Capital Formation and Interventionist Dynamics in Development Economics

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Abstract

We explore some interrelated “big ideas” missed in twentieth-century development economics: that development is a disruptive, disequilibrium process of creating (rather than merely allocating or accumulating) capital; that capital is a complex, emergent constellation of connections rather than a neoclassical “stock” and that capital is formed with reference to an existing capital structure that is the outcome of dynamic interactions between government activities and the actions of private entrepreneurs. We derive these ideas by synthesizing the work of Ludwig Lachmann and Albert Hirschman; illustrate their significance and practical implications. Both economists understood capital formation as a continual process of transforming connections in production. When government agencies and market-based entrepreneurs are entangled and thus jointly and dynamically responsible for forging connections in the capital structure, it is not meaningful to analyse underdevelopment as a problem of coordinating the allocation of an exogenously fixed or exogenously variable stock of capital. Similarly, it is not fruitful to use the concepts of market failure or government failure to analyse specific problems of development. The main message is that by conceiving capital formation processes and capital structures in the manner of Lachmann-Hirschman, no single source of market failure or government failure can be isolated as a cause of underdevelopment. Resting the micro foundations of capital formation on the ideas of Lachmann-Hirschman makes it possible to understand why national development trajectories differ rather than converge to some unique international pattern.

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“It is to be regretted that the growing interest of economists...in the economic progress of underdeveloped areas, has not been matched by a more profound theoretical analysis of the...processes involved. Here ...the virtual nonexistence of a theory of capital which could be applied to concrete problems was bound to make itself painfully felt” (Ludwig Lachmann 1948: 711).

I Introduction

In the twentieth century, between the 1940s and 1960s, capital accumulation came to the fore in the “years of high development theory” (Krugman 1995: 7). Pioneering contributors to that high theory included Hirschman, Lewis, Myrdal, Nurkse, Rosenstein Rodan, Scitovsky, and Streeten. Contemporaneously, neoclassical growth theory was set on a new path by the work of Robert Solow (1956) and growth theory overlapped with the evolution of early development economics (Temple 2008). In most of this work “capital” was conceived as a homogeneous substance easily divided and transformed, expectations of investors were set aside, and capital was structurally amorphous such that its allocation could be perfectly synchronised in the long run, amenable to measurement, aggregation and accumulation into a single magnitude.¹ This was essentially “neoclassical” capital with doctrinal roots extending back to J. B. Clark and it became standard fare in neoclassical Cobb-Douglas production functions (Harper and Endres 2010). Furthermore, while there were serious disagreements over the above-mentioned features of neoclassical capital during the notorious Cambridge capital controversies in the 1960s and 1970s (Cohen and Harcourt 2005: xlii-xlil), development economics proceeded oblivious to these disagreements. Deep,

¹ The focus on capital aggregation and accumulation in neoclassical development economics and growth theory did not exclude human capital (thanks to the pioneering work of Schultz 1961). Earlier, Lewis (1954: 155) accepted that “the central fact of development is rapid capital accumulation” and he included “knowledge and skills with capital”.

unresolved problems concerning the aggregation of heterogeneous capital goods in production were also ignored (Felipe and Fisher 2003, 2008).

Up until the early 1960s, one of the “big ideas” (Lindauer and Pritchett 2002) in development economics was that capital accumulation in the neoclassical sense was central to development (see the “big ideas” summarized in Table 1 (A)). However, perceived market failures meant that capital investment coordination (to synchronise the allocation of the available amorphous mass of “capital”), as well as major scale problems, required extensive government action in LDCs that was often led by “planning ministries...for mobilizing and allocating” capital (Lindauer and Pritchett 2002: 4-5). In the 1970s, attention turned to improving the allocation of financial capital aggregates by liberalizing financial markets (e.g. McKinnon 1973). By the 1980s, capital was still widely considered an aggregate that should be accumulated by LDCs but the emerging new consensus was that government-led investment should be de-emphasized in favour of promoting the idea of “productive investment by the private sector”. In this view the role (though not necessarily the extent) of government in capital formation had to change in the light of the widespread experience of spectacular government failure leading to frequent capital destruction as well as crowding-out and underinvestment by the private sector. Governments were urged to provide the right incentives and appropriate institutional environment for private capital formation. Development policy was to be guided by a new mantra summarized by Pranab Bardhan (1993: 135): “The task of development policy is to coordinate expectations around high investment”. Thus the government role in addressing “coordination failure” did not turn simply on providing direct government investment as a substitute for private investment (Bardhan 1995: 2934-5).
Table 1: Big Ideas in Development Economics with a Focus Upon Capital Formation and the Role of Government

<table>
<thead>
<tr>
<th>Period</th>
<th>Prominent Ideas</th>
<th>Author</th>
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<tr>
<td><strong>A. Big Ideas Explored in Twentieth-Century Development Economics</strong></td>
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<tr>
<td><strong>1940s - early 1960s</strong></td>
<td>▪ Large-scale investments in infrastructure and industry require a dominant government role</td>
<td>Rosenstein Rodan 1943</td>
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<td>▪ Government investment planning is necessary for coordinating and allocating the capital stock</td>
<td>Nurkse 1953</td>
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<td></td>
<td>▪ Accumulation of capital stock is central to development</td>
<td>Lewis 1954</td>
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<tr>
<td><strong>1960s and 1970s</strong></td>
<td>▪ Factor accumulation, including human capital, is central to development</td>
<td>Schultz 1961</td>
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<td></td>
<td>▪ Government has a major role in regulating and reforming financial capital markets to encourage private capital formation and FDI</td>
<td>McKinnon 1973</td>
</tr>
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<td></td>
<td>▪ Rent seeking diverts capital to less productive activities</td>
<td>Krueger 1974</td>
</tr>
<tr>
<td><strong>1980s - 2000s</strong></td>
<td>▪ Assimilating technologies embodied in capital, coupled with learning-by-doing, is central to development</td>
<td>Lucas 1988</td>
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<td></td>
<td>▪ Information problems hinder the assimilation of technologies and suggest government interventions to improve capital allocation</td>
<td>Stiglitz 1989</td>
</tr>
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<td></td>
<td>▪ Capital accumulation and total factor productivity together are the main cause of development</td>
<td>Romer 1990</td>
</tr>
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<td></td>
<td>▪ Government must liberalize the regulatory environment to spur private capital accumulation, get the prices right and improve capital allocation</td>
<td>Williamson 1990: ‘Washington Consensus’</td>
</tr>
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<td><strong>B. Big Ideas Missed in Twentieth-Century Development Economics</strong></td>
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<tr>
<td></td>
<td>▪ Capital structures are heterogeneous, multi-level and open-ended; they are the unintended outcomes of interactions among many capital-forming entities</td>
<td>Lachmann 1956</td>
</tr>
<tr>
<td></td>
<td>▪ Development is a process of creating rather than accumulating capital conceived as a constellation of “linkages”</td>
<td>Hirschman 1958</td>
</tr>
<tr>
<td></td>
<td>▪ Capital is not a given quantum—it’s formation is engendered by acts of entrepreneurship</td>
<td>Bauer 1971</td>
</tr>
<tr>
<td></td>
<td>▪ The dynamics of interventionism and political entanglements have a pivotal influence on the emerging character of capital structures</td>
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Public or private management and allocation of capital oftentimes had to take place in economies with “expectational inertia” and in the face historical and institutional obstacles that resulted in low-growth equilibrium traps (Ray 2000: 13; Adsera and Ray 1998). Economists also focussed their empirical work on total factor productivity rather than capital productivity in isolation, and also turned their attention to “assimilation” and learning problems associated with technologies embodied in accumulated capital (e.g. Collins and Bosworth 1996). (See Table 1A). Moreover, these factors along with missing markets, and information asymmetries between countries and in capital markets made it no longer simply a matter of a government identifying market failures and then proceeding to correct them (Hoff 2001).2 Following all this work and the lingering influence of the so called “Washington Consensus” in the 1990s, development was “no longer seen primarily as a process of capital accumulation but rather as a process of organisational change” to get the prices and incentives “right” so as reduce the prevalence of either market or government failures in capital allocation (Meier 2005: 127, emphasis added). In practice, under these conditions it became difficult to gauge whether or not “capital” formation processes in fact mattered, and whether or not government intervention in capital formation should be permanent, one-time or temporary.

In this paper we argue that the “big ideas” of twentieth-century development economics were wedded to an exceedingly narrow and flawed concept of capital and its structure. This capital concept portrayed capital as homogeneous and jelly-like in form and substance and, crucially, it implicitly assumed that the allocation of capital could be synchronized across an

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2 Thus we have Stiglitz’s (1989: 200) reformulation of the “problem of development” in terms of acquiring “information” about technology (defined very broadly), how to acquire the technology, about what to produce and how to produce things with that technology.
economy by divining the optimal mix of markets and government. By default, this view made the supply of capital a necessary prerequisite for inducing a supply of entrepreneurship in developing countries whereas we reverse the causal chain: our perspective makes entrepreneurial agency the very source of capital formation. (See Table I B). While capital formation processes, engendered by entrepreneurship, should remain squarely at the centre of development economics, some research agendas in the field would benefit in decoupling from the neoclassical focus on optimal capital allocation. More attention might then be given to processes of capital formation, capital structuring and restructuring, and to the subsequent diversity of development patterns.

In Section II, we demonstrate that development economists’ adherence to the neoclassical, production-function concept of capital caused them inadvertently to ignore a “big idea”—namely that real world capital is a heterogeneous phenomenon created by entrepreneurs. We outline the basis of this idea in the work of Ludwig Lachmann and Albert Hirschman in the 1950s. In Lachmann’s seminal work on Capital and Its Structure (1956), invested capital at any point in time possesses a multi-level and complex structure. A process of economic “development” by definition means that this structure will not be completely integrated.

We synthesise Lachmann’s approach with the more applied development economics of Albert Hirschman beginning with his seminal contribution The Strategy of Economic Development (1958). Hirschman advanced the idea of “linkages” in capital formation leading to “antagonistic” rather than smooth, balanced growth in LDCs. In many respects Hirschman’s work complements Lachmann’ ideas; in remarkably similar ways both challenge the conventional approach to capital in economic development. We consider the implications of conceiving capital as a complex structure created and disrupted by
entrepreneurs. Section III revisits some of Hirschman’s work on development problems derived from his observation of many real cases including examples of the interaction between entrepreneurial and governmental activities in capital formation.\(^3\) We highlight the difficulties involved in dovetailing government actions in capital formation—investment inducing, correcting or replacing actions—with private economic calculation and entrepreneurial agency. Complex capital structures are created and transformed in developing economies constituted by networks of entities (both government and private) that either promote or hinder capital formation; they are also the outcome of the dynamics of interventionism (Ikeda 1997) and entangled political economy (Smith, Wagner and Yandle 2011). Section IV provides a closer inspection of the problem of government failure applied to capital formation in LDCs. Foreshadowing one of our major results, no single source of market failure or government failure can be isolated and used to explain the configuration of capital allocation in a developing economy. Development rarely starts with a clean slate of capital-forming entities and opportunities and with exogenous governmental machinery poised to intervene—there is usually an existing capital structure that is reproduced or disrupted by entrepreneurial action and an actively embedded government. Moreover, ongoing sources of capital transformation in LDCs may be traced to the nature of interventionist dynamics in any real case. Section V summarizes our results.

\(^3\) “Government” activities in this paper refer to all regulatory, legislative and executive interventions at the subnational, national and international levels relating to production or affecting production.
II Lachmann, Hirschman and Beyond: Capital Conceived as a Complex Connective

Structure

Table 2 provides a list of short propositions about capital in economic development that both Lachmann and Hirschman would have accepted, compared with the conventional wisdom on capital inherited from the neoclassical production function. The main purpose of this section is to elaborate on some of the contrasting positions outlined in Table 2, that is, the main points of difference between the neoclassical approach to capital and development and the Lachmann-Hirschman approach.
## Table 2: Propositions on Capital and Development: Neoclassical vs Lachmann-Hirschman

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Neoclassical</th>
<th>Lachmann-Hirschman</th>
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<tbody>
<tr>
<td><strong>Capital</strong></td>
<td>• Increases in scalar magnitude</td>
<td>• Increases in complexity</td>
</tr>
<tr>
<td></td>
<td>• One of a set of inputs in production</td>
<td>• A constellation of connected inputs in production</td>
</tr>
<tr>
<td></td>
<td>• Changes quantitatively</td>
<td>• Changes qualitatively</td>
</tr>
<tr>
<td></td>
<td>• A purely technical, instrumental input</td>
<td>• An entrepreneurially driven system</td>
</tr>
<tr>
<td></td>
<td>• Institutionally independent</td>
<td>• Institutionally/socially embedded</td>
</tr>
<tr>
<td><strong>Capital</strong></td>
<td>• Depends on increase in public, codifiable, transferable knowledge</td>
<td>• Depends on growth of local, dispersed, tacit knowledge</td>
</tr>
<tr>
<td><strong>Formation</strong></td>
<td>• Absence of interesting implications for structural change</td>
<td>• Inseparable from structural change</td>
</tr>
<tr>
<td></td>
<td>• Generally accumulative, additive, constructive</td>
<td>• Simultaneously destructive and transformative</td>
</tr>
<tr>
<td><strong>Capital</strong></td>
<td>• Balanced, integrated, synchronized with equilibrium conditions</td>
<td>• Unbalanced, imperfectly integrated, kaleidic, always in disequilibrium</td>
</tr>
<tr>
<td><strong>Structures</strong></td>
<td>• Exogenously fixed or exogenously variable</td>
<td>• Transformed endogenously</td>
</tr>
<tr>
<td></td>
<td>• Ahistorical entity</td>
<td>• Historically contingent (lock-in, path dependence)</td>
</tr>
<tr>
<td></td>
<td>• Levels of structures interact inconsequentially</td>
<td>• Levels interact, producing continual gaps &amp; opportunities for connection-making in structures</td>
</tr>
<tr>
<td></td>
<td>• Quantitative replication of levels in structures</td>
<td>• Qualitative change in connections between levels in structures</td>
</tr>
<tr>
<td><strong>Capital and</strong></td>
<td>• Investment coordination failures corrected by ‘autonomous’, well-informed public sector managers</td>
<td>• Entrepreneurs and ill-informed public sector managers invest in an interactive, dis coordinated process with rampant unintended consequences</td>
</tr>
<tr>
<td><strong>Interventionism</strong></td>
<td>• Public sector managers replicate and substitute for entrepreneurial calculations</td>
<td>• Private entrepreneurs and public enterprise managers form capital in two different, interacting, realms of economic calculation</td>
</tr>
<tr>
<td></td>
<td>• Only recognizes incentive effects of intervention</td>
<td>• Recognizes discovery and incentive effects</td>
</tr>
<tr>
<td></td>
<td>• Downplays superfluous and stifled entrepreneurship generated by intervention</td>
<td>• Regards superfluous and stifled entrepreneurship as consequential for development</td>
</tr>
</tbody>
</table>

The nature of economic development
In our opening quotation we cited a passage from Lachmann (1948: 711) regretting that economists’ study of the economic progress in LDCs up to that date, “had not been matched by profound theoretical analysis of... processes involved” (emphasis added). He singles out the lack of an applicable theory of capital as the main reason for the neglect of processes in economic development. This remark may appear strange if applied to the rapid advances in development economics during the 1950s and 1960s since most theorists in the field had by then incorporated at some stage in their work, either Harrod-Domar growth models or Solow-type neoclassical growth models with aggregate production functions; these approaches certainly embodied a neoclassical concept of capital (see Table 2).

However, the embodied idea of “capital” equated “development” with “purely quantitative growth” of national aggregates (Lachmann 1956: 17). Some of those aggregates might have included GNP and associated scalar magnitudes such as GDP per capita, capital stock, rate of return on capital, the capital–output ratio, and capital intensity. Writing independently in the 1950s, both Lachmann and Hirschmann eschewed such macro measures and instead focussed on the capital structures and the fundamentally qualitative process of capital structure formation and reformation. For Lachmann (1956: 3, 17) development was concerned with “economic progress” in which “unexpected change” occurred in capital structure. 

As Morgenstern (1972: 701) was later to complain: quantitative growth as measured by aggregates such as GDP is a “largely useless notion” for gauging genuine economic development since any such aggregate is a “scalar” that cannot tell us “about the growth of a complex system, forever increasing in complexity”.

There were other “structuralist” approaches during this period e.g. the work of Prebisch and Furtado considered reasons for the structural disadvantages affecting the (Latin American) “periphery”. Unlike Lachmann and Hirschman, these economists “emphasized a rise in the rate of capital formation as a main development policy priority” (Altmann 2011: 101). Also by contrast with Lachmann and Hirschman, they took a macroeconomic view of the existing capital structures in less developed nations and sought to change those structures in one-fell-swoop with import substitution policies.
structures. Such change could not be restricted to the impact of changes in external “data” (preferences, endowments and exogenously given technologies); it also emanated from the endogenous effects of entrepreneurial behaviour. The Lachmannian entrepreneur is involved in continuous acts of interpretation and reinterpretation of existing capital structures in search of structural gaps that represent potential profit opportunities (Endres and Harper 2013). There can be no capital invested in development without the prior application of entrepreneurial agency to forge connections between heterogeneous capital goods. Entrepreneurs disrupt any existing “harmony of proportions” in the use of capital goods and other resources. Except in very formal models, progress in reality could not generally be reduced to steady-state growth in which existing resources were homogeneous and just increased in magnitude and in fixed proportions (Lachmann 1956: 17).

Furthermore, the analysis of economic development in terms of comparative static shifts—from one equilibrium growth path or underdevelopment trap to another equilibrium state—is also unedifying because it cannot explain the process of structural change. To be sure, economic progress leads to increases in real incomes but this is the end-point of development. What is far more deserving of economists’ attention is the complex developmental process of qualitative change in which entrepreneurial agency is the prime mover that searches for gaps in the capital structure and then changes that very structure. While entrepreneurship is omnipresent in the Lachmannian approach to development, it is restricted to the entrepreneurial market process in which economic calculation is disciplined by market price signals, private property and profit and loss accounting.

For Hirschman (1958: 51-2) too, development was concerned not with balanced growth but with structural change—it “means the process of change of one type of economy into some
other more advanced type” (his italics). Like Lachmann he denied that development was generally associated with an economy-wide, “balanced distribution of capital coefficients” (p.32); and it cannot be described by the application of standard production functions in which resources are taken as given in terms of quantity and quality. Thus “finding optimal combinations for [those] given resources” to maximise development prospects is an unrealistic goal. Rather, development involves “calling forth...resources and abilities that are hidden, scattered, or badly utilized” (p.5); it is a “combining process” of “drawing together a variety of conditionally available resources and latent abilities” including either “latent or misdirected entrepreneurship” (pp. 6, 25). Anticipating Baumol (1990), Hirschman appreciated entrepreneurship in several broad senses and in particular, in many real cases, he observed how market entrepreneurship could be suppressed and misallocated by inappropriate government regulations, and occasionally present as parasitical, destructive and unproductive when the incentive and reward structures in an economy are not well established. Creating the conditions for the emergence of latent, productive entrepreneurship (as opposed to pure rent seeking or regulatory avoidance activity) was a major task in developing countries and was far more crucial than capital accumulation in its own right. Furthermore, developing country contexts commonly illustrated the prevalence of political entrepreneurship operating outside the market economy and this phenomenon had to be taken in to account because it interacted and overlapped with market-based entrepreneurship.

Hirschman (1958: 5-7) maintained that the problem of development is not about finding a single, key “missing component” that can be injected into the process, for example capital, abilities, information, technology, or institutions. Instead the focal point of development is
unearthing and unleashing “latent capacities” and scattered resources in particular national contexts. Thus the “fundamental problem of development consists in generating and energizing human action” to combine latent and scattered resources. And later, this type of “human action” was incorporated in specialized discussions of entrepreneurship in development (Harper 2003).

From these common points of departure on the nature of economic development, the works of Lachmann and Hirschman diverge somewhat both in terms of their emphasis and their applications differ. Essentially, both economists conceive of the problem of development as one of forming and reforming—rather than simply accumulating—capital. Lachmann concentrates on the deep micro level causes of change in capital structures in a market-based context, on complementarities between capital goods, the role of private expectations and entrepreneurship as an interpretive activity focused on searching for repeated gaps in capital structures. He predicted that capital structures would increase in complexity during the process of development (Lachmann 1956: 85). Hirschman was especially interested in meso level issues in LDCs. In many of these countries the mixed economy structure meant that governments took a leading role at the enterprise, industry and macroeconomic levels; they at least played a guiding role in capital formation and thereby rendered actual capital formation processes more complex. In this context Hirschman (1987: 210) remarks on the “increasingly complex pattern of possibilities” arising from unique constellations of investment decisions occurring in any real case of economic development. He examines the complexity of resource utilization and resource

\[\text{\textsuperscript{6} Cf. also their contemporary Peter Bauer (1956: 636): “It is often more meaningful to say that capital is created in the process of development, rather than that development is a function of capital”; and Bauer (1981: 248): “Much of capital formation is not a pre-condition of material advance but its concomitant”}\]
complementarities (including the use of capital goods) in a very novel manner, as we shall see presently.

**Capital formation as a process of connection-making**

Lachmann and Hirschman studied the dynamics of capital formation in economic development. By “dynamics” we mean that their work inspired a view of the problem of development as a process driven by human agency that is responsible for a composition of capital that:

1. Connects previously unrelated and sometimes latent, heterogeneous resources.
2. Is induced by interactions, breaks and ruptures in the existing connections of elements that constitute the capital structure.
3. Exhibits emergence of an expanding range of connections between different levels of an increasingly specialized structure (due to technological progress, diffusion of technological capability and changes in the division and dispersal of knowledge).

Without defining capital in a very formal way, Lachmann and Hirschman seemed to favour a very general, inclusive and comprehensive notion similar to that of Irving Fisher (1906), in which any resource could conceivably take the form of capital if it yields a flow of services to human beings over time. Thus, land, natural resources, intermediate goods, human beings and human capabilities, all qualified as capital, provided they could be productively connected with other complementary capital items. Hirschman was especially concerned to highlight “hidden” items—“latent” resources (such as human ability) and previously unused
or underutilized resources.\(^7\) In our present translation of their approach to “complexity”, they essentially envisaged capital formation (and reformation) as a form of structuring (and restructuring) that we will call “connection-making”.\(^8\) Lachmann emphasized input complementarities and transformative connections in production, while Hirschman emphasized industry-level interactions, reactions and intersectoral connections. Here we intend to offer some illustrations of the various types of connection-making and their role in economic development, originally inspired by the work of Lachmann and Hirschman.

(i) Lachmann’s enterprise-level connections

We turn first to Lachmannian connections (“capital combinations”); these are founded on processes of learning and discovery at the enterprise level. Economically productive connections emerge from entrepreneurial “trial and error”, including imaginative conjectures—a “painful” and messy process that is nevertheless vital for economic progress (Lachmann 1956: 18; Endres and Harper 2013: 308-9). Entrepreneurial plans involve the setting out of connections forming capital; they are always forward-looking and unfinished in a multi-period context. With the passage of time, new discoveries are made by trial and error, new interpretations are made of the existing configuration of the meso- and macro-level capital structure and these generate potential, exploitable profit opportunities. Investment expectations and the knowledge upon which those expectations are based will inevitably change in this process. Thus, a capital structure is “always in the process of being formed” (Lachmann 1956: 73).

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\(^7\) Hirschman is not clear on the limits pertaining to the elasticity of resource constraints, if any. He implies, like Kirzner (1984:43), “that we never know what real possibilities remain to be discovered; we never know what the real limits are”.

\(^8\) Here we follow Potts (2001: 418-23); Earl and Wakeley (2010); Loasby (2012) and Lewin (2013).
At first blush the “new growth theory” due to Romer (1993) would seem to take Lachmannian knowledge-based, connection-making into account because it underscores “idea gaps” as opposed “object gaps” as crucial causes of development. Object gaps turn on the accumulation of capital conceived as a single magnitude of physical entities. In Romer’s view it is all well and good to have physical objects (industrial establishments, roads, raw materials etc) stockpiled for economic development but without ideas for their productive use, those objects would have no economic function. In modern development contexts, ideas may “include the innumerable insights about packaging, distribution, inventory control, payments systems, information systems, transaction processing, quality control, and worker motivation” that comprise actual capital combinations (Romer 1993: 548). “Ideas” for Romer are prime movers in development and this view is corroborated by many examples of developing economies (e.g. in East Asia) that have sourced growth from the assimilation of relevant technological knowledge extracted from more advanced industrialized economies (Collins and Bosworth 1996). However, this is not the whole story because Romer’s “ideas” are assimilated as public knowledge—they possess nonrivalrous, public good features, such that knowledge is accumulated as a macro “stock” (Cowan, David and Foray 2000: 227). What is missing from this treatment is connection-making at the micro (enterprise) level that relies on context-specific, often tacit knowledge, not only to execute capital formation and transform production in which local conditions in factor markets must be understood, but also to link different markets, find product markets, and make new product markets (e.g. MacMillan and Woodruff 2002; Casson 2005: 335-38).

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9 This is reminiscent of Lachmann (1956: vii): “Beer barrels and blast furnaces, harbour installations and hotel-room furniture are capital not by virtue of their physical properties but by virtue of their economic functions”.

10 Cf. Lachmann (1956) who like Boulding (1963), rejected the idea that knowledge of production processes could be accumulated in a stockpile.
Ultimately, entrepreneurs seek to move beyond passively implementing foreign technology by cultivating and using local “innovation capability” (Fagerberg, Srholec and Verspagen 2010: 842-44). In Lachmannian terms, acts of assessing and interpreting possible resource complementarities (read: connections) are the basis of capital formation and capital use. Romer’s new growth theory is therefore justifiably criticised for ignoring a wide range of vital connections—it leaves “no room for any of the structural aspects of capital that are of fundamental importance for development” (Baetjer 2000: 165).

All these connection-making activities contribute to networks of capital formation in which entrepreneurial knowledge is necessarily incomplete and cannot be easily codified, articulated and appropriated. It is not the stock of ideas but the application of knowledge to imaginative enterprise—the connections of ideas manifested in the creation, maintenance and dynamics of particular capital structures—that is the primary force of development. Closing “idea gaps” may be necessary for development but it is not sufficient to explain the process of capital formation and reformation, and new, complex microstructural capital-goods complementarities responsible for divergent and self-reinforcing patterns of economic development. As development proceeds, enterprise-level knowledge and learning becomes critical for qualitative economic change: innovative activity, market-making, market discovery, discovering efficient scale, novelty creation and product differentiation that sustains capital formation and leads to full blown business modernisation and sectoral innovation in developing economies (Malerba and Nelson 2012). Entrepreneurs give special identity to resource inputs—that is, once put to

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11 Hidalgo and Hausman (2009) demonstrate that economic development in the long run is a process of learning how to produce more complex products. See also the empirical measures constructed on this subject by Felipe et. al. (2012).
complementary use, once connected in practice, they are no longer homogeneous, generic factors of production. Given the special functions conferred on resources, capital subsequently created becomes non imitable in many respects. For example, capital may produce refined, niche products or special services relying on unique intangible assets, idiosyncratic physical assets, and specialized human capabilities (Teece 2010: 722-23).

(ii) Hirschman’s intersectoral connections

Likewise, Hirschman (1958, 1977, 1984, 1987) also examined capital connections, though unlike Lachmann he focussed upon interactions between and within industrial sectors of developing economies. In other words, he studied the formation and impact of changes in the sectoral composition of capital and its structure. He formulated a typology of “linkages” in order to describe key connections that “induce” capital formation and make capital structures:

**Backward linkage**: a diachronic production relationship between one capital combination (which is in the process of expansion or contraction), and other capital combinations that provide its inputs.

**Forward linkage**: a diachronic production relationship between the outputs of one capital combination (newly formed or expanding) that are supplied as inputs to other capital combinations.

**Inside linkage**: a capital combination devoted by an entrepreneur to the production of a particular output is expanded—the expansion is linked to the same entrepreneur
**Outside linkage:** a new capital combination is linked to new entrepreneur(s) entering an existing industry

**Spatial linkage:** a capital combination in one geographic space is replicated in another space, induced by a range of possible obstacles to inter local trade and transportation.

**Consumption linkage:** a final demand-driven capital combination induced by rising incomes and market size in LDCs and/or by government initiatives to encourage consumption led development.

**Fiscal linkage:** a diachronic relationship between a capital combination formed by public sector entrepreneurs induced by taxing the ongoing profits of private capital combinations.

Now LDCs present an observer with “different linkage constellations” (Hirschman 1977: 73) that generate their unique economic structures. Within any economy, opportunities to create linkages through time are always diffuse, reflecting in turn the fragmentation and distribution of entrepreneurs’ knowledge. One merit of the linkage approach is that it classifies major patterns of interaction in capital structures, patterns that amount to more than an already known set of production related (e.g. pecuniary and technological) externalities yet to be mediated by markets or governments. The linkage approach embodies two key ideas: first, that this structure is multi-layered (some linkages subsume, come before or dominate others) and second, that the linkages produce an emergent capital structure through time (see Fig. 1 below)—the combination and interaction of all the linkages produces an overall effect that is different from one or other linkage operating on its own (Harper and Endres 2012).
The orthodox characterization of backward and forward linkages is that they amount to no more than supply-side pecuniary and technological “externalities” and “strategic complementarities” (Krugman 1995: 17, 20, 22; Bardhan 1995: 2994). We submit that this characterization of linkages is inadequate—they signal a different way of investigating and explaining the actual process of capital formation in development. First, the approach underscores the importance of economic calculation and the stimulants to calculation (on assessing and exploiting linkages) presented by major economic imbalances (such as shortages, bottlenecks, pressures caused by inflation or current account deficits on the national balance of payments). In developing country contexts, Hirschman (1984: 91) observes entrepreneurial agency in forming capital to respond to these imbalances; it is prosecuted “by trial and error [and] some cunning principles of action of which they were themselves hardly conscious, that might seem perverse to outsiders, but actually prove quite effective” (e.g. in mobilizing previously latent resources and capabilities). There are, he concludes, “hidden rationalities” in the process of structuring capital in day-to-day economic calculations, “patterns of action” that may seem “odd, irrational or reprehensible” from an outsider’s point of view because they do not seem to employ modern project appraisal techniques. This conclusion invites economists to study real and historically situated cases of capital formation in LDCs (Hirschman 1967; and for a more modern example see Ostrom and Gardner 1993). Such an approach does not favour using top-down macro models in which capital is not much more than an abstract macroeconomic stock and entrepreneurial agency is either absent or inconsequential.

Second, embedded in the linkage concept is an appreciation of capital as a complex, connected phenomenon with the following implications. It implies that the overall macro,
economy wide capital structure cannot easily be “integrated” and planned in its totality by a central planner relying on a multi-decade “plan” (Hirschman 1971: 44-6). It suggests endemic time delays of various lengths in production processes—it is not obvious that input-providing or output-receiving investments will be made at all or made to the appropriate scale that allows the “linkage” actually to “induce” sustainable, profitable connections. The source of some linkages may involve capital destruction for two reasons: firstly, not all may have positive effects on long-run development (e.g. capital formed behind high tariff walls) (Syrquin 1992: 125-6) and secondly, capital formation processes may also imply “antagonistic” development—some linkages are being broken, some capital being scrapped elsewhere (Hirschman 1984: 106-7). The connections implied also suggest discontinuous bouts and dynamic sequences of capital formation as entrepreneurs assess the gaps in existing linkages (either forward or backward), decide whether to invest and how much capital to form relative to other entrepreneurs who are also making the same calculations. This is not a one-time event.

What makes for complexity in the capital structure is that the “constellation” of linkages is a “thicket” of capital forming entities and actions; the capital structure is always emergent, that is formed and reformed and never fully coordinated in practice (e.g. it may be fragmented in a particular economy because potential spatial linkages have not been realised due to geographic factors and labour market imperfections). The thicket of connections is represented in reality by intra- and inter-industry exchanges and production relationships. The thicket of capital forming linkages may be focal points of development in the sense that they become sectorally concentrated because of special inducing or focussing events (e.g. the pattern of government policies, wars, financial crises) historically
established path dependencies, and specific, easily exploited national resource endowments (Hirschman 1977). Such concentration may develop a momentum of its own because minimum efficient scale and even increasing returns to scale can be realized quickly. If certain linkages are not being exploited and capital formation is sectorally “unbalanced”, this should not be seen as an example of coordination failure in development—such “failures” are a concomitant of economic development and a stimulant for further entrepreneurial calculation.

The extent of inside and outside linkages will depend on entrepreneurs’ knowledge of an industry, the general organization of an industry and governmental restrictions, among many other factors. Market size may be especially important when constructing capital on the basis of potential consumption linkages. Moreover, the competitive structure in the upstream or downstream industries is not usually given (e.g. if entry conditions are opaque), and it becomes a major consideration in the economic calculation process. New connections in the structures of capital in LDCs have commonly been sequential and diachronic precisely because economic calculation has been bounded and social organization impinges on the process. For instance, “one reason for the ‘sequentiality’ of irrigation projects is that...one finds considerably more pressure, enthusiasm, and competence for the engineering phase of irrigation projects than for their agricultural and marketing tasks” (Hirschman 1967: 71). Engineering enthusiasm can often mean that financial evaluations take place ex post. Learning capacities at the societal level and in business organization take time and the credibility and workability of possible linkages must be established. Therefore, connecting one investment activity with another is rarely simultaneous. Economic calculation that goes in to forming capital structures is not
exclusively reliant on a repository of public knowledge; the orchestration of resources to make new connections in those structures involves enterprise level and micro level learning. Locally driven capital formation that feeds off other acts of capital formation draws once again on “‘hidden rationalities’. In the latter respect, a pivotal factor is the “unique constellation of experiences and consequences, of direct and indirect effects” of a major act of capital formation in the local environment (p.186, his italics). Dispensing with the assumption of a regularly distributed, constant supply of private and public entrepreneurship and a corresponding optimal rate of capital formation, Hirschman (1973: 3) supposes that learning in the foregoing context gives rise to “ebbs and tides of decision making [on development projects]...at all stages of development” (his italics) and this is reflected in the tangled, complex “thicket” as we have called it, that characterizes any real capital structure.

IV Capital Structures and the Dynamics of Interventionism In the Analysis of Development Problems

The connections that are forged in the process of forming capital in LDCs are not simply the result of importing a technology and putting it to work using the appropriate quantum of information and knowledge. The “situational features of economic activities “ (Hirschman 1987: 210) that create capital and its subsequent products must include the ongoing interactions between private economic agents and those acting on behalf of political agents. Accordingly, the contours of the capital structure in any developing economy are the outcome of interactions between private entrepreneurs and activities of individuals in the public sector who are also responsible for creating specific public-enterprise capital and complementing, regulating, encouraging or suppressing private capital formation.
As Hirschman (1967: 154-9; 1973: 4) recognized, the state is rarely an “autonomous” agent in capital formation. For example, regulatory interventions can alter the pattern of investment “through tariffs, excise taxes, ...if...a certain growth pattern of consumption would exert far more powerful backward linkage effects than the pattern that is likely to develop in the absence of interference...[so that] capital formation can be called forth merely by rearranging and concentrating the pattern of imports” (Hirschman 1958: 115-6).

Of course later research on the effective rate of protection by Corden (1971) magnified the effects of tariffs on national capital structures. Irrespective of these effects, the state could exploit additional fiscal linkages and feed off taxes from the profits of importers (in addition to tariff and excise receipts).

Investment decision making in both private and public sectors responds in an unbalanced manner to opportunities either generated, or at the very least suggested, by the existence of one or more of the capital-structure linkages in the typology we presented in the previous section. Fiscal linkages are the obvious, though not the only, inducement to public-sector entrepreneurs. We assume here that the act of entrepreneurship may be distinguished from the entrepreneurial market process (Boettke and Coyne 2007: 183-4). Entrepreneurship, defined very generally for our purposes as behaviour involving the combination of resources to form capital in the pursuit of gain (from exchange, innovation etc.), may occur outside the market process though it will nevertheless interact with other entrepreneurial acts located in that market process (and vice versa, Ikeda 1997). The disciplines governing economic calculation and capital formation decisions of political–entrepreneurial agents will diverge from those used in market processes that strictly enforce the discipline of profit and loss, and that take account of comparative (opportunity)
costs. That the contextual knowledge required for enduring, successful capital formation might only be fully available through the market process may well have been a principle that Hayek relied upon in the economic calculation debate during the 1930s and 1940s (Boettke 1998). That principle is sound in theory but not very relevant here because economic calculation is as necessary for public enterprises (and municipal authorities) that create capital as it is for market enterprises (Wagner 2011). The fact that from the 1950s onwards governments in mixed economies were making large capital investments in industry and infrastructure meant that they were constructing connections in capital structures. Private entrepreneurs will not ignore government acts of capital formation and governments will not ignore private reactions to public investment. Existing private entrepreneurs have to interact with the new connections created thereby, and they also have to interpret the impact of those connections and respond with their own capital forming (or scrapping) actions.

Consider a standard treatment of the role of government in economic development such as Lindauer and Pritchett (2002: 27-8). Here reference is found to government economic “strength” and “capacity” in adopting and implementing policies, and a “diagnostic tree for policy advice” is constructed. An unstated assumption is that these government actions are autonomous from the market process and there is no feedback effect or feedback process to be ascertained from private entrepreneurial reactions. In this case, as in many others, government and market are separated as stand alone, “point-mass entities that act upon one another” (Smith, Wagner and Yandle 2011: 46). Absent from standard treatments is appreciation of the complex outcomes that emerge from the dynamic interactions between market participants and agents of government. The presence of “entanglement” between
the two realms is one important missing factor; Wagner (2006) depicts this entanglement as a polycentric system. Another critical missing factor is appreciation of the emergent capital structures that may evolve thereby; these require case-by-case analysis. Those emergent structures may be decomposed for heuristic purposes into five interacting levels of economic order: sub-micro, micro, focal or enterprise (including state-owned enterprise), meso or inter-firm/industry, and macro or economy wide. See Figure 1 below. It is at the focal level that we may directly observe capital combinations being formed by private and public entrepreneurs who forge connections with the micro and sub micro levels of the economic order; they subsequently create combinations, connections or linkages observed at the meso level.

**Figure 1 : A Capital Structure Hierarchy**

<table>
<thead>
<tr>
<th>LEVEL OF ORDER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macro</td>
<td>Economy-wide capital structure(W)</td>
</tr>
<tr>
<td>Meso</td>
<td>Inter-firm/industry capital structures (I)</td>
</tr>
<tr>
<td>Focal</td>
<td>Entrepreneurs’ capital combinations (S)</td>
</tr>
<tr>
<td>Micro</td>
<td>Available capital goods (X) at time t</td>
</tr>
<tr>
<td>Sub-micro</td>
<td>(P) = Set of more basic elements: materials(M), energy(E), knowledge(K) and tokens of their types</td>
</tr>
</tbody>
</table>

**Emergence Process**

\[ W_1 = \{I_1, I_2, \ldots I_n\} \]

\[ I_1 = \{S_2, S_4, S_9\}, I_2 = \{S_2, \ldots S_n\} \text{ etc} \]

\[ S_1 = \{X_1, X_3\}, S_2 = \{X_1, X_4, X_n\} \text{ etc} \]

\[ X_1 (m_1, e_3, k_2), X_2 (m_2, e_1, k_3), \ldots X_n \]

\[ P = \{M: m_1 \ldots X_n; E: e_1 \ldots E_n; K: k_1 \ldots k_n\} \]

*Source: Endres and Harper (2012: 973).*
The impacts of “entanglement” on capital formation and structure (at the different levels of the economic order in Figure 1) cannot be predicted but the possible direction and pattern of capital emergence in specific cases may be traced ex post by use of case studies and case histories.

Capital is formed and scrapped at the “focal” level in Figure 1 in the following four typical, general scenarios when legislatures take actions that either respond to previous interactions with private entrepreneurs or initiate new interactions. Legislatures:

1. Authorize major public investments or subsidies or production incentives of some kind thereby directly affecting the capital structure at the focal and meso levels of the economic order i.e. with ramifications and feedback effects on other industries. There will be more dispersed effects on other levels of economic order, such as on enterprises not directly related to the industry concerned, and on economy-wide capital formation and structure.

2. Intervene and their agents interact with private industry either by changing previous, or imposing new, predatory taxes and rules that affect the day-to-day operations at the focal- and meso levels of the economic order.

3. Interact with entrepreneurs who may try to obtain government interventions e.g. to provide a subsidy or concession for an enterprise or industry.

4. Make regulations and policy decisions (e.g. fiscal and monetary policy changes) that are nonspecific to any particular industry and indirectly affect capital formation at all levels of the economic order.

We turn next to some illustrative, historical examples of entangled, dynamic and emergent relations between private attempts to form capital at the focal level of the economic order and state-driven or state-influenced capital formation. These cases follow many of
Hirschman’s examples and also use his broad methodological approach (Wilber and Francis 1986).

**Case 1: Nigerian transport Industry during the 1950s and 1960s:** Viable capital structures will only occur and be sustained if they are attuned to the dynamics of interventionism including the institutional conditions within which capital investment projects are prosecuted. While the capital created may be “viable”, ongoing development is not assured. Hirschman (1967) offers copious examples of the entangled political economy of capital formation. Consider his case of capital formation in the Nigerian transport industry (pp.139-48). Nigerian institutional conditions were punctuated by four “traits”: (i) tribal tensions eased by government employment policies emphasizing tribal balance (more than merit etc); (ii) use of economic power in the polity to gain more wealth; (iii) widespread corruption (especially in public-sector maintenance and construction contracting); and (iv) “Nigerianization”, especially in the public sector—the replacement of expatriates with locals in key positions. The State Rail Corporation of Nigeria (SRC) often intervened in the transport industry capital structure by making large investments to maintain or expand the rail system with these traits in view, and struggled against them in order to attain some semblance of efficiency. However, not all were necessarily deleterious to the SRC’s revenues. For example, tribal rivalry ameliorated by a balanced employment policy encouraging tribally affiliated customers to move bulk commodities using the SRC.

The SRC competed with private trucking operators. The trucking industry was dominated by a large number of small and medium sized enterprises (SMEs). With the exception of the balanced employment requirement within each SME, the trucking operators largely accommodated other traits. The trucking industry spontaneously encouraged social
mobility because it had representatives from a cross section of Nigerian society and it also induced latent entrepreneurship. As for the other traits, they used their joint economic power to influence the legislature, and many legislators had investments in the SMEs. Corruption was just another market force, a substitute for lobbying, and was dealt with more efficiently than the SRC.\textsuperscript{12} SME entrepreneurs would be able to do favours and make side payments to political patrons, customers and suppliers more expeditiously and on the spot, as the case demanded. By contrast, managers in the SRC were encumbered by bureaucracy and by some managers who were mindful of the possibility that pandering to corruption was potentially “undesirable and progress-stunting” (p. 146).

In this environment, implementation of a new, large capital-forming intervention by the SRC had several dynamic consequences some of which were unintended. The context of economic calculation at the SRC went beyond a straightforward appraisal of the comparative economic efficiency of a rail investment as opposed to leaving supposed gaps in the capital structure for the SMEs to fill. Nigerian public-sector capital formation utilized fiscal linkages (and sometimes international agency funding) in order to encourage endogenous changes in attitudes or traits of the kind affecting the transport industry. Thus a major consideration of the new SRC investment was that “railways can usefully make a contribution to nation-building, serve as a school for cooperation among tribes in large organizations” (p. 146). The benefits to be expected from such learning may outweigh the fiscal costs. How would the competing mode of transport react to the increased SRC rail investment? How much more efficient could this new investment make the SRC? Private

\textsuperscript{12} On corruption as an “efficient” substitute for lobbying and rent seeking in some contexts, see Beckmann and Gerrits (2009).
trucking operators continued to enjoy an incentive to reinforce the very traits that the SRC was attempting to counteract and would continue to take revenue from the SRC because they would discover new opportunities to reinforce corruption and economic influence over the polity left unattended by the SRC.\textsuperscript{13} The private transport entrepreneurs believed in the resilience of various ‘undesirable’ traits and incorporated this belief into their investment calculations. Various gaps in the capital structure were opened by the SRC’s attempts to shun these traits; private entrepreneurs seized on those gaps, thereby frustrating the capital forming objectives of the SRC. Nonetheless, managers at the SRC did not face a hard budget constraint so they compromised pure efficiency considerations indefinitely in the face of competition, adhered to balanced employment policies and retained a “latitude for poor performance” (p. 148). For the SRC, the four traits were, in effect, negative externalities that the market (but not the SRC) was internalizing by creatively accommodating them in private economic calculation.

In an attempt to correct major institutional imperfections affecting the transport market, the SRC intervention continued to give latitude for poor economic performance in the rail sector and spurred activity and capital formation in the trucking sector. There was an underlying intention to create greater efficiency and integration of the capital structure through government involvement in correcting a perceived market failure. Yet the intention was executed by focussing on market failure as an allocative problem. The main failures were presumably those of private entrepreneurs who did not do the right calculations in a static allocative-efficiency sense, and took too much account of prevailing institutions. This

\textsuperscript{13} The two effects mentioned here –the incentive and discovery effects of an intervention—are originally, and most lucidly, brought out in principle in Ikeda (1997: 103–4).
approach to market failure, still quite common in the study of underdevelopment, overlooks the creative functions of markets (Arndt 1988). In terms of our emergence schema in Figure 1, this is also to say that there is no recognition given to the spontaneous production of new knowledge beginning at the sub-micro level of the economic order that in time percolates through the whole capital structure. In the Nigerian trucking industry, the SRC intervention had to face the spontaneous, creative responses of a large number of SMEs.

There were political entanglements in the overall transport capital structure—objectives guiding the SRC were politically inspired to make attitudinal changes and similarly, in the trucking industry capital formation was shot-through with political considerations and political patronage. The dynamic interactive relationship between government and market-based enterprises in this case led to successive rounds of connection-making, resulting in a capital structure at the meso level that no single enterprise intended. An unintended result from government action to create more capital in the rail sector was more investment in private road transport and relative under-utilization of rail transport.

Case 2: “Autonomous” investment agencies in the 1950s and 1960s. In this large collection of cases, Hirschman (1967) illustrates how LDCs tried to create autonomous agencies that could operate in enclaves and create capital without being hindered or “contaminated” by “old” institutional constraints. Here deliberately planned, large scale public entrepreneurship, often linked to the UN or World Bank, attempted to “implant efficiency and modernity into a developing country” through major capital projects importing foreign technology and management techniques (p. 157). There are of course more modern

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14 This is an instance of the interventionist process producing “a spontaneous order, despite the prominent role played within it by deliberate, though not quite comprehensive, socio-economic planning” (Ikeda 1997: 143).
examples of this phenomenon confirming the high risks and general frequency of failure 
(e.g. Easterly 2001). The capital created in such cases was supposed to forge capital 
connections of various kinds ab ovo in the local economy at the meso level and some were 
expected to do so in isolation from the capital structure in the “old” pre modern economy. 
Some of the main capital-forming ventures cited by Hirschman included the Lempa River 
Commission in El Salvador, the São Francisco Valley Authority in Brazil, the Damodar Valley 
Corporation in India, the Imperial Board of Telecommunications in Ethiopia, the Royal 
Irrigation Department in Thailand, and the San Lorenzo Irrigation Project in Peru. Most of 
these projects were instigated by national “central authorities…. basically unreconciled to 
the formula to which they have consented in a moment of weakness, passing enthusiasm, 
or overwhelming desire to get hold of World Bank funds” (p. 159).

In fact, few projects escaped entanglement with existing tightly connected political and 
economic interests (including capital already formed in upstream and downstream 
industries). The Damodar Valley project was a spectacular failure. The project was multi-
purpose from the beginning: specialized capital combinations were simultaneously devoted 
to electricity generation, agricultural irrigation, soil conservation, and general water 
reticulation to various industries. There were too many existing economic and political 
connections (external regulatory links and regional government hurdles) that made the 
project far from “autonomous” (pp. 49-52). Superfluous capital was invested in regulatory 
compliance and avoidance activities. By contrast, in another context, by interpolating a 
single purpose-oriented capital project into the existing capital structure (at the focal level 
as per Figure 1), the Lempa River Commission was able to introduce modern technology to 
generate electricity in a geographically isolated area. Indeed “typical site bound projects”
such as river dams or ports were generally successful in generating some intended forward linkages (p.155). The Royal Thai Irrigation Department illustrated how, by embracing political entanglements from the outset (the macro political-constitutional structure), and starting with a single trial and purpose (irrigation), it successfully interpolated the relevant new technology into the highly underdeveloped capital structure in a particular region; backward and forward linkages developed slowly in the agricultural sector; workers and mangers developed on-the-job skills and knowledge (167-8). Private entrepreneurs were given sufficient time to interpret the implications of the project and modify their capital-forming plans. Overall, the project generated knowledge in the Lachmannian sense (emerging from the “sub micro level” of the economic order in Figure 1)—knowledge of a deep, unexploited structure of possible connections and new resource complementarities.

The single trial approach was helpful in allowing the Royal Thai Irrigation Department to learn and then branch out and form capital for irrigation in other regions of Thailand. It then extended its capital formation role by inducing others and contributing itself to making new connections in the capital structure at the meso level—engineering, electricity generation, cement production and agricultural services (pp. 50-1). This is a classic example of how Hirschman-type sectoral imbalances in capital formation, in this case, the impulse of a specific, innovatory, large scale project in agriculture, served over several years to unmask capital-creating opportunities in other sectors. In the long term the macro capital structure was transformed.

Case 3: Energy Subsidies in LDCs 2013
Recent research on the provision and quality of infrastructure capital in Africa suggests that an “infrastructure gap” has proven to be “an important growth bottleneck” (Escribano et al 2010: 65). Why has this gap in the capital structure persisted in the region? Why have public and private entrepreneurs not been induced to close this gap? In the first place, Easterly and Servén (2003) demonstrate that unsustainable fiscal deficits and public debt burdens over long time periods have forced governments to reduce infrastructure expenditures. Clearly this has had a top-down, negative impact on the emergence of capital in this sector. However, private capital formation has not yet filled the breach. A robust assessment by the IMF (2013) incorporating 22 recent country case studies, provides some answers that point to long-standing industry subsidies as the prime cause of low investment in energy infrastructure-capital because subsidies to consumers result in lower profits or losses for state owned enterprises (SOEs) in the sector. And capital formation in other industries is also stifled.

The IMF case study of consumer electricity subsidies in Sub-Saharan Africa is illuminating. SOEs face high generation costs because of low economies of scale and operational inefficiencies. The electricity capital structure is fragmented and the connections to other industries are tenuous. Subsidy-driven losses mean that efficient scale in generation and distribution can never be approached and private investment is discouraged thereby. The quality and consistency of regional distribution networks is also rendered substandard by ongoing losses in the SOEs. Other enterprises and industries reliant on electricity as a key capital good (at the “micro level” as per Figure 1) then suffer higher costs of production and shortages, therefore denying the emergence of new profitable connections in the capital structure (at the “focal level” as per Figure 1). Altogether,
The losses incurred by electricity suppliers due to subsidized prices have severely constrained their ability to invest in new electricity capacity and improve service quality. As a result, installed per capita generation capacity in SSA (excluding South Africa) is about one-third of that of South Asia and one-tenth of that in Latin America. Similarly, per capita consumption of electricity in SSA (excluding South Africa) is only 10 kWh per month, compared with roughly 100 kWh in developing countries and 1,000 kWh in high-income countries (IMF 2013: 15).

Energy subsidies granted to consumers have often been implemented to reduce the impact of high prices and volatile (imported) fuel prices on the poor in LDC’s. Subsidies invariably fail to achieve equity objectives and have major unintended consequences; there is now ample evidence suggesting that subsidies are captured by middle and higher income groups who have superior means to consume such things as subsidised electricity or fuel (Granado et. al. 2012). Fuel subsidies cause overconsumption, discourage capital formation in renewable energy activities, have significant negative health and environmental impacts, and give incentives for wasteful capital formation in smuggling industries that move subsidised products to higher priced destinations (IMF 2013: 16-18). As well as crowding out private capital formation, subsidies crowd-out other public means of addressing poverty directly: vouchers or direct cash transfers would be more targeted but are unaffordable given the ultimate budgetary impact of subsidies.

Once subsidies have been established in the energy supply industry in LDC’s they have proven difficult to reform, let alone remove completely. Here we are faced with an existing meso-level structure that is politically entangled; it cannot be extricated in practice from the dynamics of political involvement. Fuel subsidies, for example, are “inefficient, inequitable, and fiscally costly” but “developing country governments often find subsidy reform politically difficult” because of immediate adverse impacts on the poor (removing subsidies
raises prices), interest groups benefiting from the status quo, and a widespread belief that
governments’ budgetary gains will be prone to competitive rent seeking (Granado et al
2012: 2241). The IMF (2013: 28-9; 32) plan to “depoliticize” energy pricing in LDCs therefore seems wishful. The IMF idea is to apply more liberalized, automatic energy pricing regimes in a carefully phased-in process. However, such schemes require omniscient “econocrats” (Self 1975), at the behest of a polity, to arrive at the right pricing algorithm. Whatever “liberalized” scheme is designed in each country case, it does not escape the dynamics of interventionism, and specifically the problem of knowing what the reactions of entrepreneurs will be to the new pricing structures. The capital structure at the meso level (in energy industries) in LDCs will never be freed of deep political entanglements, all the more so if it is dominated by SOEs.

IV The Formation of Complex Capital Structures: Implications for the Notion of
Government Failure

The categories of “market failure” and “government failure” widely used by development economists have been rendered less useful by the recent “entangled political economy” literature (Wagner 2006; 2013; Smith, Wagner and Yandle 2011). Our perspective on capital as a complex, entrepreneurially driven, emergent connective structure suggests that these traditional categories of “failure” are not only less useful in an economics of development context; they should be assigned to the scrap heap of ideas—they have been well-worn,
tried, tested and failed to illuminate the problem of maintaining capital formation in developing economies.¹⁵

The structure of connections between capital forming entities, whether private or public, has been our focus of attention. It is realistic to assume that, far from being separated and acting on one another like an exogenous force, these entities interact in unpredictable ways to produce different development patterns. And it is this interaction that deserves more study and explanation. There is a simultaneous, mutually interactive relationship among capital-forming enterprises in both public and private spheres. These enterprises are congeries of entrepreneurs pursuing plans to form, reform and scrap capital. The plans will be forward looking and heterogeneous. Plans are always in process of being formulated; they are shaped by different investment expectations and investment horizons (e.g. public sector infrastructure investment plans are often justified on exceedingly long horizons and ignore or underestimate resource opportunity costs), new knowledge and especially new knowledge garnered from ongoing interpretation of the impacts of current interactions between entrepreneurs’ capital formation activities in their relevant domain of interest. Capital-forming plans are made by private or public entrepreneurs or even (less commonly in LDCs) by public-private partnerships. As long as this interactive, feedback capacity is at play, as long as new connections are being created, exploited or extinguished in the process, it does not matter who is pursuing the plans—the resultant capital structure will retain an emergent quality as depicted in Figure 1. Now given this perspective, what are we to make of the notion of government failure in this context?

¹⁵ These two categories represent another example of economists’ “misadventures” in the developing country context, although this is a case of an methodological misadventure rather than a failure to offer meaningful, effective policy advice. Cf. Easterly 2001.
If a developing country is seen to have an incomplete set of markets in the present and the future, or possesses markets that are poorly coordinated because private entrepreneurial plans are not perfectly dovetailed, then it is always possible that decision making on the part of government agencies may lead to government intervention in the capital structure—either to correct for missing markets or correct poor coordination. By “correct” we mean that the objective is to achieve some notion of overall efficiency in the allocation of capital that would approximate what would have been the case if markets were better coordinated. Here the efficiency desideratum is a static, equilibrium formulation. The analytic convention to benchmark the formation of capital in less developed economies against this equilibrium notion is not helpful; it tends to separate market and government as single-point entities both in practice and in time, while also abstracting from ongoing feedback effects. Thus, markets are at one instant seen as “failing” because they either do not provide sufficient capital or an optimal, efficient allocation of capital. Governments then act to “correct” the “failing” market by moving the quantum of capital and its allocation toward some semblance of long run optimality.

Accordingly, Governments intervene directly to form capital or they may indirectly (by regulation) simultaneously redirect, stifle or enhance private capital formation. The early “public choice’’ arguments expressing the problem of “government failure” turned on the possibility that various attempts to ameliorate market failures will in fact result in outcomes that are more damaging to long run capital formation than simply leaving gaps in the market to correct themselves. The generic sources of failure in government decision-making on capital can be located in “structural ignorance” of market-based choice contexts where comparative economic costs are clearer. In short, government decision makers are unable
to replicate the discovery and creative functions of private entrepreneurs (Boettke, Coyne
and Leeson 2007: 128). The latter receive more accurate feedback from their calculations
and subsequent actions, thereby enabling them to construct more profitable connections in
the capital structure.

If the political economy of capital formation is not static and “separated” but an
“entangled”, open-ended process then the matter of interactive feedback effects (referred
to above) and general economic calculation is complicated. “Failure” does not seem to be
an appropriate description of process or outcomes. A large, irreversible government-led
capital investment imposed on a developing country’s capital structure may have been
misguided and wasteful in that it deprived private entrepreneurs of an opportunity to form
capital in a more efficient way. Should this government interpolation in the capital
structure be described as a “failure” when it spurs private entrepreneurs to discover new
gaps in the capital structure thereby created? As Lachmann and Hirschman maintained,
disruptive acts of capital formation generate endogenous incentive and discovery effects
that are not always intended by the first mover. Although it is never obvious in advance,
when government actions dictate, the subsequent effects may be destructive, superfluous,
or productive, from some point of view. As we saw in the subsidy case cited in the previous
section, a government intervention led to less private investment and in the Nigerian
transport case it induced further resource mobilization by private entrepreneurs (who were
linked in other ways to the polity), deliberately frustrating and countering the intervention
and profiting thereby. From the entrepreneurs’ point of view their own capital-forming
actions were therefore productive; from the standpoint of the public sponsors of the major
investment in the State railway system, those entrepreneurs’ actions were destructive.
Again, these are not cases of one-off “failure” on the part of the government intervention in capital formation; they are better understood as but one phase in a process of capital formation involving interactions between the actions of government-appointed decision makers and entrepreneurs. The electricity subsidy case in Sub-Saharan Africa saddled SOEs with an equity objective that conflicted with efficiency, quality and discovery. A poverty alleviation objective for SOEs could not be subjected to the market discipline of profit and loss. Thus, private investment in the industry was discouraged, major gaps in the structure of capital in the energy infrastructure were maintained, and potentially new connections in the structure outside that specific industry were stifled. Furthermore, equity objectives were not met, subsidies were politically difficult to reverse so that historical lock-in of the existing gaps in the capital structure was assured. On the other hand, the Nigerian transport case illustrated unintended consequences caused by fragmented and dispersed knowledge even within a particular industry.

Regulatory entanglement in capital formation, and the operation of SOEs in particular, generally make the interpretive economic calculations of private entrepreneurs more involved, more costly and, for economists, they make it impossible to quantify overall impacts on capital formation. Regulatory entanglement has differential impacts—it may confer very short run, differential advantages or disadvantages to market players (e.g. subsidies, tariff protection) and it may create long run, “big players” in a particular industry. At the macroeconomic level, economic policy settings administered by big player central banks and government treasuries can change unpredictably, thereby

16 Big players have major influences on their markets; are “insensitive to the discipline of profit and loss” and their actions are to some extent arbitrary in that they do not follow predictable rules (Koppl 2002: 120).
introducing regulatory uncertainty (Koppl 2002: 123). Furthermore, SOEs operating in a market use discretion arbitrarily because competitive pressures are not very consequential insofar as governments regard the SOEs as too big to fail. In the event, both fixed costs of entry to the industry and the uncertainty introduced for the magnitude of future variable costs, become prohibitive for private entrepreneurs. Markets do not fail in this context; capital formation in the relevant industry reflects calculated reactions to existing connections between SOEs, existing market participants (if any) and potential market entrants. Markets would fail in this case if entrepreneurs mistakenly entered the market and subsequently scrapped capital. Equally, inquiring in to the extent of government failure seems pointless if it is the intention of regulators to confer monopoly powers on SOEs.

V Conclusion

Our Lachmann-Hirschman synthesis revealed several missing “big ideas” relating to the place of capital in economic development. Capital combinations are an essential part of the evolving, connective microstructure of any economy. Economies are propelled along development paths by a process of capital formation in which unexploited connections in an existing capital structure are forged in an uneven and often disruptive fashion through a variety of interrelated and interacting market and nonmarket means.

The dynamics of government interventionism contributes to the emergence of the constellation of connections that constitute capital structures in LDCs. Those structures are extended in time, as are the actions and interactions of market and State. It is difficult to isolate, in time, any single source of market failure or government failure that is not a reaction to, or does not call forth, capital-transforming actions of some kind (by either
agents of government or market participants). Case studies and case histories reveal that the simultaneous interactions between an involved and embedded government and market entrepreneurs manifests itself in transformative actions that are continually altering the shape and conformation of capital structures. Thus it would seem futile to undertake an analysis of the process of capital formation in the light of a deemed “market failure” or “government failure” respectively, either to prescribe remedial development policies focussing on capital allocation or proscribe government actions that would not produce an optimal allocation of capital in the neoclassical sense.

The full consequences of emergent interactions in the connective structure of capital in any developing economy will not be fully grasped in advance. However, with the microfoundations of capital supplied by Lachmann-Hirschman, it is easier to understand why: (i) national development trajectories differ rather than converge to some unique international pattern and (ii) development is persistently uneven in the same country over different periods. Indeed, this is what we should suppose when private enterprises, government enterprises and economic regulation coexist and coevolve. Capital formation processes of the kind elaborated in this paper produce the unfinished thicket of capital combinations—the open-ended capital structures—that we observe in reality.

References


