



Encore for the Enclave: The Changing Nature of the Industry Enclave with Illustrations from the Mining Industry in Chile

abstract

Conceptual innovation with respect to the enclave concept has been virtually absent compared with industry agglomerations. This is despite the fact that some varieties of agglomeration distinguished in the literature appear to come close to what previously were regarded as industrial enclaves and despite frequent allusions to the enclave nature of economic spaces produced by contemporary processes of globalization. Bringing the literature on agglomeration and enclaves into dialogue, we revisit the concept of the enclave—a concept that has been largely neglected since it enjoyed a popularity in connection with the study of particular (notably extractive) industries and particular (notably *dependencia*) theories of national economic development during the 1960s and 1970s. Much has changed since this time, which suggests that the concept of the enclave ought to be ripe for reevaluation. In this article we take an initial step in this direction, identifying analytical dimensions to the enclave and illustrating different manifestations of enclaves in the mining industry, drawing on the case of Chile. We conclude by advocating the renewed study of industry enclaves within contemporary economic geographic analysis.

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After a brief interlude in the 1970s when the energy behind *linkage studies* dissipated, academic interest in industry agglomeration has continued unabated. In contrast to the forlorn search for locally bound causes of industrial agglomeration within the earlier linkage studies (Phelps 1992), the literature since has produced important advances in our understanding of the phenomenon, including more formal elaborations of localization based on external economies (Scott 1983, 1986; Storper 1995). A greater appreciation of the geographic range and interaction of different external economies in terms of scale and scope, specialization and diversity (Parr 2002; Phelps and Ozawa 2003), or related variety (Frenken, Van Oort, and Verburg 2007) has also been apparent. The nonlocal stimuli to industry agglomeration has figured prominently in accounts of local buzz in global pipelines (Bathelt, Malmberg, and Maskell 2004), and the geographic extension of global commodity chains (GCCs), global value chains (GVCs), and global production networks (GPNs) (Gereffi 1999; Kaplinsky 2000; Coe and Hess 2011). Moreover, the *form* of industrial agglomeration has itself usefully been decomposed (Gordon and McCann 2000; Markusen 1996), leading to consideration of the life cycle of industrial agglomerations (Menzel and Fornahl 2009).

The linkage studies of the 1960s and 1970s existed alongside a parallel literature concerned with many of the same issues in developing countries, where industrialization manifested in enclaves (Singer 1950; Cardoso and Faletto 1969; Weisskoff and Wolff 1977). An economic enclave can be defined as a physically, administratively, or legally bounded territory whose geography or morphology is intimately related to the following economic characteristics: dependence on one or a few large firms; high specialization in one activity; and weak integration into the local economy, which is used primarily to access some local factors of production. As a result, the economic enclave is not able to generate localization economies related to specialization. In the short and medium term, enclaves can grow rapidly to contribute export earnings and have a positive net local economic impact, mainly based on internal economies of scale. This characteristic remains the main basis for enclave-led growth strategies. In the long term, however, a characteristic of enclaves is the lack of sustainability. Paradoxically, if an enclave is to produce sustainable local economic development in the long term, it will cease to be an enclave in spatial

terms—becoming less firmly bounded with the development of urbanization economies producing or resulting from integration into a larger urban economy.¹

Curiously, the literature on enclaves has, in contrast to industry agglomeration, almost disappeared from discussion in economic geography, which has been slow to engage with interest in enclave forms of economic development found in area studies, international relations, and political geography. The analytical demise of the enclave concept is interesting in several respects. First, it has come about despite the fact that some forms of industry agglomeration distinguished in the economic geography literature come close to what in the past were considered as enclaves (Arias, Atienza, and Cademartori 2014). In this respect, a widespread, albeit variegated, neoliberalization of national and international law, regulation, and policy affecting foreign direct investment (FDI) appears to have aided the possibilities for the creation of such enclaves. Second, the literature on enclaves is an important corrective to much of the writing on new industrial districts, flexible specialization, agglomeration, and clustering with its implicitly favorable normative tendencies (Markusen 1996) and its focus on industry cores old and new (Hayter, Barnes, and Bradshaw 2003). Third, one analytical strength of the enclave literature compared to agglomeration has—by virtue of its linking local outcomes to the international organization of production—been its greater recognition of the multiscalar nature of economic relations of industrialization. These three curiosities related to the demise of the enclave concept motivate this article.

Drawing on the case of mining in the Antofagasta region of Chile, we concentrate on distinguishing different enclave forms in a way that integrates discussion of the net local losses, often associated with enclave forms of industrialization, and the net local benefits associated with industry agglomeration.² By bringing conceptual discussion of enclaves and agglomeration into closer dialogue, we make several contributions in this article. First, we argue that a return to, and a development of, the concept of the enclave is overdue not least in order to avoid conflating enclaves with agglomerations. Second, we highlight the fundamentally multiscalar nature of economic relations underlying both formations and, in particular, the potential for patterns of industrialization that are also between, or a mixture of, enclaves and agglomerations. Thus, if the traditional notion of an enclave is as a firmly delimited, fenced-in place, such as a mining company town or a plantation, we highlight a variety of contemporary scenarios of economic development that are in between enclaves and agglomerations or in which the two coexist within regional and national urban systems. Third, we offer a set of analytical dimensions as a first step toward a renewal of theory and classification of different enclave forms. These dimensions might be added to or revised as part of a broader research agenda on the modern-day enclave, part of which would be to elaborate typologies applicable in different industry and geographic settings where enclaves are to be found.

In this article, we use these analytical dimensions to explore different manifestations of the enclave with respect to the mining industry in Chile. The case of mining in the region of Antofagasta, the main mining region in the country, provides a particular vantage point within a broader research agenda that might encompass not only different (more positive) outcomes in other resource extraction regions, but also the likes of

¹ A distinction has been made between localization economies (the external economies associated with industry specialization) and urbanization economies (the external economies associated with urban industrial diversity) (Hoover 1948). In what follows we also draw on the distinction made between pecuniary and technological externalities (Scitovsky 1954).

² The question is more multifaceted than this, as the environmental and social benefits and costs might be weighed not least because these may impact on the economic sustainability of agglomerations or enclaves.

tourism resorts, *offshore* financial and business process outsourcing centers, and export processing zones (EPZs) and special economic zones (SEZs) in the manufacturing sectors. Notably, while the enclave has been a concept central to understanding the enduring nature of a *resource curse* (Auty 1993) on the economic development prospects for national and regional economies, some of these latter forms of enclave in manufacturing and service sectors have had demonstrably different economic development outcomes. A greater appreciation of the variegated landscape of enclaves, agglomerations, and situations in between is vital to understanding the uneven economic geography of GCC/GVC/GPNs. Since the enclave concept also highlights important theoretical and policy questions surrounding the sustainability of processes of economic growth and development, it may also offer a window on the subject of the evolution of local and regional economies.

122 The article begins by distinguishing enclaves along several key dimensions. It becomes apparent when doing so that some forms of agglomeration come close to what could be considered an enclave. The point here is that there is an area of overlap between discussions of the two concepts. Much of this overlap is the product of a fundamental—if little recognized or elaborated—unity between industry agglomerations and enclaves found in the multiscale relations that underlie them both. In the next section, then, we illustrate some of the potential variety that may exist in enclave formations. We draw on the case of the mining industry in Chile to exemplify a typology of different forms of industrialization consisting of enclaves and combinations of enclaves and agglomerations. We draw on the extant academic and policy literature and secondary data from industry organizations. In the conclusion, we argue that the enclave idea has a continued salience to understanding some forms of industrialization in primary industries but also in secondary and tertiary sectors. Finally, consideration of the enclave economy can help infuse contemporary economic geographic research on GCC/GVC/GPNs with a greater sense of internationally uneven patterns of development and on evolutionary economic geography and evolutionary political economy, with a greater appreciation of the role (or absence) of institutions and active industrial policy in the creation and evolution of enclaves.

Agglomeration, Enclaves, and Intermediate Forms of Industrialization

The interest in industry agglomerations has produced several influential typologies. The classifications of Gordon and McCann (2000) and Markusen (1996) have been important in establishing the value of the analytically productive tension between nomothetic and idiographic outlooks found in economic geography as *variations on a common theme* to set against the singular and universal formulations of agglomeration found in economics (Krugman 1991) and of clustering in business studies (Porter 1990). In many ways, these works set the horizon for what inquiry into enclaves might also achieve.

According to these typologies, it is plausible to question whether certain forms of industry agglomeration—production complexes in Gordon and McCann's (2000) terms and hub-and-spoke and satellite platforms in Markusen's (1996) terms—do indeed have net economic benefits at the national and local scale. Moreover, some enclave formations—such as *entrepreneurial* (compared to *plantation*) single industry resource towns (Hayter 2003)—appear to approximate industrial agglomerations.³ There is, then, an

³ The picture is yet more complicated in the literature on entrepreneurship on ethnic enclaves, which we do not consider here (Wilson and Portes 1980).

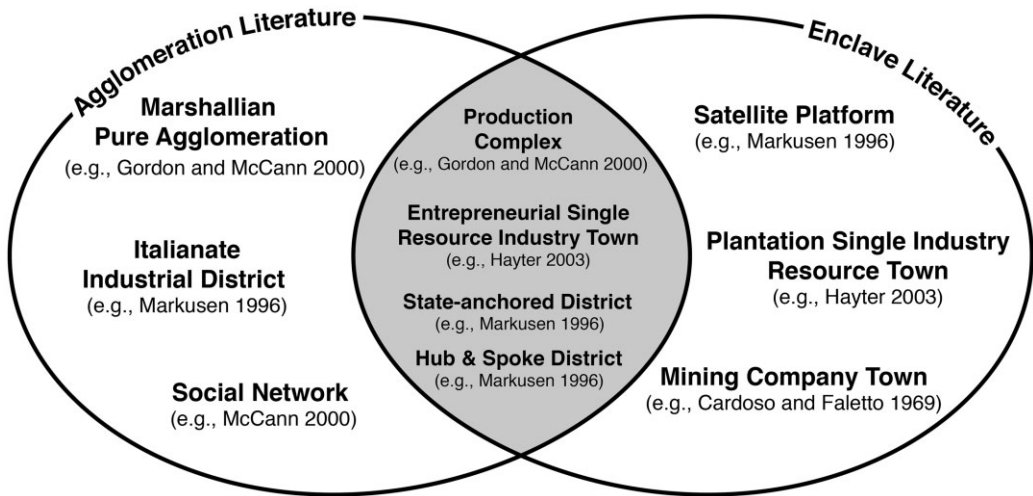


Figure 1. Overlaps in the literature on agglomeration and enclaves.

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intriguing area of intersection between the literature on industry agglomerations and the literature on enclaves. We summarize this intersection in Figure 1, and it is present in our discussion of several key dimensions with which we sketch a landscape of different enclaves and situations between local industry enclaves and agglomerations.⁴ These overlaps imply important conceptual insights to be drawn from both bodies of work and the existence of a middle ground of outcomes between the two forms of industrialization.⁵

Contemporary economic geographic research on industry agglomeration can usefully reflect back on research on enclaves. This is not to argue for an uncritical return to notions of dependency. Rather—to the extent that industry enclaves and agglomerations are two sides of the same analytical coin—some key insights might usefully be retained from the literature on enclaves alongside those on industry agglomeration, especially when considering the multiscalar nature of development outcomes from the international organization of industries. The literature on enclaves is largely, though not exclusively, associated with resource and extractive industries—vantage points that provide important insights on processes of globalization and that can produce new theoretical perspectives (Hayter et al. 2003). It is only in this way that a *dark side* (Coe and Hess 2011) of outcomes from participation in GCC/GVC/GPNs (the possibility of enclave formation) and the potential for *strategic decoupling* (MacKinnon 2011) can be considered alongside instances of *strategic coupling* and local industry and corporate upgrading leading to agglomeration. It is also only in this way that instances of local industry and corporate upgrading can be reconciled with broader systemic patterns of uneven development on the global scale (Selwyn 2014).

⁴ Figure 1 is illustrative of *some* important intersections in *some* of the key literature on industrial agglomerations and enclaves. To prefigure our concluding discussion, empirical studies suggest that, for example, EPZs, offshore financial havens, and tourism enclaves, could be placed in the right-hand side of the diagram.

⁵ Many of the problems of adequately defining agglomerations are mirrored with respect to the concept of the enclave (Arias et al. 2014).

From the literature on industrial agglomeration, we stress the lack of significant localization economies stemming from specialization as an essential trait of enclaves.⁶ Among the potential forms that localization economies can take, we highlight the role of technological externalities (related to processes of labor formation and knowledge transfer), in contrast to the old literature on enclaves focused on pecuniary externalities (or linkages). Here, then, enclaves might be regarded as the troughs in the distinctly *spiky* geography of knowledge flows associated with multinational enterprises (MNEs) (Iammarino and McCann 2013).

We distinguish local industry enclaves, agglomerations, and outcomes between the two in terms of a composite set of analytical dimensions drawn from geography (spatial delimitation), development studies (linkages), orthodox economics (pecuniary and technological externalities, factors of production), and political economy (social reproduction).

Spatial Delimitation

124 Different types of industry agglomeration might be defined broadly as those where different combinations of pecuniary and technological externalities are present locally, driving the wider processes of social reproduction that characterize sustained urbanization. In contrast, the enclave is a highly specialized and tightly bounded agglomeration of sorts but one where localization economies are almost nonexistent locally as a result of their being stretched at a national and international scale and where urbanization economies fail to materialize or be sustained. A major reason for this is the tendency for industry enclaves to be associated with internalization within a single large, often multinational, enterprise. Export-led growth can give the enclave an apparent image of prosperity, but the lack of sustainability is one of its main characteristics (Arias et al. 2014).

The question of the geographic scale at which local industry agglomeration (and its associated economic benefits) has manifested is one that has proved remarkably ill defined (Phelps and Ozawa 2003; Martin and Sunley 2003). The same issue affects consideration of enclaves, though studies have typically acknowledged the fundamentally multiscale scope of their costs and benefits (Eggert 2001), and how local prospects are intertwined with production possibilities overseas (Singer 1950). It is important to recognize, then, that the various relations that make up industry agglomerations and enclaves have stretched across multiple geographic scales—local (the town, city, or production site); regional (i.e., subnational); national; and international. In this respect, the literature on enclaves arguably resonates more with the present interest in GCC/GVC/GPNs than does the literature on industrial agglomeration.

In terms of the multiscale relations that compose agglomerations and enclaves—revealed in their being open to both territorial and nonterritorial perspectives in economic geography—it can be said that both concepts represent two sides of an analytical coin. However, the coin may be an inappropriate metaphor for considering the multiscale relationships that make up both agglomerations and enclaves since it implies the impossibility of a middle ground. The interesting thing about the enclave and agglomeration concepts in the modern era is that they can be reformulated in ways that indicate scenarios of external economies being available (or not) at different geographic scales (Phelps 2004). Arguably, such a middle ground has been overlooked, but it is one

⁶ Urbanization economies from diversification are not possible in an enclave, except when it overcomes this condition with a loosening of formal boundaries and integration into a larger surrounding urban economy.

that we highlight when classifying patterns of mining-related industrialization in Chile where it may be the case that agglomerations and enclaves coexist but are geographically separated within the national urban system.

Pecuniary Externalities (Linkage Effects)

The literature on enclaves reminds us of the need to engage in the analysis of pecuniary externalities manifested in a variety of different linkages (and leakages) such as the production linkages (backward and forward), the induced consumption linkages, and the fiscal or tax linkages (Hirschman 1981) whose effects may not be captured locally.

Traditional approaches to the study of enclaves focused attention quite narrowly on the pecuniary effects of linkages. These studies revealed a priori what a complicated and potentially highly variegated picture the enclave phenomenon can be. Weisskoff and Wolff (1977), for instance, identified 16 different types of enclaves, based on the combination of different types of linkages. Almost nothing is said in two influential classifications of industrial agglomerations (Markusen 1996; Gordon and McCann 2000) regarding the induced linkages of industry clusters. In the developing world, these are most visible in the congregations of informal sector vendors that congregate outside the gates of individual companies or industrial parks. Markusen (1996, 304) notes how satellite platforms often are assembled at a distance from major conurbations and, we might add, fail to fully elaborate this particular ingredient of broader-based urbanization from industrialization. Partly as a result of this, we can suggest these ensembles might be regarded as enclaves.

Fiscal linkages have rarely figured in the literature on industrial agglomeration. One exception here is Markusen's (1996) typology of industrial districts. Markusen's approach extends beyond the contribution of economic agents and transactions, into questions of the role of trade unions and the state in the formation of sticky places within erstwhile slippery space. These considerations take analysis into evaluation of the welfare implications of industry agglomerations, which is complex and perhaps consequently has rarely been apparent in the literature. Yet such welfare implications were most definitely evident in work concerned with enclaves, although not without a measure of critique, since "the ability to tax the enclave is hardly a sufficient condition for vigorous economic growth. For the fiscal linkage to be an effective development mechanism, the ability to tax must be combined with the ability to invest productively" (Hirschman 1981, 68–69). It was this observation that led Hirschman to emphasize the importance of private sector productive and fiscal linkages to local and national economic development. Fiscal linkages are also an important consideration in some industry agglomerations where the state is important in anchoring some businesses and their geographically focused interdependencies. According to Markusen (1996), the stickiness (and one might argue that the overall balance sheet) of hub-and-spoke and the satellite platform industrial districts remains quite contingent on state intervention.

In the case of extractive industries, the neoliberal era of trade and investment regulation has produced something of a bonanza with a geography that reveals patterns of both extensification (general scope) and intensification (volume) of FDI (Bridge 2004). At the same time, neoliberalization arguably has adversely affected the bargaining position of developing country governments with MNEs as a result of law and regulation constructed in an upper tier of multilateral bargaining (Ramamurti 2001), undermining, among others, fiscal linkages.

Technological Externalities

Despite an emphasis on linkages remaining apparent (Morris, Kaplinsky, and Kaplan 2012), research on MNE location strategies and their effect on local development has pointed to the primary importance of technological externalities in a context where the geographic scope of productive relationships is globalized, and firms can offshore many activities functions that were previously locally supplied (Iammarino and McCann 2013). The distinction between pecuniary and technological externalities (Scitovsky 1954) is therefore an important one. Pecuniary externalities stem from interdependence through the market mechanism and are mainly composed of the quantifiable effects of productive, induced, and fiscal linkages mentioned above. Technological externalities are those externalities that typically are associated with *untraded interdependencies* (Storper 1995), and they include, to an extent, the formation of the thick labor markets and knowledge flows that Marshall (1890) described—since, labor inputs and embodied processes of tacit knowledge creation and transfer are only partly costed in market transactions.

126 Discussion of technological externalities was almost absent in past studies of enclaves but has featured prominently in analysis of industrial agglomerations. In a context of rapid international economic integration, driven by changes in transportation and communications technologies, and in trade and investment regulation, pecuniary external economies are particularly *mobile*; that is, they are rapidly exhausted as a source of competitive advantage at the subnational scale or dissipated at a national and international scale to become ubiquitous (Maskell and Malmberg 1999; Phelps 2004). Local assets, which increase the potential for technological externalities, are considered to be a more enduring source of competitive advantage, sustaining industry agglomerations, and contributing to the potential for strategic coupling between local economies and GPNs (Coe and Hess 2011; Iammarino and McCann 2013).

There are two main lines of thought here. On the one hand, the blurring of a binary that might be said to have existed between global-codified and local-tacit knowledge and the opportunities for local buzz to be mobilized through global pipelines (Bathelt et al. 2004) implies a potential for new industry agglomerations to result from incorporation in GCC/GVC/GPNs and for FDI flows between agglomerations to be accompanied by parallel knowledge flows (Bathelt and Li 2014). By extension, technological externalities could be mobilized at a distance, given the importance of international trade and investment linkages to enclaves. On the other hand, for an increasing number of industries, technological externalities predominantly exist in the very largest, most internationally connected heavily urbanized (usually capital) city-regions (Simmie 2000), where there is the reciprocity between specialization and diversity (Jacobs 1969) or the *related variety* (Frenken et al. 2007) so vital for sustained innovation. From this perspective, the lack of thick local labor markets and the lack of knowledge creation and transfer capacities within a particular local economy are considered the main causes of the lack of localization economies and sustainability of industry enclaves, and may yet undermine the development of industry agglomerations in secondary cities.

Returns to Scale

By definition, industry agglomerations are founded on economies that are external to any individual business and shared among a large number of enterprises. These localized external economies manifest in pecuniary and technological externalities, and are driven by processes of vertical and horizontal disintegration (Scott 1983, 1986). However, the enclave literature reminds us that we should be wary of describing a spatial concentration

of industry based on a single or very limited number of businesses as an agglomeration, as the returns to economic scale are almost entirely internalized. This is partly why Gordon and McCann (2000), and McCann and Mudambi (2004, 2005) distinguish agglomerations based on the logics of Marshallian (*pure agglomeration*) and *social networking* from the *production complex*. The production complex is an agglomeration where pecuniary and technological external economy effects may be minimal at both the national and local scale—since the agglomeration is predicated on the economization of transaction costs from the exploitation of internal economies of a large company or vertical quasi-integration between a large company with a network of suppliers (Blois 1972). This is a form of industrial agglomeration that, as experience with growth pole policy of the 1960s tells us, is a long way from either localization economies in specialized towns, districts, or urban quarters, or the sorts of urbanization economies apparent in major diversified economies of large metropolitan areas. In production complexes, the connection between industrialization and urbanization has been severed in important ways. Standing in splendid isolation in out-of-town, sparsely populated interior regions, or littoral port lands, they rarely have stimulated either indirect backward and forward linkages or knowledge spillovers to indigenous companies. This is a problem that presently faces EPZs and SEZs—widely promoted but that, in many cases, remain as enclaves (Farole and Akinici 2011).⁷

However, Morris et al. (2012, 411) argue that changes in corporate strategies and the likes of corporate social responsibility initiatives promoting vertical and horizontal distintegration of production mean that “whatever the historical relationship between industry and resources, in recent years there has been a restructuring . . . across a variety of sectors, including resource extraction, which enhances the scope for linkage development.” Moreover, they suggest that “the conventional wisdom of enclave development often overstates the shortfall in local capabilities in low income countries.” In what follows, we acknowledge the importance of these developments and their *potential* to produce sustainable industry agglomeration. Perhaps as a result of the empirical case on which our account draws, we remain skeptical of the strong version of the sorts of industry agglomeration discerned by Morris et al. (2012). Indeed, Eggert (2001, 34) distinguishes three models of economic development associated with the mining industry—the *strong linkage*, the *weak linkage* (enclave) and the *sustainable development* model—the last of which he labels “a model yet to be defined fully.” Thus, while there seems clear *potential* for some of the pecuniary externalities to generate agglomerations at the national and subnational scale, the extent to which technological externalities have developed in nations and localities that host extractive industries remains unclear to say the least. Some important exceptions may be the cases of the Bothnian mining cluster in Sweden and Finland, the BP hydrocarbon industry in Azerbaijan, and some cities in Western and Northern Australia that have been able to build an internationally competitive mining services supply industry (Scott-Kemmis 2011). The latter case, however, is not uncontested (Brueckner et al. 2014; Mackinnon 2013).

Factor Mobility

The traditional enclave literature has long emphasized the importation of some of the most mobile factor inputs such as capital and intermediate inputs. The literature on agglomeration has stressed the importance of labor—one of the least mobile factors of

⁷ We are not arguing that these enclave-led growth strategies are condemned to produce enclaves. There may be cases of EPZs or SEZs that have been able to overcome their initial conditions as enclaves in the long term.

production—as one of the main local assets, through localized pooling and social reproduction. Between these two perspectives lies a modern reality shaped by corporate organizational change and selective regulatory experimentation among and within nation states promoting greater labor mobility.

128 The increased international economic integration facilitated by a widespread (neo)liberalization of national trade and investment laws, policy, and regulation has presented opportunities for the formation of new internationally competitive industry agglomerations, examples of which have been relayed in the GCC/GVC/GPN literature. Many of these opportunities have grown up in delimited spaces or modern enclaves such as EPZs. Traditionally, manufacturing EPZs have been synonymous with the export of labor (Warr 1989). However, corporate organizational change and regulatory experimentation mean that such enclaves are differentially regulated from host national territories as *zones of graduated sovereignty* (Ong 2007). The labor markets of such enclaves are those where significant amounts of labor may be *imported*, as well as effectively exported, once again registering a change in the nature of the classical enclaves. This is especially the case in extractive enclaves where local labor is not necessarily a place-bound asset, since fly-in fly-out systems (Storey 2001) allow workers to live far away from the mining regions, reducing the potential for localization and urbanization economies.

Social Reproduction

Finally, the lack of sustainability of enclaves—their social reproduction—is, to some extent, the summation of the preceding dimensions of analysis. Social reproduction is taken as the signature of urbanization (Castells 1977), and there are often question marks hanging over enclave forms of industrialization and their potential to sustain themselves in the longer term either through the development of localization or urbanization economies. The fact that the literature on industry agglomeration, for the most part, has been little concerned with fiscal linkages is curious given the tendency for capitalist enterprises to underinvest in collective consumption expenditures vital for the reproduction of labor (Scott and Roweis 1977). That is, state expenditure is vital to the functioning of many industrial agglomerations and the development of urbanization economies on which they are partly predicated.

The enclave literature reminds us that, historically at least, private companies have, in some remarkable instances, taken on the burden of providing for collective consumption. Yet consideration of fiscal linkages and their connection to broader questions of local provision for collective consumption and social reproduction can also hardly be separated from a multiscale perspective on enclaves and industry agglomerations. For example, the sorts of labor mobility discussed immediately above entail scenarios in which the costs of social reproduction are borne by several different places of work and residence, across subnational, national, and even international urban systems.

Out of the Fences: Mining Industry Enclaves in Chile

Drawing on the preceding discussion, we now turn attention to discussing possible variations in the form of industrialization in the Chilean mining industry. The case of Chile is especially relevant for an economic geographic analysis of mining-related industrialization. First, Chile is the main world copper producer, with almost a third of world exports and the largest world deposits, 27.7 percent (COCHILCO 2013). Currently, mining represents more than 60 percent of Chilean exports. Second, in the last three decades, the country has implemented a very flexible strategy for the attraction of

FDI that had important results in term of the increase in mining production. Currently, MNEs represent two-thirds of copper production while the rest is produced by the public company CODELCO, the largest firm in the country. Third, Chile started a development strategy based on the creation of a mining cluster at the beginning of this century. After more than a decade, however, the lack of integration of Chilean firms into mining GCCs/GVCs/GPNs, especially in the case of knowledge-intensive mining services, has been recognized (Arias et al. 2014; Lagos 2014; Urzúa 2012). Finally, the organization of mining production in Chile has experienced important changes in the last century. Chilean mining was characterized by the existence of traditional company towns to exploit nitrate mineral deposits. Currently, the spatial organization of mining production is much more complex, based on a network of mining camps connected to local urban agglomerations, such as Antofagasta and Calama, to the capital Santiago and internationally in mining GCCs/GVCs/GPNs.

In this context, and after a decade of high mineral prices, whether the main Chilean mining-dependent cities of Antofagasta and Calama are following a sustainable path of development or represent a new manifestation of enclave economies is an important open question. For our purposes, the main contrast to be drawn is between the main mining region of Antofagasta (with its major mining-related cities of Calama and Antofagasta) and the capital city region of Santiago and nearby port of Valparaiso (see Figure 2). Our thoughts here doubtless reflect some of the specificities of the case, which, despite a solid macroeconomic performance, could be considered a country of extremes. It is also a case that highlights the fundamentally contested history of the economies of resource peripheries (Hayter et al. 2003). Nevertheless, mining development in remote and extreme areas is a characteristic of most mining countries such as Australia, Canada, Russia, South Africa, and other African countries. In this sense, we consider that the Chilean case is an important one regarding the economic geography of mining regions.

Although an extremely diverse country in terms of climate, geography, and geology, Chile is also sparsely populated, with almost 40 percent of its 17 million people concentrated in Santiago. The fact that it is a highly centralized unitary state serves to reinforce this economic, political, and policy focus on the capital city. Chile is notable for being, perhaps, the earliest and fullest experiment with neoliberal regulatory and policy reform (Mayol 2012; Moulian 2002). This experimentation in a highly centralized national economy can hardly be separated from a host of issues surrounding the natural resources that are at the heart of the Chilean economy. To begin with, the neoliberal experiment itself followed from a military coup triggered, among other factors, in response to the expropriation of the mines of overseas MNEs by a socialist government. However, neoliberal reforms sit uncomfortably with the framing of the development experience in existing political and economic traditions in Latin America (Gore 2000), extending into a long history of international legal contestation surrounding the regulation of FDI (Sornarajah 2010), in which, as elsewhere in resource peripheries (Emel, Huber, and Makene 2011), nationalist sentiments surrounding natural resources remain strong.

We draw a major contrast between the historic mining company town and the trend toward the mining camp to present three different scenarios involving enclaves and combinations of enclaves and agglomerations derived from a multiscale perspective. The characteristics of each of these three forms are summarized in Table 1, and their spatial organization is depicted in stylized terms in Figure 3. The mining town represents the first classical type of industry enclave (Figure 3a) in which the overall logic is one that can be summarized as internalization, operating simultaneously at the local and the international scale. At the other extreme the effects of processes of internalization or



Figure 2. Map of Chile with notable mining-related industry locations.

externalization (vertical and horizontal disintegration) associated with the mining camp could be so thinly spread across an urban system—by way of weak integration into a GCC/GVC/GPN covering local, national, and international scales—that the whole nation can become an enclave (Figure 3d). This can be summarized from Table 1 as a situation in which the logic of industrial organization is one of internalization *or* externalization being ostensibly international in scope. This is the second classical sense in which the nation, as a whole, serves as an industrial enclave (Singer 1950).

However, in between these two classical senses of the industry enclave, the tendency toward mining being carried out in camps produces scenarios (Figure 3b and 3c) in which the camp is integrated, to some extent, with industry agglomerations elsewhere in subnational and national urban systems. With the mining camp, the modern industry enclave is no longer tightly bounded by the fences or walls as in the classical mining town. Some of the characteristics of the enclave have sprung their bounds. The present organization in Chilean mining industry exhibits patterns of contracting, subcontracting,

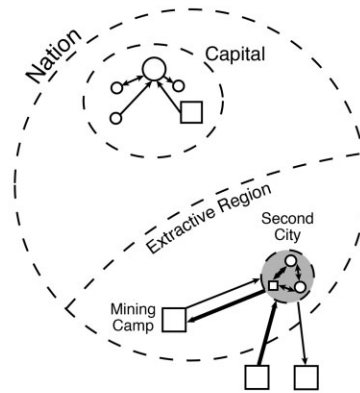
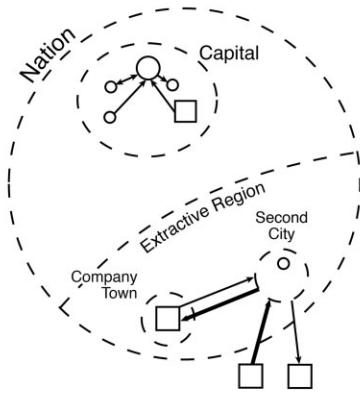
Table I

Summary Characteristics of Three Types of Enclave in Chilean Mining

	Intermediation			Nation as enclave
	Company town	Agglomeration in secondary city	Agglomeration in capital city	
Spatial delimitation	Strongly delimitated but with the possibility of territorial expansion at subnational scale.	Delimited as a quarter or dispersed across the whole of the secondary city.	Delimited as a quarter or agglomeration within the capital.	Mining camps exist as one among many dispersed points or fragments of production chains or networks of international reach.
Indirect (backward and forward) linkages	None locally, very few nationally	Emergence of agglomeration at secondary city due to opportunities for supply industries and downstream processing	Emergence of agglomeration within capital city as a result of reciprocity (specialization and diversity)	None locally, nor in capital or secondary cities
Induced linkages	Significant locally but internalised	None locally but some in secondary city	None locally but some in capital city	None locally but weak nationally in capital and secondary cities
Fiscal linkages	Limited: modest receipt of taxes centrally, little or no receipt of tax locally	Modest: centralized receipt of tax, possibly redistributed to extractive region.	Modest: centralised receipt of tax, captured by capital city	Limited: centralised receipt of tax captured by private interests?
Technological externalities (knowledge transfer)	Internalization (vertical integration)	Collaboration and knowledge transfer to secondary city suppliers	Weak at the secondary city, vertical collaboration and knowledge transfer at the national level	Weak at the secondary city and national level
Returns to scale	Internalization (vertical integration)	Partial externalization (vertical and horizontal disintegration) locally and nationally	Partial externalization (vertical and horizontal disintegration) nationally and internationally	Internalization (vertical integration) or externalization to international suppliers
Mobility of factors of production (capital and labor)	Importation of almost all mobile capital. Imported labor becomes fixed in town.	Importation of most capital, with weak local capital formation. Direct production labor staged through secondary city.	Importation of much capital with modest local capital formation. Management and key knowledge labor (indigenous and imported) staged through capital city.	Importation of all mobile capital. All labor staged through multiple localities in regional, national and international urban systems.
Social reproduction	Workers live and work in the enclave. Considerable private investments for collective consumption.	Workers live in various settlements, regionally, nationally and internationally No private investment for collective consumption	Workers live in various settlements regionally, nationally and internationally No private investment for collective consumption	Workers live in various settlements regionally, nationally and internationally Minor private investment for collective consumption
Overall logic of industrial organisation	Internalisation locally and internationally	Internalization (partial externalization) locally and internationally	Internalisation (partial externalization) nationally and internationally	Internalisation or externalisation internationally

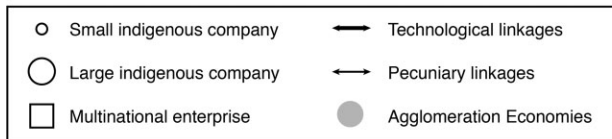
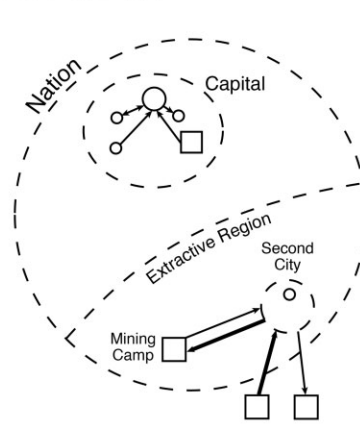
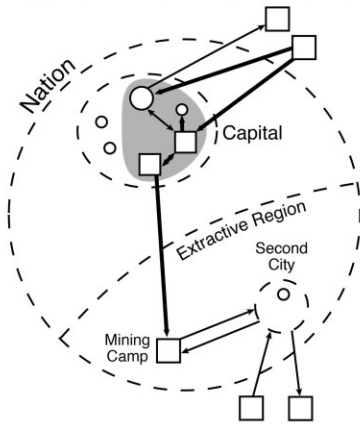
a) Company Town

b) Agglomeration Economies Present in Secondary City



c) Agglomeration Economies Present in Capital City

d) Nation as Enclave



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Figure 3. Three types of enclave: the company mining town (a), intermediation based on the mining camp (b and c), and the nation as enclave (d).

labor commuting, and fiscal transfers that are significantly delocalized (unlike the company mining town). We term the two scenarios of nonlocal industry agglomeration generated with the mining camp *intermediation*, and there is a double sense to the use of the term. There is intermediation of business activities, but also such processes of intermediation present forms of industrialization that are intermediate in geographic terms; that is, when external economies drive industrial agglomeration away from the mining camp elsewhere into subnational and national urban systems. Here the logic of industrial organization can be summarized from Table 1 as intermediation (or partial externalization) at the local and international *or* national and international scale (where, in the latter case, the capital city ostensibly is the nation in economic terms, due to extreme primacy). In the next sections, the Chilean experience is analyzed according to

the dimensions introduced earlier (and in Table 1) and these three enclave forms of industrialization.

The Mining Company Town

“Antofagasta in northern Chile owes much of its development over the last century and a half to nitrate and copper mining” (Eggert 2001, 18). The mining company town (Figure 3a) has been a feature familiar in the main extractive region of Chile during this time. The many mining ghost towns that exist in Antofagasta are testament to the temporary nature of industrialization and urbanization associated with this type of enclave. In Table 1 and Figure 3a, we note how the mining company town enclave is tightly spatially delimited. In the traditional company town, some important factors of production, all of the direct employment and some of the different types of linkages—indirect, induced and fiscal—are localized, normally in places close to the mineral deposits (see Table 1 and Figure 3a). Significantly capital (financial and technological) is almost entirely imported, yet this mobile capital is firmly rooted not only in the fixed location of land (natural resources), but also in labor that was imported from other regions. Much of the output was exported directly or, more usually, through mining secondary cities that acted as commercial nodes, linking the company town, normally through railways and ports, with the rest of the world economy (Garcés 2003). In terms of Figure 3a, the inland city of Calama and the port cities of Antofagasta and Iquique developed in this way, intermediating, to a limited extent, in the export of commodities.

Most indirect linkages and intermediate inputs and associated transactions, while localized or internal to the town, were also, crucially, internal to the corporation. With town and company synonymous, any returns to scale were captured through vertically integrated operations. As labor was housed and reproduced locally within the town, a notable feature of the company town was its significant and highly localized induced linkages—which were captured locally as expenditures on consumer services. Moreover, in some early instances, these, too, were internalized by the company through the use of local currencies in the form of tokens to be redeemed at shops and other amenities only within the town itself. In a context where there was competition among company towns for skilled labor, the internalization of these induced linkages also had the important effect of virtually eliminating labor turnover since tokens were not redeemable in other mining company towns. The high exports, coupled with the apparent urbanization of capital and secondary cities in the extractive region, generate the illusion of development; but the extreme internalization and vertical integration of economic activities means that while this pattern of urbanization has its basis in natural resources, it is unable ultimately to detach itself from these resources in the way that great cities have done historically to have an enduring role as economic engines (Fernández and Aizenman 2011; Krugman 1996).

In these towns, the company replaced the state in several of its duties, meaning that basic public goods and services—like the police, education, housing, water, and energy—were supplied and controlled by the company, obviating the perceived need for fiscal transfers from central governments. In some ways, it is remarkable that such self-contained towns were developed, given the costs of localized social reproduction borne by private enterprise.

It is important to recognize that there are variations on this company town enclave form itself (Garcés 2003). The earliest company mining towns in Chile, such as the British developed nitrate town of Chacabuco in Antofagasta, were self-contained settlements. Chacabuco, which existed from 1924 until 1938 as a town with a population of

around 7,000 and 1,700 workers involved with nitrate production, had not only production and administration activities, but also contained a market, a school, church, hotel, and a sizeable theater. Chacabuco and other earlier mining towns developed in what Jones (2005) refers to as a first global economy. While they contained many of the same amenities, later company towns, like the British nitrate company town Pedro de Valdivia (1931–96) or the substantial copper mining town of Chuquicamata (1915–2007), which reached a population of 25,000, developed in a more nationally partitioned era of international trade and production.

Between Agglomeration and Enclave: The Ambiguous Implications of the Mining Camp

134 “Mines have moved away from a high level of vertical integration towards outsourcing almost every stage in the mining process to independent firms, including the provision of capital goods and intermediate inputs such as chemicals” (Morris et al. 2012, 409–10). That is, mining production is now more *roundabout* (Young 1928) or vertically and horizontally disintegrated (Scott 1983, 1986) in its organization. The sourcing, organization, and reproduction of labor also has become more roundabout, though the implications of this for local and national economic development are less clear. Even with regard to this relatively immobile factor of production, things have changed in a world where corporations have been less willing to bear the costs of social reproduction via the provision of goods and services for collective consumption typically found in mining company towns. This roundaboutness in production (including labor) is not unusual with regards to many manufacturing and service industries either historically or presently, but its effects with regard to extractive industries—more frequently the subject of enclave formations—can usefully be elaborated.

The stretching of economic relations across multiple scales renders environmental costs of consumption less visible (Princen, Maniates, and Conca 2002). Arguably, the economic costs and benefits of mining have also become less visible as a result of the increasing roundaboutness of industry and its increasing geographic reach. Some idea of the complexity of judging the costs and benefits of any individual mining project are outlined by Eggert (2001). Such complexity derives not just from differences in how private and social costs and benefits are judged, but from the fundamentally multiscale nature of the economic effects of any given project. The multiscale nature of relations surrounding mining operations contributes to a lack of visibility regarding the economic costs and benefits of mining industry to policy makers and *may* be one ingredient in the asymmetry in the bargaining position of states vis á vis MNEs over royalties and even the limited fiscal transfers to mining regions (see Table 1). In these respect, while Chile has been considered as a model of macroeconomic governance transparency regarding the mining industry (Korinek 2013), such macroeconomic management has been spatially blind and has played no active role in the promotion of *local* industry agglomerations.

After the nitrate crisis, which started in the 1930s, company towns progressively disappeared in Chile. Currently, only the company town of Maria Elena is still working. The decrease in transportation costs, both in terms of time and money, and the new form of organizing mining production, moving away from vertical integration, opened the fences of company towns (depicted in Figure 3b through 3d where the boundary of the mining town has disappeared) leaving only mining camps—the equivalent in mining to offshore oil platforms (Storey 2001; Ferguson 2006).

Mining camps are exclusively places of work and production and not residential places, unlike the company towns. Camps are built by the mining companies close to the

mineral deposits to exploit them and offer just a room and some services to their workers. Despite being perfectly delimited, camps are not designed to be autonomous, like the company towns were, since they depend on external labor. Mining camps are one point in a more geographically extensive system of production. A new and distinctive aspect of mining camps is long-distance commuting based on roster-work systems where the worker remains in the camp for a number of consecutive days followed by rest periods in their places of residence, which can be located in a secondary city in the mining region or even abroad (Aroca and Atienza 2008, 2011).

As Ferguson (2006, 14) explains, regarding the experience of Africa, mining camps and offshore platforms are fenced off and “at the same time linked up, with a ‘flexibility’ that is exemplary of the most up-to-date ‘post-Fordist’ neoliberalism, both with giant transnational corporations and with networks of small contractors and subcontractors that span thousands of miles and link nodes across multiple contexts.” It might be tempting to view this connection of different worlds offered by localities’ and countries’ incorporation into mining GCC/GVC/GPNs as leaving opportunities for the development of localized agglomerations of economic activity. While it is important not to overgeneralize, and while extractive industries do not necessarily lead to enclave economies, there are good reasons and evidence to suggest that such localized agglomeration is unlikely. Instead, the emergence of the mining camp is associated with developmental outcomes that are intermediate—the mining camp as an enclave coexisting with a measure of industry agglomeration elsewhere in subnational and national urban systems (Figures 3b and 3c).

The Mining Camp and Agglomeration Economies in Secondary Cities

Mining production in Chile is arranged as a system of mining camps located close to the mineral deposits that hire workers from different parts of the country and internationally, and that contract and subcontract the different services necessary for the exploitation of deposits following a hub-and-spoke pattern. Thus, while analogous to an oil platform, the mining camp itself is perhaps even more tightly delimited in spatial terms than the mining company town as a point of production rather than a settlement. From this perspective, intermediation means that some of the economic relations centered on mining camps may promote agglomeration in a secondary city where the development of mining services industries may or may not be spatially delimited (Table 1).

The organization of production in the Chilean mining camps is characterized by the highest level of workforce contracting-out in the world—being over 60 percent compared to 24 percent in Australia and Canada and 8 percent in the United States (Korinek 2013). The externalization of tasks in mining opens the possibility of increasing the strength of backward linkages with local suppliers. Mining, however, is characterized by the weakness of both backward and forward linkages at a local level (Aroca 2001; Arias et al. 2014). This suggests that pecuniary externalities of mining have a broad geographic scope. Local pecuniary effects are made up of suppliers that are predominantly small and medium enterprises (SMEs) hired to provide ancillary services such as construction, steelwork, transportation, maintenance, repairs, cleaning, and food provision. In this context, secondary cities (such as Calama and Antofagasta) in a mining region potentially can play an intermediary role (the shaded area in Figure 3b indicating the presence of agglomeration economies in the secondary city). Notably, this intermediary role would center on the supply of services to mining camps and/or around further processing prior to export. Yet it is unclear whether secondary cities can indeed benefit from localization economies in this way, in order to become an internationally competitive agglomeration let alone benefit from significant urbanization economies (Table 1).

It is rare for industry agglomerations linked directly or indirectly to mining to promote broad-based urbanization in the form of medium or large cities (Freeman 1945; Garcés 2003; Fernández and Atienza 2011). Consequently, these cities usually suffer scarcity of specialized workers. Mining companies have tended to solve this problem by increasing the flow of long-distance commuters from other parts of the country, especially during mineral boom periods. The lack of thickness of local labor markets signals the absence of Marshall's (1890) labor market pooling external economies and also implies a loss of induced linkages where such expenditures *fly over* to other parts of the country where long-distance commuters live (Storey 2001). Currently, more than 10 percent of the Antofagasta labor force comes from other regions working on a shift system, a practice that reduces the potential for the diversification of production (Aroca and Atienza 2008, 2011).

136 Despite the weakness of the pecuniary externalities of the mining industry at a local level, perhaps the main constraint on the formation of localization economies in mining regions is related to technological externalities. In Chile, the specialization of SMEs from Antofagasta in ancillary and routine tasks implies that their research and development activities would be marginal, and that knowledge creation and transfer would be fundamentally exogenous. This situation implies an increase in the technological and cognitive distance between mining companies and their local suppliers, reducing the possibility of vertical knowledge transfer and collaboration agreements oriented toward innovation, since mining companies will not perceive significant benefits from this collaboration (Table 1). Furthermore, the competition among local firms for a reduced number of big clients becomes an obstacle for horizontal collaboration and trust among local SMEs (Atienza 2012). This situation is reinforced by the spatial division of labor that characterizes mining activity in Chile. The most specialized and knowledge-intensive services that are associated with technological externalities are normally provided to mining companies by specialized MNEs with dominant global positions and whose branches tend to be located in Santiago. The capital city, where the headquarters of the main mining companies and main mining suppliers tend to be located, specializes in occupations that require a higher level of human capital and decision-making capacity, such as managers, professionals, and technicians, whereas the mining regions specialize in occupations of a routine and physical type that require a medium or low level of qualification (Lufin and Atienza 2010).

The weaknesses of localization economies centered on mining activities have been analyzed by Arias et al. (2014) in Chile for the region of Antofagasta. This region seems currently to be closer to an enclave than to a sustainable industry agglomeration based on mining-connected activities. Linkages of local suppliers with mining companies are weak. The local labor market specializes in routine physical tasks, and the scarcity of qualified workers means that there is a reliance on long-distance commuting to satisfy labor demand. Finally, there are few signs of the existence of knowledge spillovers partly because local SMEs' capacity to absorb such spillover effects is itself very limited. Despite high growth rates during the past two decades, and despite the fact that mining represents more than 65 percent of regional gross domestic product, the weakness of pecuniary and technological externalities at a local level and this high level of dependence on mining, raises doubts about the sustainability of the two main cities of the region—Antofagasta and Calama.

The question mark that hangs over sizeable cities like Antofagasta and Calama, in this scenario, is therefore whether their present economic and population expansion will prove sustainable or whether the expansion will be followed by shrinkage and decline. Crucially, in this scenario, fiscal transfers to secondary cities are often limited (see

Table 1). Indeed, in the case of Chile, “revenue from the mining sector is not earmarked for the jurisdictions (municipalities, regional governments) of the territories where mining industries are based, as is found in some other natural resource rich countries” (Korinek 2013, 34). Thus, while Chile may have solved what Eggert (2001) refers to as the *macroeconomic and political* and *investment* challenges of generating sustainable economic development from extractive industries, it has barely addressed the *distributional* challenge. This distributional challenge surrounding fiscal transfers to mining regions seems likely to come to the fore as, suitably targeted, fiscal transfers could have a role to play in the promotion of localization externalities, possibly by way of the development of skills through localized social reproduction and ultimately the economic sustainability of such secondary cities.

The Mining Camp and Agglomeration Economies in Capital Cities

In Figure 3c, we suggest that if agglomeration economies are to form from the vertical and horizontal disintegration surrounding mining camps, it is most likely that they will form at the national level as a spatially delimited quarter in the capital city, since it plays the main intermediary role in the global supply chain of mining production and firms can benefit from the existence of urbanization economies (the shaded area representing a specialized industrial agglomeration within a larger diversified urban economy).

In this scenario, the country can gain from the presence of large mining companies because tax revenues and external economy effects are concentrated in the capital city. In contrast, the secondary cities of mining regions—although sizeable and growing in population as a result of induced linkages and real estate development as staging posts for commuting workers—display many of the characteristics of an enclave. This appears to be the most likely scenario in which an industry agglomeration would develop in a small national economy with a high concentration of population in the primary city and with a strongly centralized national government such as Chile. The idea of a cluster of mining services suppliers located in the business districts of the main cities of the urban system has also been suggested in the cases of mining activity in South Africa (Kaplan 2012), Ghana (Bloch and Owusu 2012), Zambia (Fessehaie 2012), and Australia (Scott-Kemmis 2011).

Notably, the scale and diversity of capital cities may present opportunities for synergies between localization and urbanization economies, such that an extractive industry cluster may become one of a number of clusters that can coexist in the largest metropolitan economies. Here, then, technological externalities may well be present, since MNE mining suppliers and their headquarters are located in the metropolitan area, together with the most qualified workers. The urban amenities of capital cities reduce the prospects of MNE managers and the highest skilled segments of expatriate and other long-distance commuting of labor associated with the emergence of mining camps moving to the secondary cities of mining regions.

This is certainly the main sense in which policy discussion surrounding the development of a mining cluster has evolved in Chile. Mining *cluster* policy was originally designed locally, in the Region of Antofagasta, and adopted by central government ministries in Santiago in 2001 as a local development strategy to improve the strength and quality of the linkages of local services suppliers with mining companies. This policy has evolved to become a *national* cluster strategy during the boom of copper prices that started in 2004. After a brief period in abeyance during 2010–14 under Piñera’s government, cluster policies are back on the political agenda, but they remain framed at the national level. The official mining cluster strategy in Chile is currently focused on the development of service suppliers, mainly through a private sector-led

program for “world-class suppliers to the mining industry” begun by Australian BHP Billiton in 2009 and now supported by other mining companies and the government.

138 The aim of this program is to build technological capabilities in the Chilean mining suppliers, linking them with the requirements of multinational and national mining companies. It is expected that this program will develop 250 world-class suppliers by 2020. In this way it is hoped that mining will contribute to the sustainable development of a number of local communities and the country as a whole. Despite the sustainability of mining communities being declared as an explicit objective of this program, the different available data sources confirm that the mining services supply industry is concentrated disproportionately in the capital and Valparaiso rather than the mining region of Antofagasta itself. The Antofagasta region accounts for 50 percent of national mining production. However, 77 percent of the 65 mining suppliers that have participated in this program are located in Santiago or in nearby cities, and only 15 percent of the firms come from the main mining region of the country, Antofagasta.⁸ This spatial distribution of firms is also related to the distribution of Chilean services mining suppliers (Fundación Chile 2014). These findings speak to the copresence of suppliers, but they say nothing regarding the extent, intensity, and content of any interactions there may be among them. They remain inconclusive, regarding the sorts of technological externalities that would likely drive the viability of an industry agglomeration in the longer term, though it seems reasonable to speculate that the most technologically sophisticated of suppliers would be based in the Santiago-Valparaiso area. However, a proposal for a new mining development strategy recently presented to the president of Chile acknowledges the lack of integration of Chilean firms in global mining value chains, especially in the case of knowledge intensive mining services (Lagos 2014).

The National Economy as Enclave

A major strand of the literature on enclaves speaks to national economies as a whole (Singer 1950; Weisskoff and Wolff 1977). We represent this other classical concept of the enclave economy in Figure 3d. In this scenario, the nation amounts to an enclave economy due to any external economies being thinly distributed across subnational and national territories. Not only is the local economy in the form of the mining camp just “a production point—and then only for a fragment . . . of the complete production process” (Dietz 1985, 516), but so too are all other localities within the national urban system, including the capital city. In this case, the prognosis for the development of localization economies of specialization through local linkages emerging “spontaneously” is typically poor, since the main multiplier effects take place not where the investment is physically located, but in the investors’ place of origin (Singer 1950, 475). Here the enclave “cannot contribute to the expansion of the industrial arts . . . in a process of creative destruction which breaks down restraining internal barriers to progress” (Dietz 1985, 517). Instead, it is often the production possibilities of individual companies or their home economies that are expanded (Dietz 1985).

This is a scenario in which production centered on the mining camp fails to produce any of the external economies typical of an industry agglomeration, not only at the site of production (the mining camp itself), but also anywhere else within the national economy—including the secondary city in the mining region or the capital city. This scenario can emerge from internalization or significant externalization to internationally based suppliers. It is a situation in which the export of produce stimulates little or no

⁸ Figures retrieved from Fundación Chile <http://desarrolloproveedores.cl/>.

further downstream processing or value added occurring alongside the dissipation of any modest external economies and intranational linkages across the national system of cities. This is explicitly acknowledged as a feature of the lack of spillovers of mining to the Chilean economy, given the lack of competitive advantage in further downstream processing such as smelting (Korinek 2013) and weak development of knowledge-intensive services suppliers (Lagos 2014; Urzúa 2012). The potential for development is highlighted by Korinek (2013, 38) when observing how “If Chile attained the same level of mining-related activity exports as a percentage of total mining exports that Canada has achieved, this would imply an increase of more than ten times the current level.” However, for the time being, this is only a potential given the level of specialization in mining-related knowledge-intensive services attained already by Australia, Sweden, Finland, and Canada when compared to Chile’s specialization in engineering and fabrication.

This is a scenario in which there are significant imports of all factors of production at the local (subnational) and the national scale. Notably, there are significant leakages rather than linkages in the form of imports of technology and the international recruitment of labor—both of which are also apparent, though to a lesser extent, in the Chilean case. 139

In this instance, despite potentially significant fiscal linkages derived from mining activity, tax revenues are also insufficient to enable opportunities for state-anchored agglomerations in either the capital or secondary cities. It is quite possible that this is the case in Chile. The tenor of available evidence on this point is contradictory. Reports agree that the country is a success story in the attraction of, and legal protection for, mining FDI (UNCTAD 2011) and governmental transparency in the collection, management, and investment of mining taxes and royalties (Korinek 2013). However, the 27 percent of government tax revenue contributed by mining industry taxes and royalties between 2006 and 2010 (Korinek 2013) is argued to be modest (UNCTAD 2011), given the high copper prices that prevailed during the last decade. Moreover, Korinek (2013) also admits that taxes on mining company profits in Chile are low in comparison to other countries, including some, such as Australia, where there has been a significant build-up of supply industries. Prior to the disruptive nationalization of mines, and the *strategic decoupling* produced by Chile’s coup-induced neoliberal experiment, there had been successful incremental learning on the part of national government in hosting and bargaining with mining MNEs (Moran 1974).

More controversial are claims (Korinek 2013) that Chile is a model for policies to foster positive linkages and spillovers with other sectors, since the same report notes how “Chile is *introducing* policies that tap into the vast potential for technological development and the provision of specialized knowledge intensive services to mining activities” (Korinek 2013, 6 emphasis added). As we noted above, these policies have not only been unable to create a critical mass of knowledge intensive mining services suppliers (Urzúa 2012; Lagos 2014), but also have been *spatially blind*. The legal security and macroeconomic stability afforded to private investors under Chile’s neoliberal policy has been in place long enough (since the 1980s) to question why it has taken until 2009 for the private sector to assume the initiative in promoting a cadre of world-class suppliers. Furthermore, the lack of coordination and shared vision among stakeholders regarding policy to develop the supply industry to the mining sector (Korinek 2013) are hardly encouraging.

The failure of Chilean government policy to meet the distributional challenge associated with mining industry revenues also spills over into the sphere of social reproduction. Curiously, given the weakness of local and regional government initiatives in this regard,

in this scenario the private sector once again enters the picture in both of the secondary cities of Antofagasta and Calama.⁹ This may be unique to our case of mining in Chile. However, it is also possible that this could be a feature of the nation as enclave more generally, if social reproduction is undermined by insufficient provision for collective consumption.

Conclusion

140 The literature on industry enclaves is dwarfed by the literature on agglomeration, and yet across several dimensions, the industry agglomeration and the enclave are two sides of the same analytical coin. As industry continues to become more roundabout and as GCC/GVC/GPNs increasingly are stretched geographically, the economic geographic landscape is one in which outcomes between localized agglomerations and enclaves are visible. While the potential for localized industry agglomerations to develop as a result of the elaboration of GCC/GVC/GPNs has been emphasized in the literature, it is equally apparent that enclaves also remain very much part of the economic geographic landscape. That is, an understanding of industry enclaves is very much a part of understanding the full variety—including a *dark side* (Coe and Hess 2011)—of the national and subnational local manifestations and consequences of participation in GCC/GVC/GPNs. It may yet be that one of the main findings to be drawn from this burgeoning GCC/GVC/GPN literature will be that, in most instances, local and national industry development produces outcomes that are *intermediate*—those that represent neither the highs of industry agglomerations nor the lows of enclaves. In this article, we offered an initial sketch of this intermediate landscape with respect to extractive industries. The case of mining in Chile offers a good example of how the enclave economy no longer coincides with the fences of traditional company towns and modern mining camps but has a complex and multiscale structure. While significant localization economies do not as yet appear to have developed in the main mining region of Antofagasta (Arias et al. 2014), it is more debatable whether Chile represents a nation as enclave, since there are signs of something of an agglomeration of mining services suppliers in Santiago.

Our focus on enclave forms of production indicates the need for a more central position to be accorded to the study of extractive and resource industries of all sorts, since there is plenty to suggest that variety exists in the economic geographic organization of these industries. Extractive industries have remained at the margins of economic geographic analysis and yet in other respects continue to represent forms of business organization idealized not only by business itself, but also, in some instances, by governments. For Princen et al. (2002, 104) “although there are few, if any, true frontier economies today . . . policy makers and business people . . . continually try to construct them.” Extractive industries provide us with a glimpse into this sort of experimentation in the construction of such business environments. This is not merely an academic issue, as is apparent in international initiatives aimed at increasing the corporate and governmental transparency surrounding extractive industries.

Beyond these specifics of extractive industries, a landscape for future research on different logics, forms, and effects of enclaves opens up. One element of such a research agenda centers on identifying the diversity of the contemporary enclave economy, including a potential variety of economic logics to industrial organization that exceed the

⁹ CREO Antofagasta is funded by a consortium of multinational mining companies to produce a new spatial planning vision for the city of Antofagasta (see <http://creoantofagasta.cl>). The national mining company CODELCO has a similar program called Calama PLUS (see <http://www.calamaplus.cl/>).

logics associated with the mining-related scenarios presented here. Weisskoff and Wolff (1977, 625) argued that with “modernized dependency,” the enclave economy extended well beyond the primary sector. Yet economic geographers have been slow to chart this landscape of the modern enclave, despite ample evidence in the fields of development studies, area studies, political geography, and international relations of enclave forms existing in primary, secondary, and tertiary sectors. EPZs are considered to amount to manufacturing enclaves (Warr 1989). They have a relatively recent history, then, but appear to have proliferated in the recent era of neoliberal international trade and investment policy. Significantly, the growth of EPZs and SEZs as modern industry enclaves was “enabled by the vertical and spatial fragmentation of manufacturing into highly integrated ‘global production networks’ ” (Farole and Akinci 2011, 5). Their contributions have varied over time and across specific national and local and regional contexts from stories of successful contribution to national economic growth, diversification, and development in the short term to their being part and parcel of the dark side of industrial development associated with GCC/GVC/GPNs. Although legally defined in such a way as to be enclaves, offshore financial services jurisdictions (Palan 1998) may be associated with significant localized spillovers if only because of the high salaries and value added of the activities involved. Business services that increasingly have been outsourced and or offshored are often found in highly securitized environments of office and technology parks, which have been found to have different local economic development impacts (Kleibert 2014). The territorial concession appears once again to be on the rise as a means of enabling overseas investments in all manner of economic activities, including tertiary activities such as tourism and real estate development (Nyíri 2010).

A second element of a future research agenda could focus on the elaboration of evolutionary economic geography perspectives on industry enclaves. Indeed, the work of Weisskoff and Wolff noted not only that “shifts within the enclave typology” are apparent over time, but also that “the successful exploitation of linkages may be constrained by the very political conditions which initially promoted the enclave” (1977, 620, 611). This emphasis on initial conditions is suggestive of fruitful connections to be made with work on the evolution of industry agglomerations (Menzel and Fornahl 2009) but also to the concepts of lock-in and path dependence and their deployment in an evolutionary economic geography of local and regional economies (Martin and Sunley 2006). It is also suggestive of an emphasis placed on the role of policies and institutions in the establishment and evolution of enclaves that resonates with the interests of an evolutionary political economy (MacKinnon et al. 2009). The multiscalar character of the economic relations centered on the enclaves means that the concept is one that is compatible with both the GCC/GVC/GPN approach and the fundamental complexity and openness of local or regional economies emphasized in some evolutionary economic geography accounts (Martin and Sunley 2006).

Third, questions of the evolution of national, regional, and local economies are not merely theoretical ones but politically and policy-redolent ones. Palan (1998, 64) argues that “the state system is not disappearing, but, on the contrary is in the process of creating secondary, relatively unregulated juridical spaces in which economic activities can develop more or less without hindrance.” It is in this respect that neoliberal reforms put in place in many nations over the past three decades or so have important legacies in terms of the incentives and possibilities for the active construction and evolution of what are essentially enclave forms of private investment. Neoliberalization of the legal, regulatory, and policy environment affecting FDI has taken for granted its automatic effects in generating national and local economic spillovers (Phelps 2008). However, “Expecting FDI to automatically stimulate economic growth and transform industry—and designing

policies accordingly—is more likely to generate enclaves than spillovers” (Gallagher and Zarsky 2007, 10).

An enduring challenge for policy is to understand under what conditions an enclave is able to evolve in such a way that processes of industry agglomeration and consequent diversification take place. In great cities of the world, industrialization has sustained processes of economic development and urbanization whereby local economies become progressively detached from their original basis in natural resources (Krugman 1996). In some inimitable instances of modern enclave forms, such as the largest SEZs (Shenzhen in China being a notable example) and some offshore finance centers, we may see the intriguing possibility of new urban materiality produced from constructs of the legal and regulatory imagination. Greater elaboration of industry enclaves therefore presents additional and particular stories to be told of material worlds (Bakker and Bridge 2006). However, in the main, policy has been unable to gain purchase on the sorts of dimensions of enclaves we have described in this article such that economic enclaves have rarely been able to escape their initial conditions—their basis in natural resources or their basis in legal or regulatory exceptions. While there might be little value in policy to act on the highly temporary nature of some enclaves—such as the mining camps discussed in this article—it is also clear that there is a far greater value in policy to secure the longer-term sustainability of historic larger cities (such as Calama and Antofagasta) playing a potentially significant intermediary role in the mining industry.

Finally, in all of this, the potential for greater engagement between economic geography and other fields of inquiry is revealed. A renewed focus on economic enclaves can benefit from significant analytical synergies with research in area and development studies and from fuller elaboration of the political dimensions of economic geography (Agnew 2012). Such political dimensions to an economic geography would be particularly apparent not only in the decoupling of nation and state apparent in the sovereignty invested in some enclaves (Agnew 2005), but also an appreciation of the role and variety of intermediaries between companies and states involved in their creation, organization, and promotion.

References

- Agnew, J. 2005. Sovereignty regimes: Territoriality and state authority in contemporary world politics. *Annals of the Association of American Geographers* 95:437–61.
- . 2012. Putting politics into economic geography. In *The Wiley-Blackwell companion to economic geography*, ed. T. J. Barnes, J. Peck, and E. Sheppard, 567–80. Chichester, UK: Wiley-Blackwell.
- Arias, M., Atienza, M., and Cademartori, J. 2014. Large mining enterprises and regional development in Chile: Between the enclave and cluster. *Journal of Economic Geography* 14:73–95.
- Aroca, P. 2001. Impacts and development in local economies base on mining: the case of the Chilean II region. *Resources Policy* 27:119–34.
- Aroca, P., and Atienza, M. 2008. La Conmutación Regional en Chile y su Impacto en la Región de Antofagasta [Regional commuting in Chile and its impact in the region of Antofagasta]. *EURE Revista Latinoamericana de Estudios Urbano Regionales* 34:97–121.
- . 2011. Economic implications of long distance commuting in the Chilean mining industry. *Resources Policy* 36:196–203.
- Atienza, M., ed. 2012. *La pyme de la región de Antofagasta. 2005–2009*. [The SME in the region of Antofagasta 2005–2009] Antofagasta, Chile: Ediciones Universitarias UCN.
- Auty, R. 1993. *Sustaining development in resource economies: The resource curse thesis*. London: Routledge.

- Bathelt, H., and Li, P. 2014. Global cluster networks: Foreign direct investment flows from Canada to China. *Journal of Economic Geography* 14:45–71.
- Bathelt, H., Malmberg, A., and Maskell, P. 2004. Clusters and knowledge: Local buzz, global pipelines and the process of knowledge creation. *Progress in Human Geography* 28:31–56.
- Bakker, K., and Bridge, G. 2006. Material worlds? Resource geographies and the “matter of nature”. *Progress in Human Geography* 30:5–27.
- Bloch, R., and Owusu, G. 2012. Linkages in Ghana’s gold mining industry: Challenging the enclave thesis. *Resources Policy* 37:434–42.
- Blois, K. J. 1972. Vertical quasi-integration. *Journal of Industrial Economics* 20:253–72.
- Bridge, G. 2004. Mapping the bonanza: Geographies of mining investment in an era of neoliberal reform. *Professional Geographer* 56:406–21.
- Brueckner, M., Durey, A., Mayes, R., and Pforr, C. 2014. *Resource curse or cure? On the sustainability of development in Western Australia*. Berlin: Springer.
- Cardoso, F., and Faletto, E. 1969. *Dependencia y desarrollo en América Latina*. [Dependency and development in Latin America] México: Siglo XXI.
- Castells, M. 1977. *The urban question*. London: Edward Arnold.
- COCHILCO (Comisión Chilena del Cobre) 2013. *Anuario de estadísticas del cobre y otros minerales* [Annual directory of statistics of copper and other minerals]. 1993–2012. Santiago, Chile: COCHILCO, Ministerio de Minería.
- Coe, N. M., and Hess, M. 2011. Local and regional development: A global production network approach. In *Handbook of local and regional development*, ed. A. Pike, A. Rodriguez-Pose, and J. Tomoney, 128–38. London: Routledge.
- Dietz, J. L. 1985. Export-enclave economies: International corporations and development. *Journal of Economic Issues* 19:513–22.
- Eggert, R. G. 2001. *Mining and economic sustainability: National economies and local communities*. Mining, minerals and sustainable development paper 19. Available online: <http://pubs.iied.org/pdfs/G00952.pdf>.
- Emel, J., Huber, M. T., and Makene, M. H. 2011. Extracting sovereignty: Capital territory, and gold mining in Tanzania. *Political Geography* 30:70–79.
- Farole, T., and Akinci, G. 2011. Introduction. In *Special economic zones: Progress, emerging challenges and future directions*, ed. T. Farole and G. Akinci, 1–21. Washington DC: World Bank.
- Ferguson, J. 2006. *Global shadows: Africa in the neoliberal world order*. London: Duke University Press.
- Fernández, I., and Atienza, M. 2011. Increasing returns, comparative advantage and history: The formation of the mining city of Antofagasta. *Urban Geography* 32:641–61.
- Fessehaie, J. 2012. What determines the breadth and depth of Zambia’s backward linkages to copper mining? The role of public policy and value chain dynamics. *Resources Policy* 37: 443–51.
- Freeman, O. 1945. Natural resources and urban development. *Annals of the American Academy of Political and Social Science* 242:30–45.
- Frenken, K., Van Oort, F., and Verburg, T. 2007. Related variety, unrelated variety and regional economic growth. *Regional Studies* 41:685–97.
- Fundación Chile. 2014. *Proveedores de la minería chilena. Estudio de caracterización 2014*. [Chilean mining supplier. Characterization study 2014] Santiago, Chile: Fundación Chile.
- Gallagher, K. P., and Zarsky, L. 2007. *The enclave economy: Foreign investment and sustainable development in Mexico’s Silicon Valley*. Cambridge, MA: MIT Press.
- Garcés, E. 2003. Las ciudades del cobre. Del campamento de montaña al hotel minero como variaciones de la company town. [The cities of copper. From the mountain camp to the mining hotel as variations of the company town] *EURE* 29:131–48.
- Gereffi, G. 1999. International trade and industrial upgrading in the apparel commodity chain. *Journal of International Economics* 48:37–70.
- Gore, C. 2000. The rise and fall of the Washington consensus as a paradigm for developing countries. *World Development* 28:789–804.

- Gordon, I., and McCann, P. 2000. Industrial clusters: Complexes, agglomeration and/or social networks? *Urban Studies* 37:513–38.
- Hayter, R. 2003. Single industry resource towns. In *A companion to economic geography*, ed. E. Sheppard and T. J. Barnes, 290–307. Oxford: Blackwell.
- Hayter, R., Barnes, T. J., and Bradshaw, M. 2003. Relocating resource peripheries to the core of economic geography's theorizing: Rationale and agenda. *Area* 35:15–23.
- Hirschman, A. 1981. *Essays in trespassing: Economics to politics and beyond*. New York: Cambridge University Press.
- Hoover, E. 1948. *The location of economic activity*. New York: McGraw-Hill.
- Iammarino, S., and McCann, P. 2013. *Multinationals and economic geography: Location, technology and innovation*. Cheltenham, UK: Edward Elgar.
- Jacobs, J. 1969. *The economy of cities*. London: Jonathan Cape.
- Jones, G. 2005. *Multinationals and global capitalism: From the nineteenth to the twenty-first century*. Oxford: Oxford University Press.
- Kaplan, D. 2012. South African mining equipment and specialist services: Technological capacity, export performance and policy. *Resources Policy* 37:425–33.
- Kaplinsky, R. 2000. Globalisation and unequalisation: What can be learned from value chain analysis? *Journal of Development Studies* 37:117–46.
- 144 Kleibert, J. M. 2014. Strategic coupling in “next wave cities”: Local institutional actors and the offshore service sector in the Philippines. *Singapore Journal of Tropical Geography* 35:245–60.
- Korinek, J. 2013. Mineral resource trade in Chile: Contribution to development and policy implications. OECD trade policy paper 145. Paris: OECD.
- Krugman, P. 1991. *Geography and trade*. Cambridge, MA: MIT Press.
- . 1996. *Pop Internationalism*. Cambridge, MA: MIT Press.
- Lagos, R. 2014. *Minería y desarrollo sostenible en Chile. Hacia una visión compartida. Una minería virtuosa, sostenible e inclusiva*. [Mining and sustainable development in Chile. Towards a shared vision. A virtuous, sustainable and inclusive mining industry] Santiago: Gobierno de Chile.
- Lufin, M., and Atienza, M. 2010. Diferencias entre la composición sectorial y ocupacional de las principales ciudades chilenas. [Differences in the industrial and occupational mixes of the main Chilean cities] *EURE Revista Latinoamericana de Estudios Urbano Regionales*. 36:75–93.
- MacKinnon, D. 2011. Beyond strategic coupling: Reassessing the firm-region nexus in global production networks. *Journal of Economic Geography* 12:227–45.
- . 2013. Strategic coupling and regional development in resource economies: The case of the Pilbara. *Australian Geographer* 44:305–21.
- MacKinnon, D., Cumbers, A., Pike, A., and Birch, K. 2009. Evolution in economic geography: Institutions, political economy, and adaptation. *Economic Geography* 85:129–50.
- McCann, P., and Mudambi, R. 2004. The location behaviour of the multinational enterprise: Some analytical issues. *Growth & Change* 35:491–524.
- . 2005. Analytical differences in the economics of geography: The case of the multinational firm. *Environment & Planning A* 37:1857–76.
- Markusen, A. 1996. Sticky places in slippery space: A typology of industrial districts. *Economic Geography* 72:293–313.
- Marshall, A. 1890. *Principles of economics*. London: Macmillan.
- Martin, R., and Sunley, P. 2003. Deconstructing clusters: Chaotic concept or policy panacea? *Journal of Economic Geography* 3:5–35.
- . 2006. Path dependence and regional economic evolution. *Journal of Economic Geography* 6:395–437.
- Maskell, P., and Malmberg, A. 1999. The competitiveness of firms and regions “ubiquitification” and the importance of localized learning. *European Urban and Regional Studies* 6:9–25.
- Mayol, A. 2012. *El derrumbe del modelo: La crisis de la economía de mercado en el Chile contemporáneo*. [The fall of the model: The crisis of the market economy in contemporaneous Chile] Santiago, Chile: LOM Editores.
- Menzel, M. P., and Fornahl, D. 2009. Cluster life cycles—Dimensions and rationales of cluster evolution. *Industrial and Corporate Change* 19:205–38.

- Moran, T. H. 1974. *Multinational corporations and the politics of dependence: Copper in Chile*. Princeton, NJ: Princeton University Press.
- Morris, M., Kaplinsky, R., and Kaplan, D. 2012. "One thing leads to another": Commodities, linkages and industrial development. *Resources Policy* 37:408–16.
- Moulian, T. 2002. *Chile actual: Anatomía de un mito*. [Current Chile: The anatomy of a myth] Santiago, Chile: LOM Editores.
- Nyíri, P. 2010. The renaissance of concessions, *Political Geography* 31:195–96.
- Ong, A. 2007. *Flexible citizenship: The cultural logics of transnationality*. Durham NC: Duke University Press.
- Palan, R. 1998. The emergence of an offshore economy. *Futures* 30:63–73.
- Parr, J. B. 2002. Missing elements in the analysis of agglomeration economies. *International Regional Science Review* 25:151–68.
- Phelps, N. A. 1992. External economies, agglomeration and flexible accumulation, *Transactions of the Institute of British Geographers* NS 17: 35–46
- . 2004. Clusters, dispersion and the spaces in between: For an economic geography of the banal. *Urban Studies* 41:971–89.
- . 2008. Cluster or capture? Manufacturing foreign direct investment, external economies and agglomeration. *Regional Studies* 42:457–73.
- Phelps, N. A., and Ozawa, T. 2003. Contrasts in agglomeration: Proto-industrial, industrial and post-industrial forms compared. *Progress in Human Geography* 27:583–604.
- Porter, M. E. 1990. *The competitive advantage of nations*. London: MacMillan.
- Princen, T., Maniates, M., and Conca, K. 2002. Confronting consumption. In *Confronting Consumption*, ed. T. Princen, M. Maniates, and K. Conca, 1–20. Cambridge, MA: MIT Press.
- Ramamurti, R. 2001. The obsolescing "bargaining model"? MNC-host developing country relations revisited. *Journal of International Business Studies* 32:23–39.
- Scitovsky, T. 1954. Two concepts of external economies. *Journal of Political Economy* 62:143–51.
- Scott, A. J. 1983. Industrial organization and the logic of intra-metropolitan location: I. Theoretical considerations. *Economic Geography* 59:233–50.
- . 1986. Industrial organization and location: Division of labor, the firm and spatial process. *Economic Geography* 62:215–31.
- Scott, A. J., and Rowles, C. 1977. Urban planning in theory and in practice: A reappraisal. *Environment & Planning A* 9:1097–119.
- Scott-Kemmis, D. 2011. *Australian story: The formation of Australian mining technology services and equipment suppliers*. Sydney, Australia: University of Sydney.
- Selwyn, B. 2014. Commodity chains, creative destruction and global inequality. *Journal of Economic Geography* doi:10.1093/jeg/lbu014.
- Simmie, J., ed. 2000. *Innovative cities*. London: Spon Press.
- Singer, H. W. 1950. U.S. Foreign investment in underdeveloped areas the distribution of gains between investing and borrowing countries. *American Economic Review* 40:473–85.
- Sornarajah, M. 2010. *The international law on foreign investment*. 3rd ed. Cambridge: Cambridge University Press.
- Storey, K. 2001. Fly-in, fly-out and fly-over: Mining and regional development in Western Australia. *Australian Geographer* 32:133–48.
- Storper, M. 1995. The resurgence of regional economies, ten years later: The region as a nexus of untraded interdependencies. *European Urban and Regional Studies* 2:191–221.
- UNCTAD 2011. *How to attract and benefit from FDI in mining: Lessons from Canada and Chile*. Investment Advisory Series B, no. 7. Geneva: UNCTAD. Available online: http://unctad.org/en/docs/diaepcb2010d11_en.pdf.
- Urzúa, O. 2012. Emergence and development of knowledge-intensive mining services (KIMS). Working Papers in Technology Governance and Economic Dynamics 41. Norway: The Other Canon Foundation; Tallinn: Tallinn University of Technology. Available online: <http://technologygovernance.eu/files/main/2012062607344040.pdf>.
- Warr, P. G. 1989. Export processing zones: The economics of enclave manufacturing. *World Bank Research Observer* 4:65–88.

- Weisskoff, R., and Wolff, E. 1977. Linkages and leakages: Industrial tracking in an enclave economy. *Economic Development and Cultural Change* 25:607–28.
- Wilson, K. L., and Portes, A. 1980. Immigrant enclaves: An analysis of labor market experiences of Cubans in Miami. *American Journal of Sociology* 86:295–319.
- Young, A. 1928. Increasing returns and economic progress. *Economic Journal* 38:527–42.