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Sergio G. Lazzarini

Insper Working Paper
WPE: 289/2012

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SERGIO G. LAZZARINI
Insper Institute of Education and Research
R. Quatá, 300
São Paulo, SP Brazil 04546-042
Phone: 55-11-4504-2432
E-mail: SergioGL1@insper.edu.br

This version:
June 2012

Acknowledgements: I thank the valuable, rare and difficult-to-imitate comments by Dirk Boehe, Eric Brousseau, Sandro Cabral, Anita McGahan, Luiz Mesquita, Will Mitchell, participants of the CORS workshop (at the University of São Paulo), and anonymous referees. All remaining errors and omissions are my own.

Strategizing by the Government: Industrial Policy and Sustainable Competitive Advantage

ABSTRACT

Despite the prevalence of active governmental policy devised to foster firms and industries in various countries, the link between industrial policy (IP) and competitive advantage has received scant attention in Strategic Management. I propose a model where IP influences the accumulation and churning of resources and capabilities which can be flexible or specialized. I also introduce the concept of support-adjusted sustainable competitive advantage (SASCA), which occurs if a firm's observed economic performance is superior to the expected performance of competitors had they received the same array of policies. In my framework, SASCA is created by the interplay of three factors: external integration, geographical specificity, and policy-making capability. Thus, the model enhances our understanding of the determinants of competitive advantage in a context of governmental intervention.

Key words

Industrial policy, competitive advantage, resource accumulation, governmental capability, development

INTRODUCTION

Can governments actively help create competitive advantage? For scholars associated with the so-called *industrial policy* literature, the answer is a vehement "yes." Through temporary industry protection, subsidies, and coordinated government-induced investments, these scholars argue, countries can foster the development of productive industries and world-class firms (Hirschman, 1958; Krugman, 1993; Rodrik, 2004). Influential books have been written about how diverse countries such as Japan (Johnson, 1982), South Korea (Amsden, 1989) and Taiwan (Wade, 1990) managed to catch up to developed economies through active governmental policy boosting myriad industrial sectors and firms that eventually became relevant "national champions." To some, even the rapid development of the United States owes much to temporary protection against industrialized products from England in the 19th century (Chang, 1994), as well as government-sponsored research and targeted initiatives such as in computing, health and agriculture (Graham, 2010; Mazzucato, 2011; Mowery, 1984). Despite criticisms that excessive governmental involvement in the private sector can lead to favoritism and rent-seeking (Ades and Di Tella, 1997; Krueger, 1990; Pack and Saggi, 2006), some authors go as far as to claim that imperfect industrial policy "is infinitely better than failing on the opposite side" of governmental inaction (Reinert, 2009: 102).

Surprisingly, although *strategic management* is about how competitive advantage is created and sustained (Barney, 2002), there has been scant integration between the strategic management and the industrial policy literatures—henceforth referred to as "SM" and "IP" respectively. Porter (1990) and Kogut (1991) represent early SM contributions on how country- or region-level advantages can affect performance; however, they do not exploit the role of IP in detail. Porter (2008), in his important examination of how countries have created global companies out of regional interfirm clusters, actually positions himself *against* IP. In his view, IP prescriptions such as temporary protection, pro-domestic bias and targeting—the

promotion of handpicked industries—are detrimental to the emergence of diverse and competitive clusters because they artificially shield firms from competition forces that prompt continuous improvement. For Porter, the role of the government should be more like "a catalyst and a challenger" through various initiatives such as the promotion of domestic competition and investments in education. He contends that "cluster theory and industrial policy differ fundamentally in both their intellectual foundations and their implications for government policy" (Porter, 2008: 264-65).

However, IP and SM, viewed broadly, do share similar conceptual roots. At a more fundamental level, IP is based on the idea of "imperfect tradability of key inputs (and technologies) associated with modern sector production" (Rodrik, 1995: 78). In other words, a basic cause of underdevelopment is the restricted access to rare and valuable resources necessary to catch up. Were resources perfectly mobile, developing countries could easily tap into the know-how and productive assets present in developed economies, thus spurring investment and growth. Yet the idea that resources are imperfectly traded in factor markets is precisely the core assumption of the *resource-based view* in the SM literature (Barney, 1991; Peteraf, 1993). According to this view, the possession of valuable, rare, and difficult-to-imitate resources leads to *sustainable* competitive advantage—i.e., firms consistently outperforming comparable peers over extended periods. However, while SM is concerned with explaining why superior performance is created and sustained, IP focuses on how resource immobility prevents less developed industrial sectors to catch up and thrive in global markets—obviously two sides of the same coin.

Some strands in SM and IP also share a foundational origin from Neo-Schumpeterian authors such as Nelson and Winter (1982) and Dosi (1982). IP proponents typically eschew the Ricardian notion that countries should specialize in activities for which they have a natural, static comparative advantage (such as abundant land or low-cost labor). They argue

instead that countries should foster *dynamic* advantages by creating mechanisms through which firms upgrade their capabilities and exploit new technological trajectories (Amsden, 1989; Cimoli, Dosi, Nelson, and Stiglitz, 2009; Possas, Salles-Filho, and Silveira, 1996; Redding, 1999). In their view, countries whose firms fail to learn and develop new technologies may become locked into inferior capabilities associated with basic, primary products and activities (Hausmann and Rodrik, 2003; Reinert, 2009). Similarly, several SM authors have also stressed the role of learning and path-dependent processes that critically affect firm evolution. For instance, the *dynamic capabilities* literature (Teece, 2007; Teece, Pisano, and Shuen, 1997) analyzes how firms develop and reconfigure their know-how through distinct learning paths in uncertain environments.

Given these commonalities, my objective in this paper is to start a theoretical integration between IP and SM by examining whether and in which conditions governments can influence the evolution of competitive advantage. Although there have been important advances in the SM literature on how firms strategically deal with governments (Henisz, 2000; Hillman, Keim, and Schuler, 2004) and how firms respond to certain country-specific factors such as poor infrastructure or ineffective legal enforcement (Hoskisson, Eden, Lau, and Wright, 2000; Khanna and Palepu, 2000), authors usually focus on firms as decision makers constrained by local conditions and hazards. The focus of IP, in contrast, is whether governments can *create* competitive advantage. Also, although some management scholars have theorized about how public sector strategies affect industry evolution (Lenway and Murtha, 1994; Mahmood and Rufin, 2005; Spencer, Murtha, and Lenway, 2005), IP and SM contributions are still largely disconnected. Because deliberate governmental intervention to develop industries and firms remains widespread (Bremmer, 2010), an improved cross-fertilization between these two literatures can help us better understand "non-market" determinants of business performance.

In my framework, I pursue such integration by treating IP as a factor that dynamically influences the accumulation of country-, industry-, and firm-level resources and capabilities (Mahoney, McGahan, and Pitelis, 2009: 1040). My goal is *not* to defend IP initiatives; rather, I propose factors influencing whether IP-induced resource accumulation in a given country or region will lead *or not* to superior competitive advantage in global markets. In particular, given that policies may distort observed economic rents, I introduce the concept of *support-adjusted* sustainable competitive advantage (SASCA). Thus, a given global competitor may exhibit superior observed return simply because it receives large subsidies or because its country has heavy entry restrictions. Its economic performance, after adjusting for those effects, may be inferior to comparable peers in other countries with minimal governmental support. Following this logic, a firm will exhibit SASCA if its observed economic performance is superior to the expected performance of global peers had they received the same array of support policies. This concept also allows us to assess in which conditions some governments may be better than others to pull competitive advantage out of any given policy profile. Each dollar applied in industry- or firm-level subsidies, for instance, may be more conducive to superior performance in certain countries with a host of characteristics that improve the effectiveness of IP.

The paper is structured as follows. In the next two sections, I describe the baseline model used in the paper, which links IP and SASCA through the mediating mechanism of resource accumulation and churning (i.e. constant renewal of resources and capabilities). Next I introduce key factors that should increase the likelihood that IP initiatives will result in superior accumulation and churning of country-level and industry-level resources. This discussion yields a set of testable propositions establishing a causal link between IP and SASCA. To be sure, given the complexity of the topic at hand, I do not intend to offer an exhaustive theory of IP and business performance; several issues actually invite further in-

depth investigation. In this sense, in the conclusion section, I present implications of the model and suggestions for a research agenda that further explores the potential interactions between SM and IP.

BASELINE MODEL AND KEY CONCEPTS

Although the major goal of industrial policy is to bring about economic development—consistent gains in per capita income (e.g. Meier and Rauch, 2000)—scholars have emphasized that IP-induced development is mediated by entrepreneurial forces unlocking productive investments and know-how residing at a local economy (Cimoli *et al.*, 2009; Lall, 1992; Rodrik, 2004). In other words, the link between IP and competitive advantage is mediated by the (IP-induced) evolution of resources and capabilities (the latter defined as actionable human know-how with potential economic value). Thus, my baseline framework describes how industrial policy influences resource accumulation and churning, which in turn leads to *support-adjusted* sustainable competitive advantage (Figure 1)—a new concept introduced here to take into account the effect of policies on observed economic rents. Although competitive advantage in SM is usually observed at the firm level, IP can foster the evolution of resources and capabilities at the firm, industry or country level. From the point of view of any given firm, industry- and country-level resources can be seen as locally available collective goods that can improve firm-level performance. For instance, distinctive country-level resources such as high-quality education can create superior firm-level advantage in global markets if competitors in *other* countries do not have equivalent access to such resources.

Before I describe the key elements of the baseline model, it is useful to discuss its abstractions. First, "strategizing" in my context has more to do with the actions of policy-makers trying to influence the evolution of local resources and capabilities, taking the actions of *other* governments as given. Modeling the dynamic, interdependent interactions between

governments in their policy decisions is an important step for future research, but beyond the scope of this paper. Second, I assume that resources will be, at least to some extent, immobile across country borders. This assumption is consistent with both IP and SM, which equally explain differential performance based on imperfections in resource markets. Although trade agreements and multinational corporations do help increase the global flow of resources such as raw materials and labor, I will later discuss that some resources may be more or less confined in particular locations. Third, I argue that resource accumulation (and change) will be affected by IP—which is *not* to say that resources and capabilities, and the competitive advantage they generate, will *only* be created through active IP. Other factors not related to or influenced by IP are either incorporated as exogenous shocks affecting competitive advantage or simply left out of the model (for instance, cyclical shifts in global demand or a firm's private investment in brand equity).

<<Figure 1 around here>>

Industrial policy (IP)

"Industrial policy" is a rather expansive term; many definitions have been used in the literature. In general, however, there is an agreement that IP involves forms of governmental intervention that attempt at promoting productive investments in a way that would not occur in a "market equilibrium" with autonomous, decentralized decision-making by firms not subject to such interventions (Cimoli *et al.*, 2009; Pack and Saggi, 2006). This definition, however, should not be confounded with "central planning," whereby most allocations are commanded by the state (Chang, 1994). IP presupposes the existence of entrepreneurs who will seek to make a profit given the incentive structure induced by the policies in place.

According to IP scholars, using governmental policies to alter the nature and path of productive investments will be particularly advantageous when a given regional context is subject to *externalities* across industries and activities (Harrison and Rodríguez-Clare, 2009;

Krugman, 1993; Marshall, 1920). For instance, an investment in steel mills will be more profitable if mining activities and efficient transportation infrastructure are locally present. Autonomous decision making will fail to incorporate those positive externalities; to use Hirschman's (1958) famous terminology, backward and forward linkages in the local production chain will have to be created. The solution, according to IP authors, is a "big push" by the government promoting coordinated, complementary investments (Murphy, Shleifer, and Vishny, 1989; Rosenstein-Rodan, 1943).[1] Hausmann and Rodrik (2003) also argue that governmental stimulus will be needed for local entrepreneurs to "discover" their latent (unrealized) competitive advantages. For instance, firms in a given region may foresee an opportunity in information technology services; but they will only find out whether the opportunity truly exists if they invest in that activity and learn. Because learning investments yield downstream information externalities and are risky, individual returns to learning will likely fall below their expected social return. Following this logic, governmental help can incentivize entrepreneurial effort to invest in new resources and capabilities.

In applied IP discussions, two general policy categories have been proposed: *vertical* and *horizontal* (e.g. Buiges and Sekkat, 2009; Lall and Teubal, 1998; Sapir, Buiges, and Jacquemin, 1993; Suzigan and Vilella, 1997). Vertical IP aims at promoting *particular* industries or firms so as to capitalize on existing advantages and, especially, explore latent advantages. If applied to a local industry and for all or most firms in that industry, vertical IP is usually referred to as *industrial targeting*: "benefits given to certain sectors that are not given to all sectors" (Beason and Weinstein, 1996: 286). Examples of vertical IP mechanisms include differential tax breaks to stimulate exports or prompt investments in certain industries and regions (e.g. to foster local backward or forward linkages); subsidized credit programs to

[1] This is consistent with Porter's (1990, 2008) discussion on the role of related and supporting industries, as well as more recent arguments using the notion of complementarities (Milgrom and Roberts, 1990; Porter, 1996) . However, as noted before, differently from IP scholars, Porter sees a more passive role of governments in fostering such complementary activities and investments.

promote innovation in knowledge-intensive industries; governmental investments in specialized education (such as industrial engineering or agricultural technology); differential import tariffs applied to infant industries; pro-domestic bias in governmental procurement involving particular sectors or activities.

Vertical IP can also involve firm-level targeting or the promotion of the so-called *national champions*—flagship companies supported by governments and acting as symbols of national presence in global markets. The aircraft manufacturing industry is emblematic: Europe's Airbus, the United States' Boeing, Canada's Bombardier, Brazil's Embraer, China's Comac, Russia's Sukhoi, they all represent examples of firms receiving significant push through governmental subsidies and credit. In the IP literature, the theoretical justification for national champions rests on the idea that large scale and the prospect of positive economic rents—which can be greatly dissipated under intense competition—are necessary to prompt investments in innovation (see e.g. Falck, Gollier, and Woessmann, 2011; Nelson and Winter, 1982; Possas and Borges, 2009). For this reason, policies inducing national champions often involve concentration in the domestic market and temporary protection for incumbents (Falck *et al.*, 2011).

Horizontal IP, in turn, involves overarching governmental policies that yield externalities to multiple sectors and firms. Examples include government-induced investments in transportation and export infrastructure; credit programs for diverse activities; policies to reduce red tape to launch new firms; investments in public schools and universities with multiple training programs and varied research projects; among several other initiatives that will help improve the *business environment* of the country and increase the rate of return of individual investments in a generalized way. Because horizontal IP does not involve targeting at the industry or firm level, some consider that it is actually *weak* policy (Khan and Blankenburg, 2009: 336). Governmental help will be more along the lines of facilitating firm

entry and resource deployment, while—absent vertical IP—the selection of sectors or firms will be left to market forces. For this reason, critics of IP usually refrain from attacking horizontal policies and instead center their argument on potential distortions caused by vertical targeting (e.g. Pack and Saggi, 2006). Porter's (2008: 265) view on how governments should influence cluster development also takes a more horizontal stance: "instead of targeting," he argues, "all existing and emerging clusters deserve attention."

Resources and capabilities: flexible and specialized

IP, however focused, should fundamentally alter the profile and distribution of resources in the economy (Caves, 1987). Although resource-based discussions tend to focus on firms and industries, an effective integration between SM and IP requires a more systemic analysis of heterogeneous resources and capabilities available in the economy as a whole (Lall, 1992; Mathews, 2003)—for instance, collective assets such as transportation infrastructure or know-how residing in public universities (Kogut, 1991: 36). Following this idea, I proceed with a three-level resource analysis by examining resources at the country, industry, and firm level. For expositional simplicity, I henceforth refer to "resources and capabilities" generally as "resources" (e.g. Barney, 2002: 144).

Country-level resources are *flexible* because they can be applied to multiple industries and applications (Combs, Ketchen Jr., Ireland, and Webb, 2011; Ghemawat and del Sol, 1998). Such flexible resources include, for instance, generic transportation infrastructure, overarching financial credit, basic scientific know-how, human capital created from primary and secondary education systems, and so on. In contrast, *specialized* resources are circumscribed into particular uses and applications. Specialized resources *at the industry level* are resources available to all or most firms in a given local industry. Examples of such specialized resources include colleges and research centers focused on particular knowledge domains (e.g. agricultural technology) as well as industry-dedicated infrastructure (e.g. state-

sponsored telecommunication networks). Resources can also be specialized *at the firm level*, such as patented technology or private concessions to exploit mines and oil deposits. While firm-level resources are in the possession of particular firms, resources specialized at the industry level are available for all firms in the local industry. Their collective fashion notwithstanding, they may be rare in a global context if industry peers in *other* countries do not have equivalent access to such specialized resources.

The connection between flexible and specialized resources and the previous discussion on horizontal and vertical policies should be evident. Horizontal policies will foster the accumulation of country-level flexible resources, whereas vertical policies will more directly promote resource specialization—either at the industry level in the case of industrial targeting or at the firm level when the government promotes national champions. Because a key aspect of country-, industry- and firm-level resources has to do with their potential to be engaged in multiple uses, I will focus on the more fundamental distinction between flexible and specialized resources and how IP can differentially affect the accumulation of each resource type. I will also later describe the interplay between flexible and specialized resources: how flexible resources can become specialized over time, and how existing specialized resources can be reconverted, at least in part, into flexible resources.

Support-adjusted sustainable competitive advantage (SASCA)

A final and critical element of the model evaluates the performance of industries affected by IP. In the SM literature, performance is conceived as *sustainable competitive advantage*: a situation when a firm exhibits better-than-expected economic performance in the long run (Barney, 2002), whereas expected performance is usually operationalized as the average return of firms in the same industry (e.g. McGahan, 1999; Mueller, 1986). In this view, competitive advantage should be assessed in a comparative manner, taking into account the performance of industry peers. How can we apply this idea in the context of IP?

A first aspect to consider is that the reference group to assess competitive advantage should also include industry peers *external* to the region where the policy is applied. Taking an external reference point allows us to examine the effect of heterogeneous policies across countries. This is consistent with Porter's (1990) influential work on national competitiveness, which assessed local clusters comprised of companies that eventually surpassed worldwide competitors in terms of product quality and market penetration. A second and equally important aspect is that assessing performance using *observed* economic rents can be misleading. Domestic industries may be artificially "profitable" due to heavy import tariffs, massive subsidies, or selective tax breaks. Thus, it is also important to factor in the *extent* of governmental support to certain industries (see Harrison and Rodríguez-Clare, 2009; Kemp, 1960).

I will proceed here with an intuitive discussion; a more formal treatment is presented in the Appendix. To facilitate understanding, consider the following example. Suppose that a given global industry has two major competitors with similar size, each in a particular country or region (e.g. Boeing and Airbus in the aerospace industry). The average profitability in this industry, removing IP-related factors that can affect profits, is 5%. Firm 1 has received $50 million dollars in governmental subsidies which have marginally increased its profitability by 5 percentage points. Firm 2, in turn, has received a lower amount of subsidies, $10 million, which marginally increased its profitability by 2 percentage points. The final (observed) economic returns of Firm 1 and 2 will therefore be 10% and 7% respectively. Although Firm 1 outperforms Firm 2 when we consider observed profits, this is not true when we take into account the effect of subsidies. For instance, we can ask: what would be the performance of Firm 1 had it received the same level of subsidies of Firm 2 ($10 million)? Because each additional $10 million dollars results in a marginal increase of 1 percentage point in Firm 1's

profitability, with $10 million in subsidies (instead of $50 million) we would expect its final return to be 6%—therefore *below* Firm 2's observed profitability.

We can thus say that Firm 2 has *support-adjusted* competitive advantage: its observed performance is superior to the *expected* performance of industry peers receiving the same level of support. This comparison is aligned with the familiar definition of competitive advantage as the difference between actual and expected performance based on the industry norm—only that, in the context of IP, the latter will have to incorporate the level of help that each competitor receives from its government. To be fully consistent with competitive advantage as defined by SM, support-adjusted competitive advantage should also be more or less persistent or *sustainable* in the long run. If this is the case, then the firm will exhibit *sustainable support-adjusted competitive advantage* (SASCA).

A key determinant of SASCA is the *marginal return* of IP initiatives engendered by each country. In the previous example, Firm 2 exhibits SASCA because its governmental subsidies have a larger marginal effect on profitability. With an extra amount of $10 million in subsidies, Firm 1's government increases firm-level profitability by 1 percentage point, which is half the marginal effect obtained by Firm 2's government (2 percentage points). Thus, policy-makers will differ in their effectiveness to turn IP initiatives into competitive advantage, and the concept of SASCA will try to account for those differences. Essentially, my theoretical model will propose reasons for such heterogeneous marginal returns. However, because accumulated resources mediate the link between IP and SASCA, I must first discuss in greater detail how IP-induced resources evolve and change, as well as how flexible and specialized resources interact over time.

UPPACKING THE IP-INDUCED EVOLUTION OF RESOURCES

Consistent with both the IP and SM literatures, I assume that a given local economy will display (*i*) an initial endowment of heterogeneous resources (Best, 1990; Penrose, 1959),

which will allow for (*ii*) further accumulation over time through heterogeneous learning paths (Dosi, 1982; Nelson and Winter, 1982) in a context of (*iii*) uncertainty on their future economic value. In particular, I will admit the advent of Schumpeterian shocks that may render an existing know-how obsolete or alter the value of existing resource configurations (Christensen, 1997; Wiggins and Ruefli, 2005). As schematized in Figure 2, the process of accumulation is subject to several interactions and feedback loops, which will induce path-dependent accumulation and change (Arthur, 1994). This dynamic mechanism is also aligned with endogenous growth models in economics emphasizing learning subject to Schumpeterian shocks (e.g. Aghion and Howitt, 1992). Below I describe the framework in detail.

<<*Figure 2 around here*>>

Resource accumulation

As discussed before, horizontal IP will foster the evolution of flexible resources, whereas vertical IP will promote resource specialization both at the industry and firm level. These parallel accumulation paths are depicted in Figure 2 by effects 1 and 2. I also distinguish between two types of resource specialization. As indicated by effect 2a, vertical IP can *reinforce* existing resource configurations. For instance, the government can expand farm credit in an agriculture-intensive country (reinforcement at the industry level) or funnel subsidies towards national champions (reinforcement at the firm level). Vertical IP can also pursue *new* resource configurations associated with latent competitive advantages (effect 2a). Thus, instead of further expanding farm production in an agriculture-intensive country, the government can support R&D in advanced biotechnology or new food derivatives.

As indicated by effect 3, flexible resources can also become specialized over time. Thus, while new applied technology often derives from past investments in basic science, the stock of specialized labor is a function of nationwide education systems that effectively train and deliver new talent. Mowery (1984: 507), for instance, contrasts the industrial

development of Britain and the US in the first half of the 20th century, arguing that "a tradition of scant financial support for such education [secondary and university levels] in Britain did nothing to improve the number, or the professional training, of engineers, who are still much scarcer there than in Germany or the United States." Likewise, the rapid industrial development of South Korea is often credited to a large and educated workforce—a flexible, country-level resource—which could be subsequently allocated to diverse IP-induced projects in specialized fields (Rodrik, 1995).

Resource churning

I also describe how specialized resources may turn into either renewed specialized resources or flexible resources—see the effects 4a and 4b in Figure 2. Thus, while the IP literature usually emphasizes policy-induced resource accumulation, I also discuss here an equally important process of resource *churning*. Absent churning, path-dependent accumulation may lead to poor performance, for two reasons. First, as discussed by organizational learning theorists, firms may excessively focus on existing solutions and knowledge sets that generate immediate application (Cyert and March, 1963; Levinthal and March, 1993). Inhibited experimentation will be particularly deleterious when Schumpeterian shocks erode existing advantages (e.g. technological breakthroughs). Second, rent-seeking incumbents may lobby for continuous protection or help from governments, thereby fueling the cycle of reinforced specialization (Beason and Weinstein, 1996; Krueger, 1990). Deepened specialization will then further increase the incentives to request more protection so as to preserve the value of their past investments (Grossman and Helpman, 1994; Hillman, 1982). Furthermore, a local industry may face the risk of resource *depletion* (effect 5), as exemplified by nonrenewable natural resources or physical assets that rapidly depreciate. An excessive exploitation of those resources can be inimical to accumulation and therefore

mandate constant resource renewal. Churning, therefore, will be a key element in the resource-based evolution of competitive advantage.[2]

More specifically, churning can occur in two ways. First, existing specialized resources may be reconverted into *new* specialized resources (effect 4a). For instance, state-sponsored military technology had an important impact on the subsequent development of the computer industry in the United States (Langlois, 1992; Mazzucato, 2011). In declining industries, specialized resources such as experienced personnel and physical assets can be acquired by other firms and redirected to other uses (Anand and Singh, 1997; Capron, Dussauge, and Mitchell, 1998). A second way of churning involves specialized resources turning into *flexible* resources (effect 4b). Thus, the sale of idle governmental assets or the privatization of struggling state-owned corporations can be used to reduce public deficit and channel resources to activities with broader impact, such as generic infrastructure or education (Chong and Lopez-de-Silanes, 2005). Specialized human capital can also be reallocated to revamp generalized human capital. In Singapore, teachers in primary or secondary education often come from specialized jobs such as engineering and services; Barber and Mourshed (2009: 29) note that "during the financial crisis [of 2008] Singapore's Ministry of Education set up a recruiting station in the heart of the financial district." In the case of resources that can be gradually depleted, such as minerals, governments can use the royalties from their exploitation to promote flexible resources (such as universities) or incentivize the creation of new industries. Thus, churning can also be a form of dynamic adaptation.[3]

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[2] As emphasized by the dynamic capabilities literature in SM, superior performance may follow from successive reconfigurations of existing resource endowments (Teece *et al.*, 1997). Thus, IP-induced resources should not only be expected to generate long-lasting (Ricardian) economic rents, but actually be constantly reshuffled so as to yield a string of temporary (Schumpeterian) rents (Mathews, 2003: 117). Furthermore, in his reexamination of the dynamic capabilities literature, Teece (2007: 1340) also stresses the importance of "mechanisms inside the enterprise to prevent the dissipation of rents by interest groups (both management and employees)." In a context of IP, as noted before, those interest groups would be capitalists in failing industries requesting continuous support.

[3] It is useful to provide a parallel between my discussion and theories of global trade. Since Krugman's (1980) seminal work, scholars have studied patterns of specialization across nations driven by differentiation and increasing returns. This strand is referred to as *new* trade theory. Krugman (1991) himself proposed a path-

Collectively, the effects discussed in this section indicate that resource accumulation, by itself, will not suffice. Under high uncertainty and depletion, and in the absence of churning-based adaptation, overspecialized accumulation may actually create and perpetuate support-adjusted competitive *dis*advantage in the long run (i.e. inefficient industries that are artificially made "profitable" only at the cost of heavy support). What are then the factors that will influence the dynamics of accumulation and churning in such a way to yield SASCA?

TURNING IP-GENERATED RESOURCES INTO SASCA

Three critical factors should affect the extent to which the dynamics of resource accumulation and churning will eventually lead to SASCA: *external integration*, *geographical specificity*, and *policy-making capability* (see Figure 3 and Table 1). Below I define these factors, outline their determinants, explain the mechanisms through which they influence accumulation, and then deliver testable propositions linking IP and SASCA.

<<Figure 3 and Table 1 around here>>

External integration

External integration is defined here as the degree to which firms are part of global (or at least regional) flows of goods, information, and knowledge. There are two key, related determinants of external integration: *market openness*, actual or potential, and firms' insertion in *global production networks*. At first glance, market openness may be seen as inconsistent with IP, given that chosen policies commonly involve temporary protection through import tariffs or entry restrictions. However, in parallel with ongoing protection, domestic firms may be encouraged by their governments to aggressively export their products, partner with certain foreign entrants, and import components not available locally. Furthermore, protection initiatives may phase out over time and thus generate expectations of *future* openness. In this

dependent cycle whereby an increase in local manufacturing (which can be interpreted as local accumulation of production resources) begets further local specialization. More recently, scholars associated with the so-called *new* new trade theory have emphasized *within-industry* heterogeneity. These models, in particular, examine trade-induced exit of the least productive firms (Bernard, Eaton, Jensen, and Kortum, 2003; Melitz, 2003)—which is fully consistent with the notion of churning discussed here.

sense, the degree of external integration should be assessed not only by current indicators such as the volume of trade or foreign direct investment, but also by the existence of formal policy terms stipulating the phasing out of subsidies or tariffs.

In their process of external integration induced by actual or expected openness, firms will also gradually become involved in global production networks, defined as interfirm webs "whose interconnected nodes and links extend spatially across national boundaries and, in so doing, integrates parts of disparate national and subnational territories" (Coe, Dicken, and Hess, 2008: 4). Local firms may become suppliers or customers of foreign firms and actively participate in complex transnational interactions (Gereffi, Humphrey, and Sturgeon, 2005). Thus, the magnitude of local firms' involvement in global production networks can be assessed by the degree to which they establish contracts or alliances with external players.

An increase in the extent of external integration will be accompanied by two distinct performance-enhancing mechanisms. Openness, actual or potential, will introduce competition forces in the domestic arena. Being required to meet international standards through exports or facing the advent of selective imports and foreign entrants—currently or in future periods—, domestic firms should more intensely accumulate valuable resources and churn other resources with little competitive value. The so-called *Red Queen effect* in organizational ecology states that competition has a "shake out" effect which triggers incentives for learning and continuous search for improved solutions (Barnett and Hansen, 1996). Because integration exposes local industries to global standards, IP proponents emphasize the disciplining effect of a policy-induced export orientation (Amsden, 1989; Wade, 1990) and some even talk about the need of "sunset clauses" that establish a credible end of support programs if industries are not found to be competitive (Rodrik, 2004).

A second mechanism through which external integration will increase performance is through improved access to know-how residing *outside* the region where IP is applied.

Global production networks will be of particular help in that respect. Research has found, for instance, that imported components allow firms to incorporate new technologies and achieve productivity gains (Blalock and Veloso, 2007; Ferreira and Rossi, 2003). Being involved in external interactions, firms may also have access to more tacit sources of knowledge through joint projects and evolving alliances with foreign partners (Doz and Hamel, 1998; Inkpen, 1993). This process should facilitate specialization efforts at the cutting edge of industry evolution and even create opportunities for new specialization paths combining internal and external capabilities.

An illustration of dysfunctional IP initiative due to (among other things) the lack of sufficient external integration is the market protection of the Brazilian computer industry in the 1980s. Through tight restrictions on imports and on foreign direct investment (FDI), Brazil stimulated domestic groups to invest in computer manufacturing facilities, but those investments failed to deliver competitive products. In the words of Evans (1995), "while manufacturers in other countries shopped the world for price/performance in components, Brazilian manufacturers struggled to build local networks of suppliers that could reliably deliver technologically simple items like power supplies and fans" (p. 161). Furthermore, absent external competitive pressure, "… the policy also created powerful incentives *not* to engage in local innovation" (p. 120, emphasis in the original).[4]

In sum, using the framework described in the previous section, and increase in external integration should improve the marginal return of IP initiatives, thereby promoting SASCA. Each monetary unit invested in industrial development will result in superior performance if the supported industries and firms face continuous pressure to innovate from

[4] Porter (1990) also emphasizes that rivalry creates incentives for innovation and promotes competitiveness. However, he focuses on *domestic* rivalry. In my model, rivalry can also be created through an industry's insertion in the global competitive arena, even if there are one or few players in a single domestic industry (see e.g. Rugman and D'Cruz, 1993 for a critique of Porter's model) .

global competitors and can successfully tap into valuable, external knowledge. This leads to my first proposition:

Proposition 1. IP will more likely lead to SASCA when there is enhanced external integration.

Geographical specificity

I refer to *geographical specificity* as a condition where resources are circumscribed within a particular region or whose development depends upon other resources already present in the region. Using the terminology of Fahy (2002: 64), geographical specificity is created by country- or region-specific resources which are "imperfectly mobile across borders." There are two key classes of resources that create geographical specificity. First, consider *rare, inherited resources* originated from local traits and natural processes. Rare inherited resources can be specialized by firm, such as private mineral reserves, or specialized by industry, such as unique soil and climate conditions to produce wine. But they can also be flexible, such as a distinctively educated workforce or an innate population with valuable traits (e.g. English fluency in India).

Another important source of geographical specificity is based on *local social interactions*, which essentially affect the way multiple resources and competencies are articulated. Putnam (1993: 167), in his influential work on social capital, examined "features of social organization, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated actions." In this conceptualization, social capital is more or less flexible, i.e., a local trait applicable to multiple uses and firms. However, social interactions can also be specialized by industry or related industries; and certain firms may have distinctive connections that will allow them to reap superior informational or transactional benefits. Much work on the regional determinants of competitive advantage has emphasized the role of backward, horizontal, and forward interfirm ties within regionally

clustered production chains (Piore and Sabel, 1984; Porter, 1990; Saxenian, 1994). Such close interactions are found to increase the flow of tacit knowledge and stimulate joint learning efforts (Agarwal, Audretsch, and Sarkar, 2007; Gomes-Casseres, Hagedoorn, and Jaffe, 2006; Mesquita and Lazzarini, 2008). For instance, McDermott, Corredoira and Cruise (2009) show how complex social networks between local governments, associations and private entrepreneurs helped spark innovation and quality upgrading in the Argentinean wine industry.

Due to the scarcity and immobility of region-specific resources, geographical specificity is an important source of *sustainable* performance. In Barney's (1991) seminal resource-based elaboration, persistent economic rents are determined by the possession of valuable, rare, and difficult to imitate resources. Scarce inherited resources tend to meet these criteria because they are accumulated over time and remain locally concentrated. In some cases, there are even outright restrictions for foreign owners to acquire local mineral reserves and land. Similarly, empirical studies have found that countries significantly differ in their level of societal trust (Knack and Kiefer, 1997) and that the origin of social interactions depends on local history and culture (Greif, 1997; La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 1997). Social ties can also evolve over time as firms develop a history of recurring relationships and cooperative norms (Dyer and Singh, 1998; Granovetter, 1985; Jones, Hesterly, and Borgatti, 1997; Uzzi, 1996). Indeed, Barney (1991: 110) considers *social complexity* a key impediment to imitation: the path-dependent nature of region-specific interactions, as well as the inherent intricacy of interfirm networks, imply that it will be difficult for firms and policy-makers to engage in "social engineering" to imitate the relational foundations that bolster cooperation in other local contexts.

Similarly to external integration, geographical specificity should increase the marginal return of IP initiatives. Here, however, the effect will be more along the lines of generating

persistence of rents in the long run. That is, more enduring effects are expected when governments promote industries departing from specialized or flexible resources that are imperfectly mobile across localities. In other words:

> *Proposition 2. IP will more likely lead to SASCA when policies build upon geographically-specific resources.*

Policy-making capability

Because IP represents deliberate intervention in the economy to spur resource accumulation, a critical question is whether governments will have the *ability* to conduct performance-enhancing interventions that significantly outperform a more decentralized, market-based regime. Thus, Pack and Saggi (2006: 281-283) offer an impressive list of parameters that would need to be collected by industrial policy-makers to address economy-wide production externalities.[5] At a more fundamental level, Coase (1960: 18) insisted that market failure does not necessarily justify governmental intervention, because the latter can also fail. Apart from cognitive limitations to identify the "correct" areas for successful intervention and opportunities to revamp latent advantages, Krueger (1990) and others (Ades and Di Tella, 1997; Haber, 2002; Johnson and Mitton, 2003; Kang, 2002) have warned about the risk of policy capture by rent-seeking industrialists who will lobby for private benefits and unjustified protection—which, as discussed before, can cause overspecialization and lock-in.

Therefore, successful IP requires distinctive governmental capability to perform successful interventions. Honadle (1981: 577) defines governmental capability as a distinctive public skill "to anticipate and influence change; make informed, intelligent decisions about policy; develop programs to implement policy; attract and absorb resources; manage resources; and evaluate current activities to guide future actions" (see also Bowman and Kearney, 1988). Although related, my own definition is more specialized to the context

[5] See also the formal model by Klimenko (2004) on the relative benefits of targeting versus autonomous entrepreneurial experimentation.

of IP. Namely, *policy-making capability* is defined here as a superior governmental ability to successfully identify instances of potential resource accumulation and churning, while at the same time creating procedures to assess policy outcomes and repel rent-seeking.

Two factors should help create superior policy-making capability. A recurring theme in the IP literature, based on case studies of countries which implemented industrial interventions, is the role of a *skilled technical staff* with superior analytical capabilities and a sense of professionalism in their policy-making duties (Evans, 1995; Schneider, 1991; Trebat, 1983). For instance, in South Korea (Amsden, 1989) and Taiwan (Wade, 1990), IP was largely in the hands of top-notch talent recruited in local prestigious schools through rigorous admission tests. Skilled and well-trained policy-makers should attenuate—although not completely mitigate—cognitive limitations to identify potential market failures and craft performance-enhancing interventions in a context of complex cross-industry linkages and uncertain evolutionary paths.

Policy-making capability should also depend on the extent to which policy-makers are able to understand legitimate needs of the private sector without acquiescing to unjustified demands. Granting policy-makers autonomy in the formulation of IP initiatives, while simultaneously appointing Weberian professional bureaucrats (Miller, 2000; Skowronek, 1982), should reduce the risk of policy capture by private interests. However, a complete insulation from the private sector may reduce policy-makers ability to extract useful information and search for potential areas of improvement (Rodrik, 1995). Evans (1995) refers to as *embedded autonomy* a situation where "pockets of efficiency" in the governmental bureaucracy keep some dialogue with the private sector, while preserving their autonomy to devise performance-enhancing policies free of significant political distortion. As he explains, policy-makers "are embedded in a concrete set of social ties that binds the state to society and provides institutionalized channels for the continual negotiation and

renegotiation of goals and policies" (Evans, 1995: 12). Such interaction will be particularly important in uncertain environments requiring dynamic adaptation.

Policy-making capability resulting from a skilled technical staff in a context of embedded autonomy should have important implications for resource accumulation and hence SASCA. Capable policy-makers should help resolve the tension, discussed in the introduction, between static and dynamic competitive advantages. They would build upon existing resources yielding current competitive advantage while at the same time avoiding underinvestment in new, latent sectors (Aghion, 2011). In connection with the framework depicted in Figure 2, policy-makers should identify opportunities for efficient specialization in profitable industries with existing advantages (effect 2a), supported by an effective accumulation of flexible resources that guarantee country-wide competitiveness (effect 1). Policy-makers, however, should guarantee constant upgrading and adaptation to changing conditions. This can be done in two ways. First, through the creation of *new* specialized resources based on the articulation of flexible and existing specialized resources (effects 3 and 2b respectively). Second, through enhanced churning: policy-makers should cease support to failed initiatives, control excessive depletion (effect 5), and promote resource reconversion towards flexible or new specialized resources (effects 4b and 4a respectively).

This process combining specialization and adaptation is not alien to SM scholars. Levinthal and March (1993: 105) submit that organizations "engage in exploration—the pursuit of new knowledge, of things that might come to be known. And they engage in exploitation—the use and development of things already known." The ability to exploit existing resources *and* explore new resource configurations is a dynamic capability commonly referred to in the management literature as *ambidexterity* (O'Reilly III and Tushman, 2008; Raisch, Birkinshaw, Probst, and Tushman, 2009). Ambidextrous policy-makers exploit static advantages but also seek new opportunities to explore latent advantages.

Policy-making capability should also avoid governmental failure from the point of view of execution. Amsden (1989) stresses the importance of planning and clear performance metrics (e.g. export performance) to assess whether support programs should be continued or aborted. Autonomous policy-makers execute coordinated interventions in tandem with mechanisms to monitor the performance of these interventions and cease support for non-performers, so as to encourage new experimentation (Khan and Blankenburg, 2009). This is akin to an infusion of *market-like incentives* within state policy. Monitoring and performance-contingent support avoid inefficient specialization and enhance churning.

Policy-making capability is a central element in my model, affecting SASCA via several channels. On the one hand, policy-making capability should affect the marginal return of IP initiatives by guaranteeing that the other two conditions, external integration and geographical specificity, will be met. External integration will facilitate the establishment of targets based on revealed global performance and increase the credibility of threats to halt support in case of poor performance (Amsden, 1989; Rodrik, 2004). New, external resources brought by foreign firms should also increase the odds that industries will constantly adapt to changing conditions. Thus, capable policy-makers will pursue external integration as a mechanism to improve ambidexterity and infuse market-like incentives into state policy:

Proposition 3. Policy-making capability will promote IPs that foster external integration.

Instead of incentivizing industries or firms whose resources are widely available or easily imitable by firms in other regions, capable policy-makers will also devise policies that benefit from geographically-specific resources. Otherwise, any IP-induced economic rent will be rapidly competed away by other firms located in other regions. Without geographical specificity, foreign competitors well positioned in global production networks may easily transplant regionally-developed products and innovations to other localities. For instance,

policy-makers may incentivize new industries based on specific locations with a distinctive presence of networked universities, business associations, and entrepreneurial firms. Embedded autonomy will also imply that policy-makers will stimulate channels of communication between governments and the private sector. The resulting public-private networks to craft and implement public policy should result from complex social interactions and will therefore be difficult to replicate (McDermott *et al.*, 2009). Thus:

Proposition 4. Policy-making capability will promote IPs building on geographically-specific resources.

Given that policy-makers have a large menu of possible policy choices, a critical aspect will not only be whether each policy choice has a small or large marginal return, but also whether the chosen policies, *collectively*, will improve SASCA. In particular, capable policy-makers will likely promote a clever combination of horizontal *and* vertical policies that yield both specialized and flexible resources. Neglecting horizontal policies that would otherwise advance flexible resources will result in what Krueger (1990: 10) referred to as "failures of omission," including the "deterioration of transport and communications facilities," as well as weak educational systems that fail to deliver economy-wide qualified human capital. By the same token, a sole emphasis on horizontal policy may be suboptimal because it will not necessarily address the externality problem discussed earlier (Aghion, 2011; Rodrik, 2004). For instance, policy-makers may recognize that certain industries will require specialized R&D and infrastructure that may be too costly or risky to be borne by individual entrepreneurs. Vertical policies can thus encourage new resource specialization. In sum, viewing vertical and horizontal policies as complements in the process of resource accumulation and change (Lall and Teubal, 1998), capable policy makers will more likely adopt a balanced combination of those policies:

Proposition 5. Policy-making capability will promote vertical and horizontal IPs balancing flexible and specialized resources.

When adopting vertical IPs, however, the selection of industries and firms will require substantial care. The required cognitive effort to identify areas for successful intervention notwithstanding, organized industry groups can use their political clout to obtain extended protection and other favors unavailable to other industries (Ferreira and Facchini, 2005; Olson, 1965). The problem is further aggravated when firm-level targeting is adopted. Recall from our earlier discussion that an emphasis on national champions tends to promote local industry concentration with the justification that, to be on par with global peers, those champions need to achieve economies of scale and heavily invest in innovation. But the creation of large, powerful corporations will tend to increase their political ability to claim unjustified support (Ades and Di Tella, 1997) Furthermore, because support is not at the industry level but instead at the firm level, policy-makers will have to choose and target particular firms. Can governments successfully pick individual firms instead of promoting industries as a whole? Arguably, in their effort to pick "promising" firms, policy-makers may exclude other players with greater potential to prosper in international markets (Spencer *et al.*, 2005: 328).[6]

Therefore, policy-making capability will be particularly important to increase the marginal return of vertical IPs, especially at the firm-level. For instance, with clear export goals and a credible indication that protection will expire in the future, policy-makers will increase national champions' exposure to external competition and hence compensate for the diminished Red Queen pressure in the concentrated domestic market. Embedded autonomy will also increase the odds that policy-makers will more correctly identify capable firms while

[6] Spencer, Murtha and Lenway (2005: 328) provide an interesting example in Japan, showing what happened when Sharp was excluded by the Japanese government from an early computer consortium: "The consortium failed. But Sharp succeeded in calculators, and its advances in calculator screens provided a basis for its founding role in the high-volume, large-format flat panel display (FPD) industry."

avoiding capture by incumbents. All these actions will particularly important in the context of firm-level targeting because the exclusion of other players will tend to reduce within-industry resource heterogeneity and hence mandate a careful process of selection and ex-post performance assessment. This logic leads to my final proposition:

Proposition 6. Policy-making capability will enhance the likelihood that vertical IP will lead to SASCA, especially when vertical IP is at the firm level (i.e. the promotion of national champions).

CONCLUDING REMARKS

This paper is an initial attempt at integrating the SM and IP literatures through a consolidated framework describing how IP can influence competitive advantage. Specifically, I model the link between IP and competitive advantage as a dynamic process mediated by the evolution and churning of flexible and specialized resources. Using this baseline framework, I propose key conditions affecting whether the IP-induced dynamics of resource accumulation will lead (or not) to competitive advantage. Thus, this paper not only helps integrate SM and IP, but also offers important contributions to each literature and can potentially stimulate further integrative research at their interface. I describe these contributions below, and then outline suggestions for future research.

Contributions to SM

In my effort to bring IP into SM discussions, I explicitly place governments as potential determinants of firm-level performance, instead of treating them as mere exogenous factors shifting the costs of doing business or adjacent entities that simply constrain entrepreneurial action. Like it or not, many governments throughout the world have continuously intervened in industries and firms despite the privatization and liberalization wave of the 1990s (Bremmer, 2010). Thus, an explicit incorporation of governments as potential triggers of resource deployment and accumulation can help us better understand the

origin of competitive advantage (or disadvantage) in many countries. Such an effort is consistent with recent calls that SM should more directly deal with important public policy issues (Agarwal, Barney, Foss, and Klein, 2009; Mahoney *et al.*, 2009). Of course, this should not be interpreted as an outright defense of an active IP; rather, I stressed that building sustainable competitive advantage through IP is a difficult endeavor rife with important tradeoffs. However, because of SM scholars' tradition to comparatively examine the merits and costs of alternative courses of action affecting business performance, I believe that the incorporation of the role of IP can be a natural advance in the SM literature.

The concept of support-adjusted sustainable competitive advantage (SASCA) is also an important refinement to better access business performance in a context of active governmental intervention. IP can severely distort cross-country comparisons based on observed economic profitability when industries or firms receive subsidies or heavy protection from their governments. Thus, other things being equal, competitive advantage should be gauged based on performance differentials after we control for support programs which can greatly alter economic rents. In this context, superior (adjusted) performance will occur only when observed performance is beyond what is attained by peers receiving similar levels of support. This refinement would be immaterial in a world where governmental support is scant. However, given that governmental intervention appears to be the rule rather than the exception, a more refined analysis of comparative performance incorporating the role of governments is warranted.

The discussion on the factors mediating the relationship between IP and SASCA, in addition, informs received theories on the regional determinants of competitive advantage. Thus, since Porter's (1990) influential book on the competitiveness of nations, several authors have studied how interfirm clusters can be a source of competitive advantage (e.g. Arikan, 2009; Schmitz and Nadvi, 1999; Tallman, Jenkins, Henry, and Pinch, 2004). Although an

emphasis on clusters is consistent with my emphasis on geographical specificity as a key factor influencing whether IP will lead to SASCA, other relevant factors should also be taken into account. Thus, evolving interactions within clusters and other regional arrangements may become excessively inward-focused and resistant to change (Grabher, 1993). Using the terminology of Pouder and St. John (1996), "hot spots" may easily become "blind spots." Therefore, achieving SASCA in the context of IP-induced cluster formation will be more likely when capable policy-makers pursue external integration and encourage resource churning within clusters through a dynamic interplay between geographically-specific flexible and specialized resources.

Contributions to IP

The integrative framework introduced here can also contribute to recurring IP dilemmas. For instance, as discussed earlier, a central debate in the IP literature is whether countries should focus on existing natural advantages or instead exploit new, latent advantages (see e.g. Lin and Chang, 2009). This dilemma is, however, often expressed in terms of *product* export markets. The canonical case is a resource-rich developing country that grows by exporting *basic* commodities (oil, grains, metals, and so on) instead of more "advanced," differentiated, technology-intensive products. Along these lines, IP scholars distinguish between "traditional" and "modern" sectors and recommend country-level diversification towards the latter (Hausmann, Hwang, and Rodrik, 2007; Hausmann and Rodrik, 2003; Ocampo, 2004; Redding, 1999; Reinert, 2009). In the case of scarce natural resources, this point is further reinforced by the well-known phenomenon of the *resource curse* (Sachs and Warner, 2001): excessive capture and exploitation of natural resources by centralized governments and private incumbents, in detriment of resource allocations that would otherwise yield more horizontal benefits and stimulate alternative specialization paths.

However, simply observing the nature of exported products says little about the *factors*, or resources, that are employed in their production. Basic commodities are oftentimes associated with scarce and imperfectly substitutable resources—such as in the case of mineral deposits and land for agricultural production. Pushing firms towards "value-added" may actually harm long-term economic performance. For instance, agricultural producers may be able to sustain their competitive edge based on cheap land and locally-tailored farm technology, which are not available to other countries lacking those country-specific resources. But if producers decide to vertically integrate in the downstream food industry, the required resources may be either available to all competitors (e.g. processing machinery) or extremely difficult to obtain (e.g. valuable brand names). In either case, achieving competitive advantage, let alone SASCA, will be a formidable challenge.

This is *not* to say, however, that natural resource-rich countries should never industrialize or diversify; or, alternatively, that a sole emphasis on natural resources will guarantee sustainable advantage. Rather, as noted before, policy-makers should avoid overspecialization and encourage resource churning. Using our earlier framework, perhaps a clever strategy will be to build upon rare, country-specific resources by promoting specialization in existing activities while simultaneously pursuing new, related specialization paths. Chile is a case in point: public spending has been countercyclical to the price of copper, which is a distinctive local resource representing a large portion of Chilean exports (Ffrench-Davis, 2010). Furthermore, a governmental fund created from mining revenues helps subsidize new small entrepreneurs in the country; and a semi-public organization called Fundación Chile, partially funded by the government and mining firm BHP Billiton, has promoted new experiments in areas adjacent to the country's tradition in agriculture and food production (Agosin, Larraín, and Grau, 2010). Furthermore, Chile is well known for its institutional reforms that helped curb corruption and increase bureaucratic efficiency (e.g.

Stone, Levy, and Paredes, 1996)—which have arguably had a positive effect on policy-makers' ability to carry out disciplined and ambidextrous interventions.

A future research agenda at the interface between IP and SM

It was not my intention to cover all areas where IP and SM overlap, nor generate a comprehensive theory linking IP and competitive advantage. Several issues remain unaddressed and invite further research that can potentially spark an interaction between IP and SM scholars. I present below some suggestions for such a future research agenda.

Incorporating IP variables in the analysis of economic performance and assessing the determinants of SASCA. Future empirical studies should try to adjust observed profitability according to a vector of policies proxied by the extent of governmental subsidies, pro-domestic biases in governmental procurement, industry-specific tariffs, among other policy variables that might affect observed performance. Empirical scholars can also try to more directly retrieve the marginal returns of those policy variables for each country and industry. This can be done through interactions between, say, the extent of subsidies received by a firm or industry and the factors that should affect the marginal returns of those subsidies (i.e. external integration, geographical specificity and policy-making capability, as well as other factors proposed by future research). As discussed before, those differential marginal effects are key to SASCA. Other things being equal, controlling for other factors unrelated to IP, firms present in an industry and region whose policy-makers achieve superior marginal returns with their IP initiatives should have superior SASCA.[7]

In addition, scholars could examine which *specific* policies are better to spark resource accumulation. For instance, are direct R&D subsidies better than phased tariffs? If targeted subsidies are chosen, are they best applied at the industry or firm-level? It is also very likely

[7] Because governments, by definition, select firms and industries to support, empirical researchers should avoid spurious causal inference. For instance, governments may subsidize promising industries that would normally thrive without much support. Ideally, one could find instances of exogenous change in policies (such as changes induced by political transitions) to correctly measure the marginal effects of IP.

that there will be complementarities among these various policies. Namely, choices can affect the marginal returns of each other (e.g. Milgrom and Roberts, 1990); and, given these complementarities, policy-makers may likely face a complex, "rugged" landscape of choices influencing performance (Levinthal and Warglien, 1999). Delving into such specific IP tools and their possible interactions can better inform policy-makers and greatly improve our understanding of the IP-related determinants of firm-performance.

Governments as interdependent strategists. As noted before, "strategizing" in my context has more to do with policies devised by the government to stimulate resource accumulation and change. I am therefore abstracting from interdependent actions and reactions by policy-makers in an industry spanning various countries. However, an escalation in industry- or firm-level governmental support in a particular country may be retaliated by similar measures in other countries. For instance, Gollier and Jullien (2011: 153) warn that, even if countries have an argument to promote their own national champions, "each nation will dissipate resources to create firms." In the end, the authors conclude, "like arms races, the race to support national champions usually leads to an escalation in deadweight losses with little substantial benefit." Alternatively, to avoid direct rivalry, countries may respond by specializing in fewer products and stimulating product differentiation. Therefore, "strategizing" can also be generalized to include such competitive reactions in a more game-theoretic fashion. The large SM literature on competitive dynamics (e.g. Chen, 1996; Ghemawat, 1991) can be a source of inspiration to study such interdependent interactions between policy-makers.

The institutional environment for IP. SM scholars have increasingly incorporated the institutional environment of the country—its set of formal and informal "rules of the game" (1990)—as a determinant of strategic action, resource accumulation, and firm-level performance (Hoskisson *et al.*, 2000; Khanna and Palepu, 2000; Monteiro and Pianna, 2012;

Peng, Sun, Pinkham, and Chen, 2009). An alternative channel for the effect of institutions on performance may have to do with IP itself. On the one hand, policy-makers may be influenced by *local* institutions at the country-level. The literature on the *varieties of capitalism* is perhaps a useful starting point to discuss how local institutions affect IP. While Hall and Soskice's (2001) original formulation distinguished between coordinated and liberal economies, more recent work has also recognized "hybrid" models combining state intervention with market-like autonomy (Campbell and Pedersen, 2007; Kurtz and Brooks, 2008). Spencer *et al.* (2005) further refine the analysis of national institutions by observing the extent of statist orientation in conjunction with corporatist tendencies (i.e. heavy participation of organized interest groups). Variations in the institutional environment should prompt distinct policy parameters; for instance, a movement towards a more liberal setting should tilt the mix of vertical and horizontal policies towards the latter. Also, institutions should critically affect the formation of policy-making capability. Contexts involving strong corporatist tendencies, for instance, may impede the creation of policy-making units with minimal political insulation.

On the other hand, policy-makers may be constrained by *international* institutions that will limit the adoption of certain policies. Thus, heavy protectionist tariffs and targeted subsidies are increasingly condemned by the World Trade Organization (Buiges and Sekkat, 2009), leaving some scholars to recommend instead "softer" measures such as horizontal investments and generalized cluster promotion (e.g. Harrison and Rodríguez-Clare, 2009). Nonetheless, because various countries do continue promoting strong vertical policies of all sorts, another interesting question is which tactics policy-makers will devise to circumvent or adapt to constraints posed by international rules.

Organizing the implementation of IP. Various organizational arrangements can be used to implement governmental interventions. Policy-makers may more directly rely on the

state itself as an entrepreneur (e.g. through state-owned enterprises: Trebat, 1983) or, more indirectly, encourage investments by private firms—which, in turn, can be either small entrepreneurial ventures (Baumol, Litan, and Schramm, 2007; Mesquita and Lazzarini, 2008) or large, diversified business groups (Amsden, 1989; Khanna and Palepu, 2000; Mahmood and Rufin, 2005; Mahmood and Mitchell, 2004; Schneider, 2009). Because organizational choices are expected to shape the accumulation of resources and capabilities (e.g. Jacobides and Winter, 2005), different ways to implement industrial interventions should have profound implications for competitive advantage. A comparative framework assessing in detail the pros and cons of each organizational mode (e.g. Williamson, 1999) can greatly contribute to the analysis of IP execution.

To be sure, these suggestions do not exhaust all possibilities for an integrative research agenda. Whichever particular topic is chosen, SM scholars' tradition to examine the determinants of competitive advantage, associated with IP scholars' knowledge of state interventions, should help us better understand not only the expected effect of certain policies, but also how policy-makers can craft IP initiatives whose impact exceed initial expectations.

APPENDIX

Support adjust competitive advantage (SASCA): a formal definition

Suppose that a given industry j spans $k = 1, 2, \ldots, N$ countries. The economic return of a firm i, belonging to industry j in a given country k, will evolve according to the following autoregressive process:

$$R_{ijkt} = b_{ijk}R_{ijkt\text{-}1} + e_{ijkt}, \qquad (1)$$

where R_{ijkt} represents economic return observed at period t; b_{ijk} is a positive *coefficient of persistence* influencing the perpetuation of profits (Mueller, 1986; Roberts, 1999); and ε_{ijkt} is a term indicating firm-specific factors or "innovations" by firm i in industry j and country k

which will affect firm-level performance at moment t. I further decompose e_{ijkt} and b_{ijk} in the following way:

$$e_{ijkt} = \mu_{ijk} + u_{ijkt} + \boldsymbol{\alpha}'_{jk}\mathbf{S}_{ijk} \text{ and} \quad (2)$$

$$b_{ijk} = \theta_{ijk} + \boldsymbol{\beta}'_{jk}\mathbf{S}_{ijk}, \quad (3)$$

where μ_{ijk} and θ_{ijk} indicate IP-unrelated fixed factors specific to country k's firm i in industry j which will influence respectively the incidence of innovations affecting profits (e.g. R&D capabilities) and the persistence of such profits (e.g. a firm's unique brand or reputation); and u_{ijkt} is an independently distributed random term with zero mean, representing IP-unrelated temporary shocks (e.g. a sudden change in demand). The role of IP is incorporated in the vector of support policies $\mathbf{S}_{ijk}$. These policies can affect all firms and industries in country k (*horizontal*, such as generic education systems); all firms in industry j (*vertical based on industrial targeting*, such as industry-specific tariffs); or particular firms in industry j (*vertical based on national champions*, such as firm-specific subsidies). I assume, for simplicity, that IP sets an initial condition for the evolution of profit-enhancing resources and capabilities; the model can be generalized by considering policies that fluctuate over time. Finally, $\boldsymbol{\alpha}_{jk}$ and $\boldsymbol{\beta}_{jk}$ are vectors with the *marginal returns* of each individual policy affecting profits and the sustainability of those profits respectively. Notice that marginal returns can be considered for each particular policy (e.g. firm-specific subsidies versus generalized education) and are allowed to differ by industry j and country k (e.g. a country may exhibit a higher marginal return in its vertical policy towards a particular industry but not necessarily in other industries).

As is well known (e.g. Enders, 1995), autoregressive models like (1)-(3), as long as $|b_{ijk}| < 1$, converge in the long run towards the following mean:

$$\overline{R}_{ijk} = \frac{\mu_{ijk} + \boldsymbol{\alpha}'_{jk}\mathbf{S}_{ijk}}{1 - \theta_{ijk} - \boldsymbol{\beta}'_{jk}\mathbf{S}_{ijk}}. \quad (4)$$

Similarly, we can specify the expected long-term profitability of industry *j* as a whole (i.e. incorporating all firms and all countries present in that industry):

$$E(R_j) = \frac{\mu_j + \boldsymbol{\alpha}'_j \mathbf{S}_j}{1 - \theta_i - \boldsymbol{\beta}'_j \mathbf{S}_j}, \quad (5)$$

where μ_j and θ_j are coefficients indicating respectively average industry returns and average persistence of those industry returns net of IP; $\mathbf{S}_j$ is a vector of *average* IPs for all countries in industry *j* (e.g. the average level of subsidies in that industry); and $\boldsymbol{\alpha}_j$ and $\boldsymbol{\beta}_j$ are vectors with average marginal returns.

We can therefore define *support-adjusted sustainable competitive advantage* (SASCA) as a situation where

$$\overline{R}_{ijk} > E(R_j \mid \mathbf{S}_j = \mathbf{S}_{ijk}), \quad (6)$$

that is, the long-run return of country *k*'s firm *i* in industry *j* is above the expected industry return conditional on all firms in that industry being subject to the exact same level of support received by firm *i* in country *k*. It is straightforward to see that SASCA will critically depend on the marginal return of IPs. For simplicity, instead of a vector of policies, let us focus on a single policy, $s_{ijk,}$ whose marginal return is α_{ijk}. Suppose also that all countries and firms are associated with the same pattern of persistence, which will guarantee that the denominators of (4) and (5) are equal when $s_{ijk} = s_j$. Then, given (4) and (5), inequality (6) will be true if $\mu_{ijk} + \alpha_{ijk}s_{ijk} > \mu_j + \alpha_j s_{ijk,}$ or, after some rearranging,

$$(\mu_{ijk} - \mu_j) + (\alpha_{ijk} - \alpha_j)s_{ijk,} > 0. \quad (7)$$

The first term in parenthesis is akin to the more familiar notion of competitive advantage as determined by country- and firm-specific factors unrelated to IP. In a world where IP is generally absent, this is the term that matters. The second term is more related to the topic of this paper. SASCA will increase if country *k* is able to extract superior marginal returns from its IP, compared to other countries in the same industry (i.e. $\alpha_{ijk} > \alpha_j$). If this is

the case, then an increase in support (s_{ijk}) will augment performance as measured by SASCA. However, if a country's policy has an inferior marginal return (i.e. $\alpha_{ijk} < \alpha_j$), then more support can lead to *disadvantage*. The analysis of the marginal returns of each policy is therefore central to the debate on how IP can lead or not to SASCA.

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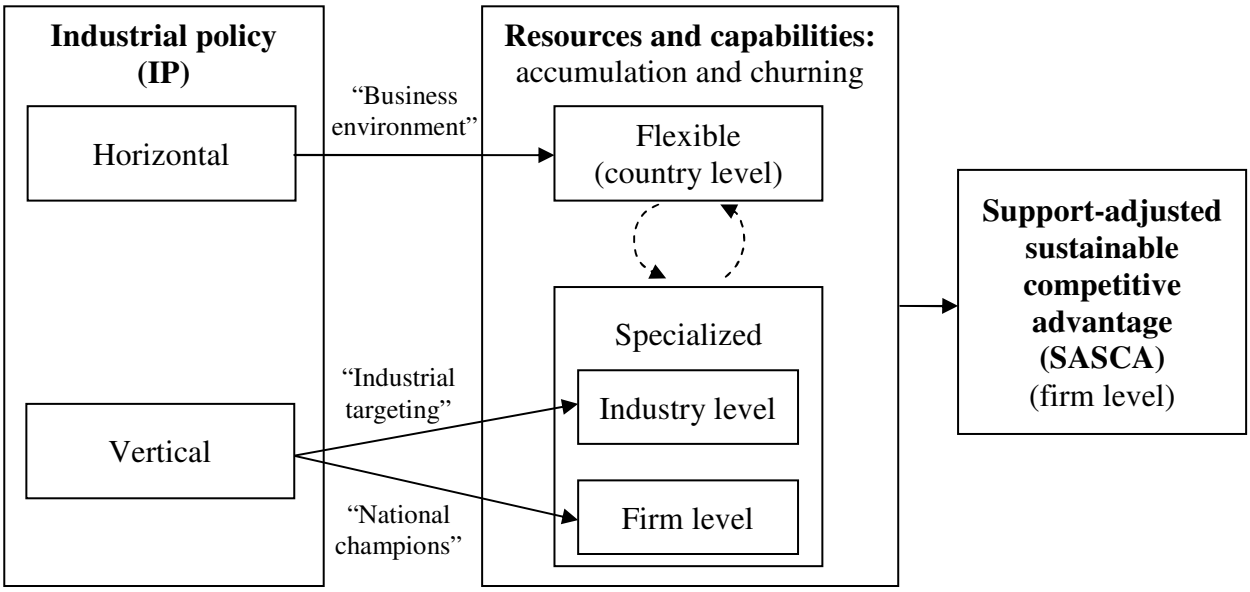

Figure 1. Baseline model linking industrial policy and support-adjusted sustainable competitive advantage

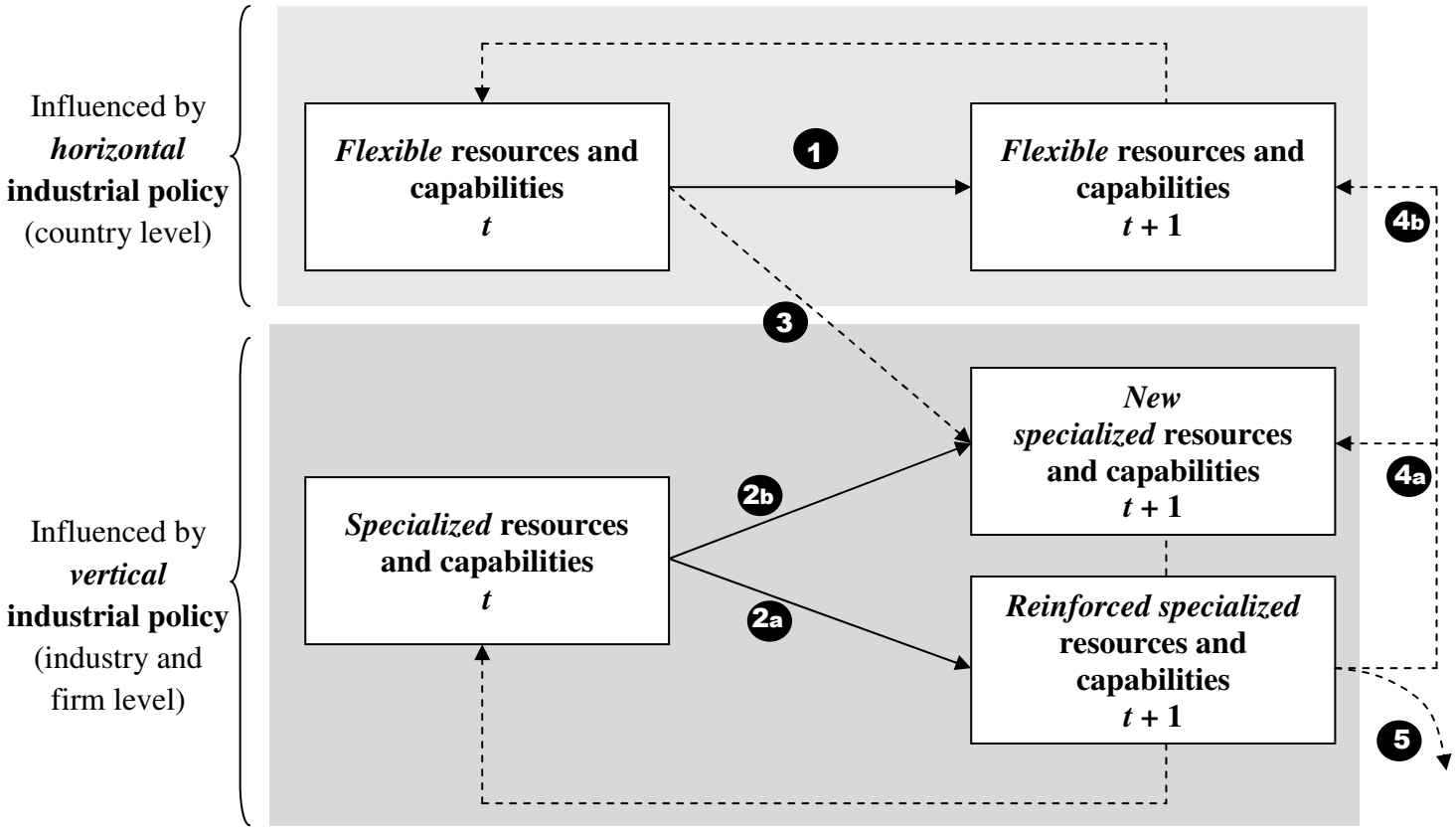

Figure 2. Unpacking the dynamics of accumulation and churning influenced by industrial policy.
① = accumulation of flexible resources; ② = accumulation of specialized resources;
③ = specialization of flexible resources; ④ = churning of specialized resources;⑤ = resource depletion.

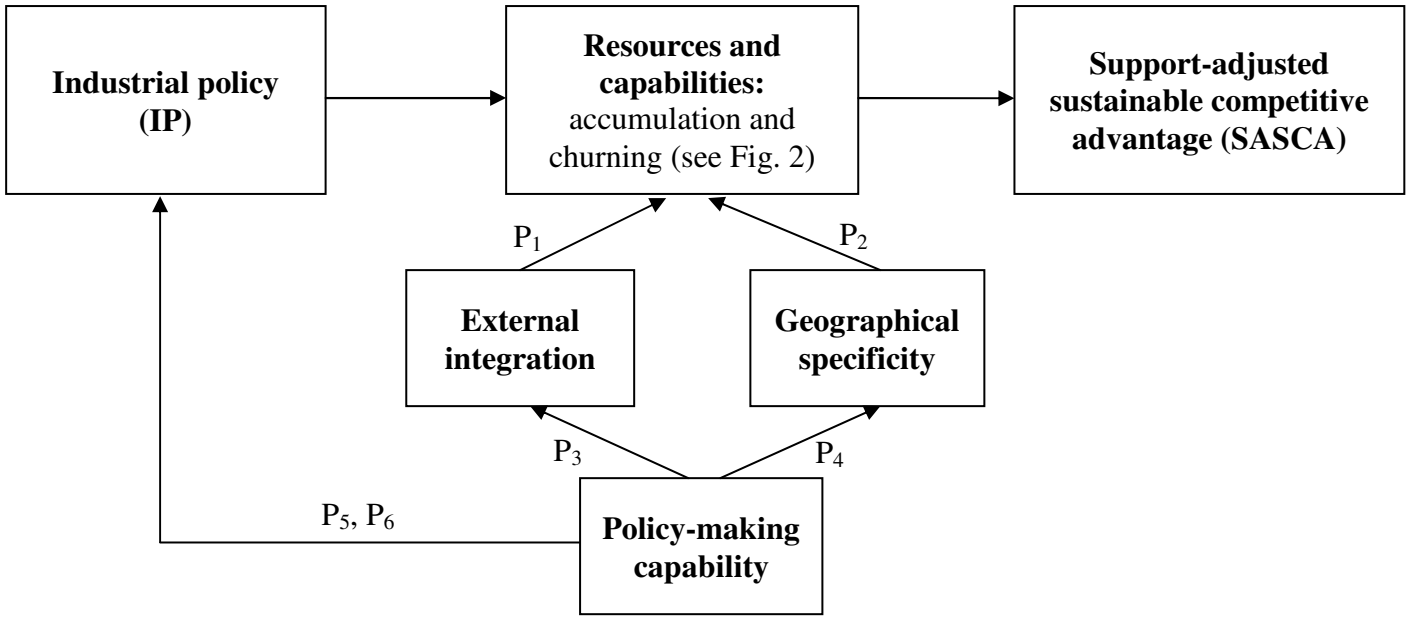

Figure 3. Theoretical propositions linking industrial policy and support-adjusted sustainable competitive advantage.

Table 1. Factors affecting whether the accumulation and churning of resources and capabilities, induced by industrial policy (IP), will lead to support-adjusted sustainable competitive advantage (SASCA).

Factor	Determinants	Mechanisms	Predicted effect
External integration	• Extent of market openness (actual or potential). • Degree of insertion in global production networks.	Access to external knowledge and Red Queen effect speed up the process of specialization and promote churning.	P_1. IP will more likely lead to SASCA when there is enhanced external integration.
Geographical specificity	• Rare, inherited resource endowments. • Local social interactions.	Geographical specificity creates barriers to cross-country resource mobility.	P_2. IP will more likely lead to SASCA when policies build upon geographically-specific resources.
Policy-making capability	• Highly skilled technical staff. • Embedded autonomy: contact with the private sector in tandem with relative insulation from political interference.	Capable policy-makers will balance exploration and exploitation (ambidextrous IP) and infuse market-like incentives in the context of state policy.	P_3. Policy-making capability will promote IPs that foster external integration. P_4. Policy-making capability will promote IPs building on geographically-specific resources. P_5. Policy-making capability will promote vertical and horizontal IPs balancing flexible and specialized resources. P_6. Policy-making capability will enhance the likelihood that vertical IP will lead to SASCA, especially when vertical IP is at the firm level (i.e. the promotion of national champions).