

Development Theory: Convergence, Catch-up or Leapfrogging?

A Schumpeterian Approach

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Concept note for the Workshop *Novo Desenvolvimentismo e uma Macroeconomia*

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Centro Celso Furtado

15 e 16 de Agosto de 2011 / EAESP - Fundação Getúlio Vargas –

São Paulo - Brazil

¹ I would like to thank Jan Kregel for some excellent suggestions to the present note. The usual disclaimers apply.

1- Introduction

The present note offers three propositions for discussion. a) it argues that instead of the suggested *convergence among nations* which constitutes the title of this session, *divergence* is a more appropriate way to conceptualize development trajectories; and that this is especially true for the last three decades; b) it suggests that “convergence” and “catch-up” are rather loose ways (or concepts) to frame development narratives and, in fact, that they are more akin to the Rostovian idea of a linear path of development towards development equilibrium – equilibrium imposed on history – rather than to the framework of continuous, structural, cumulative change and creative destruction, which should be the proper domain for development theory; c) finally, a Schumpeterian approach, centered in the concept of leapfrogging through innovation, is outlined as a more promising way to address both development theory and the historical trajectories observed since the industrial revolution in Britain.

2- China, Russia, Brazil, East Asia and Latin America: Divergence Big Time

If we take, for instance, the development paths followed by Russia and China since the late Eighties, it is clear that there is no convergence whatsoever, but accumulating divergence. As Nee states: “While in 1990 China’s gross domestic product (GDP) was 60 percent that of Russia, by the end of the decade the numbers had been reversed. While Russia saw an unprecedented increase in poverty, China saw an unprecedented decrease” (2007, p. 6). According to the World Bank (2004), transformative economic growth in China resulted in a population of 170 million moving out of absolute poverty, accounting for more than 75 percent of poverty reduction in the developing world from 1990 to 2000. China’s explosive economic growth has shown to have self-sustaining momentum. By 2040, the *Economist* (16 September 2006, p. 10) predicts China will emerge as the largest economy in the world. Not surprisingly,

international economic institutions now view China as the latest entry in the pantheon of successful developmental states, along with South Korea, Taiwan and Japan.

A Comparison of Asia and Latin America lead us to similar results: no convergence or catching- up, but another case of continuous divergence. In a recently published book in that subject, Kevin Gallagher, using China as a proxy for East Asia, succinctly illustrates the point:

“China and the Latin American-Caribbean region (LAC) began to implement economic reforms within a few years of each other; China in 1978, much of Latin America in 1982. In 1980, the collective economic output of Latin America and the Caribbean was seven times that of China — 14 times greater on a per-capita basis. Nearly 30 years later, China had pulled ahead, with gross domestic product of \$2.7 trillion in 2009 versus pan-regional GDP of \$2.6 trillion in Latin America. Over the three decades, China registered a robust annual economic growth rate of eight percent. The average annual rate in Latin America has been a more modest 3.8 percent. Between 1980 and 2009, GDP per capita increased by 6.6 percent annually in China, while in Latin America, per-capita GDP edged up by a mere 1.7 percent annually during years that were marked by crises and volatility” (2011: chapter 1).

In addition, Gallagher also produced a Table that shows that China has become the most competitive manufacturing exporter in the world, measured by China’s share of manufacturing in total world manufacturing exports; and that in 1980 China was not even on the radar screen in terms of global competitiveness, but by 2009 China’s manufacturing sector became the most competitive in the world.

The same table also shows that Latin America (represented by its two biggest economies) has gone the other way:

(percent of World Manufacturing Exports)											
1990		1995		2000		2006		2009			
17.9%	USA	13.6%	USA	13.3%	USA	14.4%	Germany	11.8%	China	15.9%	China
15.4%	Japan	13.5%	Japan	12.8%	Japan	10.4%	China	11.5%	Germany	12.6%	Germany
14.8%	France	7.3%	Germany	12.6%	Germany	10.2%	USA	10.2%	USA	9.7%	USA
6.9%	Italy	7.0%	France	6.3%	France	5.2%	Japan	7.5%	Japan	7.0%	Japan
6.7%	United Kingdom	6.5%	Italy	6.0%	China	5.0%	France	4.7%	France	5.0%	France
6.3%	China, Hong Kong SAR	3.7%	United Kingdom	5.4%	Italy	4.7%	Italy	4.4%	Italy	4.6%	Italy
4.7%	Netherlands	3.4%	China, Hong Kong SAR	4.8%	United Kingdom	4.6%	United Kingdom	4.1%	Rep. of Korea	4.6%	Rep. of Korea
3.1%	Canada	3.1%	China	3.7%	China, Hong Kong SAR	4.5%	China, Hong Kong SAR	4.0%	China, Hong Kong SAR	4.4%	China, Hong Kong SAR
2.9%	Rep. of Korea	3.0%	Rep. of Korea	3.5%	Canada	3.7%	Rep. of Korea	3.7%	Belgium	3.5%	Belgium
2.9%	Switzerland	2.5%	Canada	3.2%	Rep. of Korea	3.6%	Rep. of Korea	3.2%	United Kingdom	3.3%	United Kingdom
2.2%	China	2.1%	Netherlands	3.1%	Mexico	3.3%	Netherlands	2.9%	Singapore	2.8%	Singapore
2.2%	Sweden	2.0%	Singapore	3.0%	Belgium	2.8%	Singapore	2.7%	Mexico	2.5%	Mexico
1.6%	Spain	1.9%	Switzerland	2.0%	Singapore	2.7%	Canada	2.5%	Canada	2.0%	Canada
1.4%	Singapore	1.8%	Spain	2.0%	Netherlands	2.7%	Mexico	2.5%	Switzerland	2.0%	Switzerland
1.2%	Austria	1.6%	Mexico	1.9%	Spain	1.9%	Spain	1.9%	Malaysia	1.5%	Malaysia
1.1%	Denmark	1.0%	Malaysia	1.7%	Malaysia	1.8%	Switzerland	1.6%	Thailand	1.5%	Thailand
0.9%	Malaysia	0.8%	Sweden	1.6%	Sweden	1.5%	Malaysia	1.5%	Austria	1.4%	Austria
0.7%	Brazil	0.7%	Austria	1.3%	Switzerland	1.5%	Sweden	1.4%	India	1.4%	India
0.6%	Finland	0.7%	Thailand	1.2%	Thailand	1.2%	Austria	1.3%	Czech Rep.	1.3%	Czech Rep.
0.6%	Ireland	0.7%	Denmark	0.8%	Ireland	1.1%	Thailand	1.2%	Sweden	1.3%	Sweden
0.5%	Thailand	0.7%	Ireland	0.8%	Austria	1.1%	Czech Rep.	1.0%	Turkey	1.1%	Turkey
0.5%	Portugal	0.6%	Finland	0.7%	Philippines	0.8%	Poland	1.0%	Ireland	1.0%	Ireland
0.4%	Mexico	0.5%	Brazil	0.7%	Denmark	0.7%	Turkey	0.9%	Denmark	0.8%	Denmark
0.4%	India	0.5%	Portugal	0.5%	Indonesia	0.7%	Ireland	0.9%	Brazil	0.7%	Brazil
0.4%	Norway	0.5%	Indonesia	0.5%	Finland	0.7%	India	0.8%	Russian Federation	0.6%	Russian Federation
0.4%	Turkey	0.4%	India	0.5%	Brazil	0.7%	Brazil	0.8%	Indonesia	0.6%	Indonesia
0.4%	Poland	0.3%	Czech Rep.	0.5%	India	0.6%	Hungary	0.8%	Finland	0.6%	Finland
0.3%	Australia	0.3%	Turkey	0.5%	Hungary	0.6%	Denmark	0.7%	Philippines	0.5%	Philippines
0.3%	Israel	0.3%	Poland	0.5%	Czech Rep.	0.6%	Finland	0.7%	Israel	0.5%	Israel
0.2%	Indonesia	0.3%	Australia	0.4%	Poland	0.5%	Russian Federation	0.5%	United Arab Emirates	0.5%	United Arab Emirates
0.2%	Pakistan	0.2%	Israel	0.3%	Russian Federation	0.5%	Philippines	0.5%	Romania	0.4%	Romania
0.2%	Romania	0.2%	Norway	0.3%	Turkey	0.5%	Indonesia	0.5%	Portugal	0.4%	Portugal
0.1%	Greece	0.2%	Hungary	0.2%	Israel	0.4%	Slovakia	0.4%	Norway	0.3%	Norway
0.1%	Argentina	0.2%	Philippines	0.2%	Portugal	0.4%	Portugal	0.4%	South Africa	0.3%	South Africa
0.1%	Philippines	0.1%	Pakistan	0.2%	Australia	0.3%	Ukraine	0.3%	Australia	0.3%	Australia
0.1%	Saudi Arabia	0.1%	Slovenia	0.2%	South Africa	0.3%	Romania	0.3%	Slovenia	0.3%	Slovenia
0.1%	United Arab Emirates	0.1%	Argentina	0.2%	Norway	0.2%	South Africa	0.3%	Argentina	0.2%	Argentina
0.1%	Tunisia	0.1%	Slovakia	0.2%	Slovakia	0.2%	Israel	0.3%	Saudi Arabia	0.2%	Saudi Arabia
0.1%	Morocco	0.1%	Romania	0.2%	Ukraine	0.2%	United Arab Emirates	0.3%	Pakistan	0.2%	Pakistan
0.1%	New Zealand	0.1%	Greece	0.2%	Pakistan	0.2%	Australia	0.3%	Tunisia	0.1%	Tunisia
0.1%	China, Macao SAR	0.1%	Saudi Arabia	0.1%	Argentina	0.2%	Viet Nam	0.3%	Luxembourg	0.1%	Luxembourg
0.1%	Venezuela	0.1%	Tunisia	0.1%	Romania	0.2%	Norway	0.2%	Belarus	0.1%	Belarus
0.1%	Syria	0.1%	Croatia	0.1%	Slovenia	0.2%	Saudi Arabia	0.2%	Lithuania	0.1%	Lithuania
0.0%	Colombia	0.1%	New Zealand	0.1%	United Arab Emirates	0.1%	Slovenia	0.2%	Bulgaria	0.1%	Bulgaria
0.0%	Bangladesh	0.1%	Bangladesh	0.1%	Viet Nam	0.1%	Pakistan	0.2%	Morocco	0.1%	Morocco
0.0%	Egypt	0.1%	Colombia	0.1%	Luxembourg	0.1%	Argentina	0.2%	Colombia	0.1%	Colombia
0.0%	Malta	0.0%	Venezuela	0.1%	Bangladesh	0.1%	Bangladesh	0.1%	Croatia	0.1%	Croatia
0.0%	Sri Lanka	0.0%	Dominican Rep.	0.1%	Greece	0.1%	Greece	0.1%	Kazakhstan	0.1%	Kazakhstan
0.0%	Mauritius	0.0%	China, Macao SAR	0.1%	Belarus	0.1%	Luxembourg	0.1%	Estonia	0.1%	Estonia
0.0%	Uruguay	0.0%	Morocco	0.1%	Morocco	0.1%	Belarus	0.1%	New Zealand	0.1%	New Zealand

Finally, if we look within Asia and Latin America individually, it's divergence that shows up once more: in Asia, China is the country clearly forging ahead from all others (GDP growth, productivity growth, poverty reduction, exports, technological upgrading, you name it...). In Latin America, Brazil performs the same role. Although far from Chinese numbers, Brazil is clearly the emerging global player in the region, its biggest financial center, industrial leader, exporter, and the magnet around which the others countries gravitate (See Palma: 2011 for the distributional dimension of the issue). Divergence big time.

3- Convergence and Catch-up: “Tendency to Equilibrium in Development Trajectories”?

The discussion given above is extremely compressed, and not fully elaborated. But it clearly conflicts with the idea that there has been a process of convergence and catch-up at work in the global economy. A skeptical reader of this note might ask: even if that’s ok for the short term (three or four decades), what if we go back to the “classical” period of convergence and catch-up stories: the “Gerschenkronian” 19th and early 20th centuries? My answer to that question is that in fact what happened in the comparative histories of industrialization in Britain, USA, Continental Europe (especially Germany) and Japan was creative destruction, not catching up or convergence: a succession of episodes of corporations, industries and countries – but especially corporations and industries – overtaking others and becoming leaders.

By introducing new methods of production, organization, financing as well as new institutional arrangements, Germany managed – around the turn to the 20th century- to surpass Britain in steel, chemistry, electricity, big pharma, investment banking and research and development (Landes: 1969, chapter 5). By 1933, Germans had won more Nobel Prizes than anyone else, and more than British and Americans put together (Watson: 2011, Chapter 5). The defeat in the First World War and the Nazi disaster killed what could have been “the German Century”, but much before that, a new challenger – the US - was already making huge inroads in German leadership.

Between 1870 and 1900, the US followed suit and introduced radical innovations in railway construction, mass production, transportation, food packing, mass consumption and managerial organization (Chandler) and (later) “mass finance” (Landes: 1969, chapter 6, Porter: 2006) Victory in the war consolidated its full leadership, but from a distant corner, and without announcing itself, a new contender had already emerged: Japan. Post war “reconstructed”

Japan introduced a new set of technological, managerial organizational and institutional innovations- Toyotism, Kayzen, compact electronics, industrial robotics (Fanuc) the Keyretsu and MITI – that were not producing “convergence” or catch-up, but challenges to the incumbent leaders, including the US (Vogel: 1979, Johnson:1982 Dore: 1987, Fruin: 1992).

What Japan did, in fact, was to introduce, along with industry specific innovations, a new institutional arrangement to foster development by means of a very coherent industrial policy (building on Germany, and the US, as we know). As a result, Japan did not “converge” with the west. It leapfrogged Europe and became “number two”, threatening to displace the US as number one. Its financial bubble buried this goal – at least for now – but the “Governing the Market” development strategy perfected by Japan, adopted by its neighbors and now being re-invented by China, made its mark.

Conceptually speaking, this is precisely what Britain, Germany, and the US had done before: *leapfrogging trough innovation*, not convergence or catch-up. The theoretical framework best suited to understand those processes is Schumpeterian. Schumpeter, not Gerschenkron or Baumol holds the key here.

But, before I proceed to offer the contours of that Schumpeterian approach to understand “development through leapfrogging by innovation” (and divergence as an outcome), let me propose the following question: what is precisely the meaning of those twin concepts, convergence and catch-up?

In a recent book, Nelson, Odagiri, Goto and and Sunami² give us the following definition: “*Catch-up may be defined as the process in which a late-developing country narrows its gap in income (as one may specify by the word ‘economic catch-up’) and in technological capability (equally ‘technological catch-up’) vis-à-vis a leading country*” adding that...*This fact has been*

² Who have worked extensively on the subject (Nelson in particular).

evident since, say, the Industrial Revolution of the 18th Century and is now even more so as many industries became technology-intensive (2011, pp 2-3)³. One cannot say that this is a particularly precise definition. It's more like a reference to a multidimensional process that some countries go through and others don't. The author's acknowledge that point even before introducing the concept: "*To be sure, some countries did catch-up and some even forged ahead. Some, however, actually fell behind*" (2011, pp 2). This imprecision seems to create a conceptual problem: is catch-up a tendency (an "evident fact") or a possibility (some achieve it, some don't) for late developers? Furthermore, catching-up seems to imply "convergence" (narrowing the income gap) and, apparently, some kind of alignment at the technological frontier, in which case that frontier must be seen as a well defined object that moves incrementally, as in a Solow-Swan growth model. But, if some late developers actually "forge ahead", then neither convergence nor alignment are sure to happen.

Let me conclude this session by re-stating one of my initial points: "convergence" and "catch-up" are rather loose ways (or concepts) to frame development narratives and, in fact, that they are more akin to the orthodox idea of a tendency towards equilibrium – equilibrium imposed on history. After all, what it really says is that once a nation manages to "develop" by reaching the existing, given technological frontier (a process that may or may not happen), it tends to "stay there", or that development once achieved is self sustaining, but...maybe not even that, since nations can also "forge ahead or fall behind". In order to get a firmer grasp of these processes of structural change where catching-up is temporary, and just a prelude for

³ But "narrowing the income gap" should be understood with reference to total GDP, case in which, according to the World Bank Fact Book, Brazil and China are ahead of Sweden and Switzerland, Taiwan comes in as number 24th and Denmark as 31st? Or GDP per capita, case in which (also according to the WB) Qatar, Bermuda, Brunei and Kuwait would have surpassed the US, Germany and Japan comes in as 31st and 32nd respectively and China and Brazil are way behind the United Arab Emirates and Greece? As for "technological catch-up", how do you measure it? How far are China, India and Brazil from the "frontier"? How close is the UK (which produces and exports basically services, especially financial services)? Productivity and *changes in productivity* might be a better way to look at the dynamics of development trajectories among industries and nations', keeping in mind the nation is a very problematic unit of analysis anyway. Furthermore, narrowing the income gap is a possible result, not a given, but divergence, not convergence, a more likely outcome.

forging ahead or falling behind, let's move to the Schumpeterian terrain , and to an alternative framework .

- 4- Development theory: Schumpeterian competition and leapfrogging by means of innovation

In Schumpeter's framework, the core of the "process of economic development" is a virtuous interaction between finance (credit) and competition by means of innovation, which builds up as a struggle for survival and growth in a structurally uncertain environment (Schumpeter: 1942 [1992] part 2,). . The profits that result from dominant market positions are always under threat from imitative strategies or other firms' innovative behaviors; they can only be maintained by continuous product differentiation and productivity enhancement (Nelson and Winter: 1982, parts 2 and 5).

In any event, firms that survive invariably innovate – that is, they exploit opportunities for change by applying new ideas, methods, or combinations of resources. Further, the innovation process is ceaseless. The very success of firms' reactions to competitive challenges acts to reinforce uncertainty and instability, calling forth new reactions and innovations and leading to self-perpetuating economic change. Firms thus compete continuously for market advantages, with asymmetric results: success for some, with strengthened technological and organizational capabilities, and above-average (their own) past profits; failure for other firms, which either disappear or are reduced to marginal activities. Schumpeter put it as follows: "to escape being undersold, every firm is compelled to follow suit, to invest, and to accumulate" (Schumpeter: 1942 [1992] chapter 3: 32). This process appears to operate as much across countries as it does within countries.

In one sentence: Schumpeterian competition – creative destruction - is a permanent leapfrogging processes where forging ahead and falling behind are expected (predictable)

results. That is: divergence. And this is valid for firms, industries and countries. Furthermore, there is no fixed technological “frontier”, competition itself is a process of permanently redefining and reinventing it. In that context, leapfrogging, not convergence or catch-up is the key concept. Development in itself is an open ended and highly uncertain process where there are hardly ‘best practices’, since those are continually being challenged by innovation and where imitation is often “creative”.

To conclude, I leave you with my title question: convergence, catch-up or leapfrogging, which is the best way to approach development theory in general and the recent trajectories of “late developers in the last three decades? By now, you know my answer⁴.

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⁴ As a closing note, let me point out that here nothing was said about the “financial governance” dimension of development theory. This is basically because development theory itself has not embraced, finance (I’m not referring to “financing for development” , but to the way the financial system works and how it should be structured and governed to effectively foster innovation and development).This is a huge gap and the silence on the matter is nothing less than embarrassing. The theoretical agenda in the field should incorporate, as its departure point for rethinking development strategies, the fact that capitalism is an innovation system, but that’s also and essentially a financial system (as Hyman Minsky demonstrated so clearly).

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