, thus allowing a “greater division of labor” and higher productivity.



The more standard case when there are problems of non-excludability 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.<sup>6</sup> In that case, it would be impossible to sustain a situation where all firms invest in producing high quality goods, since in that 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).<sup>7</sup> Another interesting example of this type of problem is offered by Uruguay’s efforts to eradicate foot and mouth disease in cattle, a requirement to export beef to the United States. This is a case where there is no equilibrium with individual firms spending the first-best level in prevention and eradication: an individual firm would always be tempted to spend a bit less, since it captures 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 very significant gains to the industry and the country.

### **III – Clusters**

Coordination failures can happen at the economy-wide level or at the sector level. In the model of Murphy, Shleifer and Vishny (1989), 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 of the examples of coordination failures presented above take place at a narrower level.

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<sup>6</sup> 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.

<sup>7</sup> An interesting example of this is a regulation applied in Costa Rica that prohibited coffee producers to sell 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.

For example, in the case of economies of scale and benefits of specialization in the production of non-tradable inputs, there are multiple equilibria at the level of firms using a common set of inputs. This could be, for example, the textile and apparel sector, the microelectronics sector or something broader such as “non-traditional agriculture.” Consider also the case of coordination failures involving investments in infrastructure. The example provided by Murphy, Shleifer and Vishny (1989) is that of a railroad construction and overall industrialization across multiple sectors. One can think of examples that are more relevant for LDCs today and that apply at the sector level: 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 either; a large scale irrigation project would not be profitable if there are only few farms using modern technologies, but using such technologies is 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 towards fashion design in the absence of specialized professionals.

As the examples above illustrate, when we think of coordination failures at the sector level, it is not completely clear what “sector” means. 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 there are several different industries that 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.

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: non-tradable inputs, infrastructure, public goods, skilled workers,

knowledge.<sup>8</sup> Thus, when we think of a cluster, we have in mind a group of related industries and agents located in the same region or country. This does not imply, of course, 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 does make sense to think of a regional-level strategy to achieve 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 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, 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, whereas the argument presented here is that such a geographic

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<sup>8</sup> 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).

concentration offers only the *possibility* of higher productivity, a possibility that will only be realized through some kind of coordination.<sup>9</sup> An appealing feature of this second way of thinking 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).

#### **IV – Agglomeration Economies or Coordination Failures?**

It is worth pausing to explore at a deeper level the different policy implications that emerge from Agglomeration Economies (AEs) 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 AEs, which in turn are generally seen to justify policies that reallocate resources towards 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 (let’s call it the “advanced” sector) exhibits AEs, while the other (let’s call it 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. To understand this, note that if the economy specializes in the traditional sector, the absence of any resources devoted to the advanced sector prevents the economy from reaping any AEs there. Low productivity in the advanced good would then lead to a comparative advantage in the traditional sector, “trapping” the economy into specialization in this sector. There is another, superior equilibrium, however, where the economy specializes in the advanced good, reaps the

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<sup>9</sup> 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 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 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 are realized), hence allowing the process

benefits of AEs, and achieves a comparative advantage in the advanced good. In this context, a policy of Import Substitution (IS) could lead an economy stuck in the low-income equilibrium towards the high-income equilibrium. This happens because IS 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 it is likely that developed countries have already reaped the benefits of AEs in the advanced sector. Thus, international prices for this good would be lower, reflecting the higher productivity associated with the realization of AEs in rich countries. From the point of view of a small economy, it is the same to be specialized in an industry with strong AEs and a low international price, or weak AEs 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 implemented IS and achieved expansions of their modern sectors without benefiting from AEs.<sup>10</sup> Perhaps the reason for this is that there are different ways of producing a good, some of which may lead to AEs, and some of which may not. Consider for example the case of AEs generated by knowledge spillovers. 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, unskilled-intensive technology in an LDC and a modern, skilled-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

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to continue. Thus, to some extent, the original solution of a coordination failure leads to agglomeration economies.

<sup>10</sup> 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).

“North” and then, after progressive standardization and simplification, are produced in the “South.” More generally, an industry can exhibit AEs in one place, but not in another; it can exhibit AEs at a certain stage in its development, but not later. In other words, as Michael Porter has stated, “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 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 AEs.<sup>11</sup>

Once we accept that production in the advanced sector can take place using backward technologies or modes of production, then it becomes clear that IS does not necessarily lead to externalities and clustering. Instead, IS could simply push resources towards what are regarded in rich countries as “advanced” sectors, but that once in LDCs could be organized in ways that do not generate any externalities.

This reasoning has broader implications. Not only IS, but also any other policy (even export promotion) that distorts prices so as to push resources into “advanced” sectors would face the same problem.<sup>12</sup> 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 comparative advantage.<sup>13</sup>

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<sup>11</sup> See de De Ferranti et al. (2002).

<sup>12</sup> 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 non-clustered sector that exhibits comparative advantage (see Rodríguez-Clare, 2004).

<sup>13</sup> 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 (2004), 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.

## V – 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 to think 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 the North, and hence already reflect any benefits of AEs. 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 II, 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.<sup>14</sup> 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  $\lambda_{ji}$  with coordination failure and  $\theta_j \lambda_{ji}$  if coordination is achieved.  $\lambda_{ji}$  captures “raw” productivity while  $\theta_j - 1 > 0$  captures gains from coordination.<sup>15</sup>

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

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<sup>14</sup> 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.

<sup>15</sup> 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.

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  $\lambda_{ki}$  (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  $j$ .  $\theta_j$  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 comparative advantage in low-indexed goods. Note that a sufficient condition for this is that  $\theta_j$  be non-decreasing 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  $w/\lambda_{jS}$  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: 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:

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

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  $k$  not be too strong relative to the benefits of coordination in sector 1.

The reader may have expected the condition (\*) to be stated in terms of the benefits of coordination in sector  $k$ , rather than sector 1. But recall 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 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  $\theta_1$ . 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 different 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  $j = 1, \dots, k$  then the wage is declining as we move 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 worse equilibrium is the only one without coordination, which we already know entails specialization in good 1.

### Policy implications

An important result of the model is that the ranking of equilibria doesn't depend on the benefits that can be attained with coordination: specialization with coordination in sectors with higher  $\theta$  doesn't necessarily lead to higher equilibrium wages. The reason

for this is simply that higher  $\theta$  leads to higher productivity in North and lower international prices. Thus, even it was thought that higher-indexed goods entail higher benefits of coordination, perhaps because of stronger knowledge externalities, this does not imply that South should push for specialization in these sectors.<sup>16</sup> Putting it simply, the goal of policy is not to reallocate resources towards 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 at all. 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 towards other sectors would only decrease the wage.<sup>17</sup> Of course, if policy were to move the economy from specialization in 1 to specialization in a sector  $k$  satisfying condition (\*) *while simultaneously* achieving coordination in that sector then the wage would increase. But this seems overly ambitious. 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 (\*) were satisfied for  $k$  and South were specialized in sector  $k$  with coordination, then inducing reallocation towards 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

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<sup>16</sup> 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.

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.<sup>18</sup> Although the model shows that under these circumstances there are interventions that could increase the wage, 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 it may also be unnecessary since one would expect 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 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-end, more skilled-intensive processes and thereby remain competitive at higher wages than emerging countries. In terms of the model above, one can think of this as a process whereby 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 doesn't have the strongest comparative advantage (but condition \* is satisfied). According to the model above, the Government could improve efficiency by pushing towards an equilibrium with

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<sup>17</sup> 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 towards more sophisticated goods.

<sup>18</sup> 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.

specialization and coordination in good 1. It would then appear that at least in this particular case there is justification for a policy of sectoral reallocation of factors of production towards “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 not reasonable and not necessary either. The most realistic scenario is that the sector where the country in question 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. 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.

## **VI - Innovation Clusters**

As stated above, there is plenty of evidence showing the existence of positive (local) externalities generated by innovation activities. As is well known, 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 argued by Audretsch and Feldman (2003), it is necessary to move beyond the simple idea that innovation activities generate positive spillovers if we are to design effective interventions in this area. In particular, we need to understand better the types of innovation activities that generate such spillovers, and the mechanisms through which they arise. Even though research on these issues is still in its infancy, there are a few

conclusions that appear robust (see Audretsch and Feldman, 2003). I now list such conclusions and for each one briefly discuss 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 away. 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.<sup>19</sup> Another interesting example is offered by the comparison of innovation clusters in Silicon Valley and on 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 in Boston’s Route 128, where innovation is carried out in R&D departments within large corporations. Clearly, 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 on 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, coordinating innovation projects with private sector organizations, and support of the 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

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<sup>19</sup> 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).

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 finally “establishing 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.”

## **VII – Towards 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, towards 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 recently 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 on with increasing concentration. This finding suggests that growth in the poorest countries is related to the discovery of activities 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.<sup>20</sup> 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 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 discussed abroad, there is a need for a wide set of instruments or policies. An exhaustive list is therefore impossible. Here I present a list of examples to give an idea about the type 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 that vary in proportion to the total exports in these new markets performed by other local firms.<sup>21</sup> 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,

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

or irrigation projects for modern agriculture. Attraction of FDI may be an effective way to bring in foreign technology, or 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 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, as mentioned above, is to promote the development of innovation clusters.

It is clearly 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 here 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

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<sup>21</sup> I thank Ernesto Stein for proposing this idea.



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 different sectors that want to start or improve their level of organization.<sup>22</sup> 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.

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.<sup>23</sup> A key player here has been INIA (Instituto Nacional de Investigación Agropecuaria), an institute for agricultural research created by law in 1990.<sup>24</sup> During the 1990s, INIA developed new rice seeds that are better adapted to Uruguay’s soil and climatic conditions, allowing productivity and exports to grow at a dramatic pace: in the year

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<sup>22</sup> 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 PROCOMER (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 improve education, quality upgrading, exporting.

<sup>23</sup> This example is adapted from Hausmann, Rodriguez-Clare and Rodrik (2005).

<sup>24</sup> Although INIA is a public institution, it operates outside the sphere of the State, giving it much more flexibility.

2000, productivity reached 6,400 kilograms per hectare, one of the highest in the world, with 96% 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), improving irrigation systems and planting methods, and the continuous 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.

### **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 the year 2000.<sup>25</sup> 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, 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 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 criteria of quality and price. At the end of the second phase, there is a list of projects each of which has 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 upon 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

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<sup>25</sup> The methodology of the FRC and other details can be found in [www.conicit.go.cr](http://www.conicit.go.cr).

of the projects to make sure that the resources are being spent according to the plan and to evaluate the results.<sup>26</sup>

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, in 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 about its recently launched *Chile Innova* program, which appears to favour the second, more aggressive and selective approach to microeconomic interventions. In the documentation for the loan received by Chile from the IADB for this program, it is stated 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." (IADB, 2000). *Chile Innova* conducts "prospective studies" to identify economic activities that present the "greatest competitive potential" in the medium term. In the program's website ([www.innovacion.cl](http://www.innovacion.cl)), it is stated 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 Government, the private sector, the academic community, workers and civil society.

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<sup>26</sup> For a broader discussion see Rodríguez-Clare (2003).

There are different ways to interpret these statements. One possibility is to focus on the phrase stating that “a set of areas where competitive advantages can be created... must be identified...” In Sections IV and V it was argued that this is an incorrect approach: it is not necessary to pick winners, and it is not necessary to create winners either. 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 clearly as possible, the model presented in section V used a set of assumptions that led to complete specialization in one 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 inducing resources to reallocate to other supposedly more “advanced” sectors. But how would policy choose between proposals for collective action among the different 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, one could 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 that calculating such social returns is very difficult. 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 they conceive better proposals that later compete for Government support. Thus, one

could think of having 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 that 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 industrial policies pursued in East Asia, which for a while 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 highest growth. This provides further support for valid scepticism regarding policies that attempt to “pick winners.” But this is very different from the kind of strategy discussed in this paper. As emphasized above, there is no need for the Government to distort prices so as to reallocate resources towards 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 is likely to 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, if one wanted to call the current proposal a sort of industrial policy, it 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 (WTO, 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.<sup>27</sup>

### **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 identifying 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 rather than constructive work would clearly derail the process. A “panel of experts” that is nothing other than 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 hard to identify the areas where collective action would have the highest payoff.

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<sup>27</sup> 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 America countries (mainly Mexico, Central America and the

Similarly, it may be hard for the panel of experts to evaluate the different 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. One could then think of ways such as grants and technical assistance to encourage and support the relevant clusters to organize and prepare proposals that would participate in the competitive mechanism described above.

As discussed 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 appropriate functioning of these institutions is then 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 LDCs that show positive results (e.g., CINDE in Costa Rica, CORFO in Mexico, BNDES in Brazil, NAFIN in Mexico 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 towards 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 State and private sector organizations to accumulate expertise and thereby carry out more sophisticated policies.<sup>28</sup>

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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.

<sup>28</sup> See Hausmann and Rodrik (2003) for an excellent discussion of the organization of a sophisticated development strategy.

### **Is this strategy realistic for Latin America?**

There is a natural question as to whether Latin America 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, a 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 very 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). As an illustration, a “strong State” is one that 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.

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. It is clear, for example, that 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, where one would not even imagine that the conditions are in place for a sophisticated set of microeconomic interventions like the ones discussed above. It is clearly 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.<sup>29</sup>

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 stop their dependence on high tariffs. Although more research is needed to fully understand the conditions necessary to prevent this from happening again, it

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<sup>29</sup> 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



seems that the set of 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 harder 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 has taught us 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 NGOs – 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 sectors where the country has a comparative advantage are dominated by the economic elites, there could be a political backlash against this kind of interventions, unless it is very 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, one must accept that in deeply divided societies, where the public has little trust in Government and where all public actions generate a suspicion of

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already spend significant amounts in microeconomic interventions, so that only a reshuffling of existing spending is probably needed.

corruption, *any kind* of microeconomic interventions that are not complete general and neutral will be very difficult to implement.

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