

Learning and Industrial Policy: Implications for Africa¹

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Over the past thirty years, Africa has suffered from deindustrialization. The quarter century from the early 1980s was a period of declining per capita income and increasing poverty. Structural adjustment policies advocated by the IMF and the World Bank were predicated on the belief that by eliminating “distortions” in the economy, Africa would grow faster—by constructing an economy based on principles of free and unfettered markets, with the government restrained to ensuring macro-stability (which typically just meant price stability), economic performance would be increased and all would benefit.

It was recognized, of course, that eliminating trade protection would result in the loss of jobs, some in agriculture, many others in industry. The strongly held belief, however, was that these workers would quickly find jobs in new industries, consistent with the country’s comparative advantage. Moving resources from inefficient protected sectors to more efficient competitive sectors would raise incomes. Little attention was paid to the distribution of income, perhaps because of an implicit belief in trickledown economics—somehow, if the economic pie grew, all would benefit.

Things didn’t turn out as the advocates of these policies had hoped. Rather than growth there was decline. Job creation didn’t always keep pace with job destruction, and so workers moved from low productivity protected sectors to even lower productivity unemployment, open or disguised. When there was growth, the benefits often went disproportionately to those at the top, and didn’t trickle down to the rest of the economy.

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When, in the first decade of the twenty first century growth resumed, it was largely based on the boom in commodity prices. The share of global manufacturing value added in Africa in 2008 was 1.1 percent in 2008, from 1.2 percent in 2000 (UNCTAD 2011). Even countries that achieved macroeconomic stability and evidenced reasonably good governance seemed unable to attract much investment outside of the extractive sector.

It is imperative that this course of events be changed, particularly since the extractive sector typically does not give rise to many jobs, and certainly not enough jobs for the burgeoning labor force in many of the countries. (The African labor force is expected to grow --- working age Africans today comprise some 500m people; by 2040, that number will be 1.1bn⁴).

A Propitious Time for Africa

Fortunately, there are a set of events that may be propitious for the sub-continent. First, increasing wages and an appreciation of exchange rate in East Asia may enhance Africa's comparative advantage in manufacturing. The high levels of productivity growth in manufacturing—exceeding the increases in demand—imply that global employment in manufacturing will be declining; but it may be possible for Africa to seize a larger share of these jobs.

Moreover, there are some spillovers from even imperfectly managed natural resources: higher incomes give rise to a demand for more consumption, and some of this will be locally produced and/or serviced. There is an increasingly large middle class. Indeed, by some estimates, only around a quarter to a third of the sub-continent's recent growth is directly attributable to natural resources.⁵

Moreover, with the weaknesses in Europe and the United States that began with the Great Recession of 2008 looking likely to extend for at least a decade, those with funds are looking

⁴ McKinsey, 2010, "What's driving Africa's Growth?" available at http://www.mckinseyquarterly.com/Whats_driving_Africas_growth_2601 (accessed September 5, 2012).

⁵ See for example, McKinsey, 2010, "What's driving Africa's Growth?" available at http://www.mckinseyquarterly.com/Whats_driving_Africas_growth_2601 (accessed September 5, 2012), Exhibit 1 indicates that 24% of the growth between 2000 and 2008 in sub-Saharan Africa is attributable to resources (but a further 8% is derived from resource-financed government expenditure).

elsewhere for places in which to invest their money. Africa is looking more attractive, with an increase in the share of global foreign direct investment projects to 5.5% in 2011.⁶

But many African countries still face serious disadvantages. Deficiencies in infrastructure both increase the cost of production and increase the costs of bringing goods to market and to obtaining necessary inputs. There are also important shortages of skilled personnel, even in an environment where there unskilled workers are in abundance.

This paper is predicated on the belief that these disadvantages can be overcome by appropriate government policies, but such policies necessitate moving further away from the structural adjustment /Washington Consensus (WC) policies, by embracing industrial policies—policies which were shunned under the WC programs. Industrial policies are what we call those policies that help shape the sectoral composition of an economy. The term is used more broadly than just those policies that encourage the industrial sector. A policy which encourages agrobusiness, or even agriculture, is referred to as an industrial policy.

Such government policies can enhance the ability of African economies to seize an even larger share of global foreign direct investment, to create new domestic enterprises and to expand existing enterprises. While many countries within Africa are benefitting from natural resources, most countries have not taken full advantage of those resources, to create new industries and to provide employment for more of their citizens.

Industrial policies and market failures

At the International Economic Association/World Bank meeting on industrial policy in Washington, in May, 2012⁷, there was a broad consensus on why countries should have such policies: to correct market failures, situations where markets by themselves do not lead to efficient, or desirable, resource allocations, and in some cases, even to correct other government failures, where other, harder to alter, government policies “distort” resource allocations.

⁶ See Ernst & Young (2012).

⁷ Proceedings available as Lin and Stiglitz (2013) in accompanying volume.

Market failures arise whenever private rewards and social returns differ, and since the work of Greenwald and Stiglitz (1986) it has been recognized that such discrepancies are pervasive. Industrial policies are designed to correct major sectoral or other misallocations.

Objectives of industrial policies

For Africa, there are at least three objectives of such policies: With many countries facing high unemployment, there is an imperative to create more jobs. The labor market is not working the way it does in neoclassical models, where there is full employment. That means that the market price of labor almost surely is markedly higher than the “shadow price,” the opportunity cost of labor. Government should encourage labor intensive sectors and technologies. To the extent possible, government should be sensitive to the kinds of labor that are being demanded, using both industrial and educational policies to bring the demand and supply of, say, school leavers and university graduates into better alignment.

Secondly, many African countries have been marked by large increases in inequality.⁸ Industrial policies can affect the extent of inequality, by increasing the demand for lower skilled workers, driving up their wages and lowering their level of unemployment. While policies focusing on distribution have traditionally been centered on tax and transfers, it has long been recognized that it may be better (more efficient) to have policies that change the before tax and transfer distribution of income. Such policies reduce the burden imposed by distortionary redistributive policies (Stiglitz 1998a).

Thirdly, it has increasingly been recognized that development requires the structural transformation of the economy (see Lin 2012; Stiglitz 1998c). Markets themselves are not very good at such structural transformations, partly because the sectors that are being displaced—resources that have to move from one sector to another—typically suffer large capital and income losses, and are thus not well placed to make the investments required for

⁸ It is difficult to track inequality due to data limitations. The Africa Progress Report (Africa Progress Panel 2012) states that 24 countries in Africa have Gini coefficients in excess of 42, the level in China. It also points out that in a number of cases, recent growth has not been matched by falling poverty --- which they attribute to inequality (p.16), “In many countries, the pattern of economic growth is reinforcing these inequalities.”

redeployment, and well-understood capital market imperfections (based on information asymmetries) limit access to outside resources.⁹

Fourthly, it has long been recognized that what separates developed from developing countries is not just a gap in resources, but a gap in knowledge (Stiglitz 1998b). More broadly, even in developed countries a large fraction of the increase in per capita income over the last two centuries is attributable to technological progress, to learning how to produce things more efficiently (see Solow 1957). And the fact that some countries and firms have “learned how to learn” helps explain why the last two centuries have seen such remarkable increases in standards of living, in comparison to the millennia that preceded it, which were marked by stagnation (see Maddison, 2001).

If this is so, then it means that development strategies should be centered on promoting learning, closing the knowledge gap between developing countries and less developed countries.

*Market failures, learning, and industrial policies*¹⁰

We suggested earlier that industrial policies are motivated (in part) by an attempt to correct market failures, by the failure of markets by themselves to yield socially desirable outcomes. There can be too much inequality, too high unemployment, too little growth. This paper centers around the failure of markets in learning.

Knowledge is different from ordinary products. Knowledge is essentially a public good, that is, its consumption is non-rivalrous (Stiglitz 1987a, 1999). When one individual shares knowledge with someone else, it does not diminish the amount of knowledge that the first person has. Markets by themselves are never efficient in the production and utilization of public goods. The producer of the knowledge may restrict the usage of the knowledge (through secrecy or patents), in an attempt to appropriate returns, in which case there is underutilization. More generally, there will be underproduction, because—even with effectively enforced patents—

⁹ See Delli Gatti *et al.*, 2012a, 2012b.

¹⁰ See Greenwald and Stiglitz (2013), for a more extensive discussion of these market failures.

there are important spill-overs from learning. What one firm or industry learns enhances the productivity of others. When learning is a by-product of investment or of production, a corollary is that there will be underinvestment or under production (Arrow 1962; Stiglitz, 2012a).

There are other market failures associated with learning: because learning is a fixed, sunk cost, sectors in which learning is important are likely to be imperfectly competitive.¹¹ Because investments in learning cannot be collateralized, imperfections of capital markets may restrain research expenditures, say, relative to real estate speculation. With learning by doing, optimal production may entail firms increasing production today, beyond the point where they are breaking even, in return for the benefit of lower production costs in the future, but with capital market imperfections, firms cannot finance the ensuing losses (Dasgupta and Stiglitz 1988a). The fact that investments in learning are highly risky, and risk markets are absent (especially in developing countries), also discourages such investments.¹²

The general theory of learning and industrial policies is taken up in Greenwald and Stiglitz (2013). Here, we focus on several topics that illustrate the general themes discussed there and that are of particular relevance to Africa.

The inevitability of industrial policy

First, however, we want to reiterate an important point raised in our earlier paper: governments are inevitably involved in industrial policy, in shaping the economy, both by what they do and what they do not do. If they don't manage well the macro-economy, then more cyclically sensitive industries will be discouraged. If they use interest rate adjustments to stabilize the economy, interest sensitive sectors will suffer. If they don't stabilize the exchange rate, then non-traded sectors are encouraged.

Some are wont to say, just let market forces shape the economy, but market forces don't exist in a vacuum. Every market is shaped by laws, rules, and regulations. A bankruptcy law that

¹¹ Moreover, potential competition is not an effective substitute for actual competition. See Dasgupta and Stiglitz (1988b); Stiglitz, 1987b.

¹² These failures (imperfections in capital markets) can themselves be explained by imperfections of information.

gives priority to derivatives encourages these financial products. A bankruptcy law that says that student loans can't be discharged, even in bankruptcy, encourages banks to make more student loans. A tax law that provides for deductibility of mortgage interest leads to more mortgages. A tax law that taxes capital gains at lower rates than ordinary income encourages land and financial market speculation.

Moreover, in almost all countries, governments play a central role in education, health, infrastructure and technology, and policies and expenditures in each of these areas --- and the balance of spending among these areas --- also shapes the economy. In short, all governments really do have an industrial policy. The only difference is between those who construct their industrial policy consciously, and those who let it be shaped by others, typically by special interests, who vie with each other for hidden and open subsidies, for rules and regulations that favor them, usually at the expense of others. Even the agenda of financial market liberalization was an industrial policy--one pushed by the banks and the financial sector, the effect of which was to lead in many countries to a bloated financial sector, rife with explicit and implicit subsidies (reaching record levels in the crisis of 2008-2009), diverting resources from other uses that arguably would have led to high sustained growth. It was an industrial policy that led to more macro-economic instability, which, as we explain below, itself was adverse to learning.

I. The Washington Consensus and learning

The Washington Consensus policies referred to earlier in this paper focused on static efficiency. They didn't consider even, what were the consequences for innovation and learning. If there was learning and technological progress, it was assumed to be exogenous, outside the purview of policy, and certainly outside the purview of the economic policies on which they focused. That this was so was striking, given the observation, made earlier, that development was so much about learning and economic transformation.

Standard theory has long recognized that there could be a trade-off between learning, or dynamic efficiency, and static efficiency. The patent system creates a temporary monopoly and

imposes restrictions on the usage of knowledge, but these significant static inefficiencies are justified on the basis of the increased innovation that results.

The success of the most successful countries in development—those in East Asia—is largely attributable to their recognition of the importance of learning. Korea, for instance, paid little attention to its static comparative advantage. Its static comparative advantage would have led that country to focus on rice farming. But it knew that even if it became the most productive rice farming country in the world, its prospects would be limited. Only by focusing on sectors from which it could learn, and on the basis of which it could close the knowledge gap with more advanced countries. It developed complementary education and technology policies, and it succeeded, increasing its per capita income more than eight-fold in a span of less than four decades.

Had it followed the dictates of the Washington Consensus policies¹³ it would have eschewed industrial policies, and it would have focused investments in education at the primary level—and it would have, at best, been a middle income rice growing country. Unfortunately, many countries in Africa have followed the dictates of the Washington Consensus policies, and through the structural adjustment programs they have made a step backwards, as we have noted, becoming increasingly resource dependent economies.

The Washington Consensus policies were predicated on the assumption that markets, by themselves, are efficient; and that therefore the major source of inefficiency or mal-performance of the economy arises from government intervention. Hence, the first item in the reform agenda is to eliminate these interventions with the market. The only role of the government was to ensure price stability.

Even before these doctrines became fashionable, their intellectual underpinnings had been taken away. Greenwald and Stiglitz (1986) showed for instance that whenever information was imperfect (asymmetric) and risk markets incomplete (which is always the case, and especially so in developing countries) markets are not constrained Pareto efficient (that is, taking into

¹³ Broadly understood—not in the more restricted sense that the term was used by Williamson (1989).

account the costs of obtaining and disseminating information or creating and maintaining markets.)

But the financial crisis of 2008 reinforced the conclusion that markets, on their own, may be massively inefficient, and unstable. It showed also that maintaining price stability did not necessarily lead either to growth, stability, or efficiency.¹⁴

In short, the crisis has re-emphasized the importance of market failures. It is thus natural that there should not only be a rethinking of macro-economic theory and policy, but also of micro-economic theory and policy, including the most important subject for Africa today, that of industrial policy, of how governments can help change the structure of the economy to promote learning—thereby increasing long-term sustainable growth.

Learning and one-size-fits all policies

One critique of the Washington Consensus is that it has attempted to impose one-size-fits all policies. Such policies may be particularly inappropriate when it comes to creating a learning society.

A critical aspect of “learning” is that it takes place locally and must adapt to local differences in culture and economic practice. Thus “learning” prescriptions that apply in some environments will not apply in others. For example, in some economies what has been called (by outsiders) “crony capitalism” has a long and successful record. In others it does not.¹⁵ Learning how to relate to government has value in most economies, but in some, the skills required may concern those related to bidding processes, in others to interpersonal connections. American firms have had to learn to adapt to the Foreign Corrupt Practices Act.¹⁶ Labor norms differ too among countries, and personnel policies have to accommodate such differences. Differences in consumer preferences and norms as well as in distributional channels necessitate different

¹⁴ For a discussion of the implications of the crisis for economic theory and policy, see Stiglitz (2011).

¹⁵ It is, perhaps, worth noting that what is viewed as corruption in one society may not be so viewed in that way by others. Many outsiders, look at the American system of large campaign contributions and revolving doors, which seems to “buy” favorable legislation as a form of corruption, even if there isn’t money stuffed into brown paper envelopes for the politicians themselves.

¹⁶ Dixit (2012) has argued that firms from developing countries may have a knowledge advantage in dealing with governments of other developing countries.

“learning” about marketing. Most importantly, and perhaps obviously, relative factor prices may differ, so that the returns to learning on how to save on the utilization of one factor versus another may differ.

These cross country differences have numerous implications. It helps explain why learning in a firm may spill over more easily to other firms in the same country than to firms in other countries. The learning in one country may simply be less relevant to production in the other country.

They help explain too why it is that in some economies public enterprises function well. In others they do not.¹⁷

They also help explain the limitations of globalization: local firms have a competitive advantage in having more knowledge about local circumstances.¹⁸ Much financial information is chiefly available locally, and even when information is available, outsiders may have less of an understanding of the nuances of the country’s distinctive institutional structure – as foreign investors have learned to their cost about US mortgages. Thus, effective capital deployment will often require local financial institutions.

Unfortunately, Washington Consensus policies which pushed capital and financial market liberalization did not take into account this local knowledge. Foreign banks succeeded in attracting depositors away from local banks, because they were perceived as safer (and in some cases, may have been, because they had the implicit guarantee of governments with deeper pockets.) But foreign banks were at an information disadvantage relative to local banks about small and medium sized local firms, and it was thus natural that lending be diverted away towards loans to government, consumers, and large domestic firms (including local monopolies

¹⁷ Herbert Simon emphasized that if there are differences in the performance of public and private enterprises, the differences could not be explained just by differences in incentives, since in both typically most individuals work for others, and have to be incentivized. See for example Simon (1991, 1995).

“This examination of authority and organizational identification should help explain how organizations can be highly productive even though the relation between their goals and the material rewards received by employees, if it exists at all, is extremely indirect and tenuous. In particular, it helps explain why careful comparative studies have generally found it hard to identify systematic differences in productivity and efficiency between profit-making, nonprofit, and publicly controlled organizations.” (Simon 1995: 288).

¹⁸ See Greenwald and Kahn (2005).

and oligopolies.) But in doing so, local learning and entrepreneurship may have been undermined, and growth weakened. Rashid's paper in this conference (2013) provides data strongly supporting this conclusion.¹⁹

By the same token, WTO restrictions on industrial policies and domestic sourcing (and possibly other restrictions on financial markets) may impede the ability of developing countries to foster learning, to garner for themselves the full learning benefits of foreign direct investment, or, as we shall see shortly, force them to employ second-best methods for promoting learning within their economies.

II. Macro-conditions for creating a learning society

Most of this paper is concerned with micro-economic policies, but in our earlier paper, we argued that one of the objectives of industrial policies is to create an economic environment that is conducive to learning. For this, the macro-economic environment is central. Economic stability appears to play an important role in creating a successful “learning” environment. Evidence for this comes from the experience of developed economies during recessions. Productivity growth is normally low during contractions and there is no off-setting gain during subsequent expansions.²⁰ The productivity loss during the dislocation associated with the recession appears to be permanent.²¹

There are several reasons why stability is important for learning. The first is that much information is embodied within existing institutions, in complex webs of interactions. Key institutions—firms—often die in the face of high levels of instability.

¹⁹ Greenwald and Stiglitz (2003) present the general theory.

²⁰ There are exceptions, including the increase in productivity in the current US recession. While there are several explanations of this distinctive aspect of the downturn, one is the increasingly short sighted behavior of firms ignores the long run costs of firing or laying off trained workers. In that case, it will still be the case that there will be long run adverse effects of the downturn on productivity. In the Great Depression productivity growth also appears to have been quite high in part due to important investments made by government (including in transportation) (Field 2011).

²¹ This is, of course, consistent, with standard results on unit roots. See Dickey and Fuller (1981) and Phillips and Perron (1986).

Moreover, managerial attention is limited. When firms are focusing on survival, they have less attention to devote to “learning,” except learning how to survive.

Thirdly, high levels of macro-instability lead firms to act in a more risk-averse manner. When firms go into recessions, among the first things to be cut are investments in R & D, and this is even true among firms that are relatively dependent on innovation. Part of the reason is that learning is future-oriented. One has to make sacrifices today and undertake risks today, for future benefits. But in the presence of instability, there is a risk that there will be no future—and hence less reason to make the requisite investments today. Instability weakens future oriented incentives.

And fourthly, learning requires resources, including access to capital. Instability may make capital less accessible and more costly.²² In downturns, capital is likely to be rationed, and investments in R&D are often sacrificed.²³

This has important implications for policy: policies which *expose* countries to a high level of instability, or which increase the economy’s instability (e.g. by weakening automatic stabilizers) have an adverse effect on learning. Examples include financial and capital market liberalization and deregulation (Rashid 2012; Stiglitz *et al* 2006; Stiglitz 2008), and tariffication (Dasgupta and Stiglitz 1977).

By the same token, policies that focus on price stability, at the expense of *real* stability, may actually be counterproductive. (See Stiglitz *et al*, 2006.) Inflation targeting, with its focus on price stability attained by interest rate adjustments, may be “doubly” bad: Responding to inflation by increasing interest rates—even when the cause of the inflation is an exogenous supply shock—is an example of a pro-cyclical policy. And the increases in interest rates have a disproportionate effect on certain sectors, those that are most interest sensitive and which rely most on bank financing. Small businesses, in particular, bear the burden. Small firms that may be killed when interest rates are raised dramatically don’t come back to life when they are

²² This can be put slightly differently: With capital (debt and equity rationing) the shadow price of capital often increases dramatically. (See Greenwald, Stiglitz, and Weiss, 1984; Greenwald Stiglitz, 2003).

²³ Greenwald, Salinger, and Stiglitz (1990); Stiglitz (1994).

subsequently lowered: there are important hysteresis effects. This is especially important in developing countries where there may be a dearth of entrepreneurship. If, as some claim, much of the learning and innovation in society occurs within small and young enterprises, then these policies increase the burden on these key “learning” sectors. But whether that is the case or not, these policies exacerbate the already adverse effects arising from the cyclical volatility in the “shadow” cost of capital.

III. Exchange rate policy

The exchange rate affects the competitiveness of the economy--the ability of exporters to export and of import competing firms to compete with imports. The consequences of an appreciation of the currency (say as a result of the inflow of capital or foreign aid) can be severe: if the exchange rate increases by say 25%, there is no way that (in the short run) productivity can compensate, or for there to be offsetting adjustments of wages and the prices of other inputs. Moreover, there are, as we have noted, important hysteresis effects: a firm that dies because it can't compete is not brought back to life when the exchange rate subsequently falls. (Capital market imperfections imply that especially small and medium sized firms will be unable to obtain the capital required to tide them over.)

By the same token, it is expensive for firms (especially small and medium sized domestic firms) to manage exchange rate volatility, especially in emerging markets and in the least developed countries. In many of these countries, there may be no markets in which firms can hedge their exchange rate risks.

Thus, like it or not, exchange rate policy affects the industrial structure. A decision not to actively manage the exchange rate will result in a more volatile exchange rate and a smaller traded goods sector than would otherwise be the case. In the context of Africa, the decision of many resource rich countries to allow their exchange rate to appreciate has contributed to deindustrialization, and even the weakening of the agriculture sector.

There are several implications of this analysis. First, governments need to adopt policies that make exchange rates less volatile, e.g. capital controls (or more generally, they have to adopt a portfolio of tools for capital account management).²⁴

Secondly, governments need to keep exchange rates "low" so as to make domestic firms more competitive--to expand exports and import competing sectors. This may also necessitate the buildup of reserves. This is especially true because low exchange rates help export sectors like manufacturing, which have higher learning elasticities and generate more learning externalities. (See Greenwald and Stiglitz, 2006; forthcoming).

But a concern about industrial policy means governments need to be attentive to *how* they intervene to stabilize and lower the exchange rate. If to prevent a large decline in the exchange rate they increase interest rates (as was the wont of the IMF), while they may thereby save large numbers of enterprises who have taken on foreign denominated debts, at the same time they may kill other enterprises that were more prudent and took on only domestic debt. The effects may be particularly adverse to small and medium sized enterprises (who typically do not take on foreign debt, because they do not have access to international markets)—as was evident in the East Asia crisis (Furman and Stiglitz 1998).

There are alternative ways of stabilizing the exchange rates, and even more so, keeping exchange rates low, which may be less costly--in particular, direct intervention, with the consequent buildup of reserves. Some have suggested that it is impossible to push the exchange rate down for more than a short period of time. But such arguments are based on a confusion: it is impossible to keep exchange rates above the "market" level through direct intervention, because to do so requires selling dollars (or other hard currency), and countries only have limited amounts of these in their reserves. But to push the exchange rate down requires selling one's own currency, and buying dollars (or other hard currencies), and this countries can easily do.

²⁴ Moreover, as we noted above, learning benefits from having a stable environment.

There are other instruments available for affecting especially the *level* of the exchange rate. Any regulation that affects the flow of money out of or into the country affects the exchange rate. Thus, making it easier for foreign companies to invest in the country leads to the appreciation of the currency; making it more difficult leads to the depreciation of the currency. In assessing foreign direct investment policy, one has to weigh the benefits of access to markets or technology or training with the costs to the rest of the economy from the exchange rate appreciation (including the adverse effects on learning.) By the same token, loosening restrictions on citizens of the country investing their money abroad lowers the exchange rate. Since most countries have a broad array of regulations affecting inward and outward investment, there is, in a sense, no "free market" exchange rate. Through these regulations and through interest rates, as well as through direct interventions, governments "set" the exchange rate, either intentionally or not.

A lower exchange rate represents a broad-based mechanism for industrial policy--firms themselves decide whether they can compete at that lower exchange rate. The government has identified broadly that the export sector has more learning externalities, and therefore that sector should be encouraged relative to others; but it doesn't have to identify precisely which sub-sectors or firms should be encouraged. The market does that.

This has an advantage and a disadvantage. More finely tuned targeting may increase the overall (dynamic) efficiency of the economy; after all, each firm or sector takes no account of the extent of the benefits that accrue to others. A more targeted approach can offset the externality associated with research or learning in each sector. On the other hand, government attempts at fine tuning may encounter more severe "political economy" problems. (See the discussion below.)

There are two questions about the use of each of the instruments. First, what really matters is the real exchange rate. The question is: can government affect, at least more than just briefly, the real exchange rate? Here, the critical question is the extent and speed of "pass through." For very open economies, importing and exporting a large fraction of their goods, lowering the nominal exchange rate leads to increases in nominal prices, which can undo the benefits,

unless, say, monetary authorities take actions to dampen the potential inflation, but such actions themselves have costs (e.g. higher unemployment.) It is clear that many countries have managed to lower their *real* exchange rate for an extended period of time, and have done so at the same time that they have promoted growth.

Secondly, what are the costs of each of the interventions, and do the benefits exceed the costs? Some worry that the costs of preventing inflation from direct intervention is too high. The East Asian countries have managed to intervene in the exchange rate over long periods of time without facing either high inflation, or high costs of avoiding inflation. But, at least in China, there is another growing concern: to keep the value of their currency low, they have bought dollars, which yield a low return. Worse, dollars are depreciating relative to the RMB, implying that they are experiencing a (paper) capital loss.

Industrial policies can intervene in relative prices in ways which avoid these costs (and which can in fact be more targeted than lowering the (real) exchange rate), e.g. by sectoral subsidies (including subsidized interest rates) or “infant industry” protection. But international trade agreements restrict the use of industrial policies. The only instrument left may be the exchange rate. Lowering the exchange rate simultaneously decreases the price of exports in foreign currency, leading to an increase in the demand for exports, and increases the price of imports (in domestic currency, relative to the price of nontraded goods). It thus encourages substitution away from imported consumption goods. Increased exports and reduced imports lead to a trade surplus.

In a two-period model, this means that the country consumes less than it could in the initial period, offset by increased consumption in the later period.²⁵ The static distortion (consuming less than what would normally maximize utility, based on the equality of the marginal rate of substitution and the interest rate) is justified by the dynamic benefits—producing more of the

²⁵ In our simple model, we assume individuals cannot borrow or lend, and simply solve a period-by-period static utility maximization problem, determining the allocation of current income among the three commodities. But it would be easy in principle (complicated in practice) to generalize the results to cases that include individual borrowing and lending, with precise effects depending on the structure of preferences (e.g., on reparability of utility functions.)

export good, say, leads to more learning, which generates a higher level of consumption in the second period than would otherwise be possible.

But if the learning effects are strong enough, even in an infinite period model, the benefits of expanding exports are sufficiently great that it may be possible that optimal policy requires the country to build up reserves forever, never to use them (essentially like throwing money away). The benefits of learning exceed the costs of the “forced saving” required to ensure that the exchange rate remains competitive. One can construct a model in which each period the world looks as it did the previous period, so that if it is desirable to have a surplus at time t , it is desirable to have a trade surplus at time $t + 1$.²⁶ (Of course, in a more general dynamic model, it may be desirable to have trade surpluses initially, to be spent at later dates.)

IV. Investment Policies

In some (but not all) of the successful countries, foreign direct Investment has played an important role.²⁷ For some countries with limited access to finance, FDI can be an important source of funds. But even in those countries with high savings rates, champions of FDI extoll its virtue in terms of the transfer of knowledge. But this doesn't happen automatically, and the learning spillovers are more important for some forms of FDI than others. Thus, there are two questions facing industrial policies: How can FDI, especially of the kind that might have more learning spill-overs be promoted? And how can the amount of learning that results from any FDI that does occur be increased?

The theory of localized technological change (Atkinson and Stiglitz, 1969) explains that the spillovers from learning associated with one technology are more likely to be greater for “nearby” technologies. What matters is both the *relevance* of the knowledge associated with one technology for the improvement of another, and the *capacity* of those employing one technology to learn from another.

²⁶ See Stiglitz (2012a).

²⁷ FDI did not play an important role in several of the countries of the East Asia miracle (Korea, Taiwan, and Japan).

As Greenwald and Stiglitz (2012) explain, spillovers may well be stronger across sectors for similar technologies than within the sector for markedly different technologies. Thus, just-in-time inventory practices have benefits for many sectors in which inventories play an important role.

Much of the knowledge which is embedded in, say, mining technologies is of limited relevance to most other sectors of the economy. Thus, the learning benefits of FDI associated with resource extraction are likely to be much more limited than those associated with, say, manufacturing, and this may help explain why so many resource dependent economies remain “dual” economies, with few spillovers from the natural resource sector to the rest of the economy. If this is so, it means that FDI in this area—one which has dominated in Africa—if of much less benefit than FDI in other areas.

While it may be easiest to learn about adjacent technologies, the benefits of such learning may be more limited than that associated with making larger steps (sometimes referred to as leapfrogging.) There is then a complicated optimization problem: Both the costs and benefits increase the larger the step. Moreover, one wants to move towards technologies from which one can learn the best going forward, and that may not always be easy to assess from one’s current vantage point. Korea and Japan’s industrial development was characterized by strategies that did involve moving some distance from the technologies that they were then employing.

The discussion so far has focused on “learning,” but even more important is “learning to learn” (Stiglitz 1987c). Industrial and trade policy can enhance an economy’s learning capacities, its underlying “capabilities,” and development strategies need to be focused on that, especially in an era with fast-changing technologies, where specific knowledge learned at one moment risks rapid obsolescence.

Government subsidies for FDI and other investment-related activities to promote learning

Government subsidies for FDI have typically been justified in terms of the government revenue and employment generated. But our analysis suggests another rationale: learning. But if this is

so, then subsidies should be larger for those sectors and technologies which are likely to have large spillovers, and for firms that are willing to engage in practices that enhance the likelihood of such learning.

In many cases, entrepreneurial spillovers may be larger in the case of domestic enterprises than foreign, since domestic firms are likely to be more firmly embedded within the local community. Government policy should, accordingly, provide some preference for domestic firms relative to foreign firms, except when there are strong learning benefits that are specifically related to foreign firms, e.g. because the foreign firm brings knowledge that is not locally available.

Government policies can affect factor prices, and therefore the level of investment, and thus the level of learning. The benefits of learning can more than offset the social costs of the distortion.

Compulsory employment/training programs and domestic procurement requirements (programs that compel firms to source locally) are more likely to lead to learning spillovers. The success of Malaysia's FDI was partially attributable to these requirements.

V. Making the Most of One's Natural Resources

We noted earlier the large dependence of African economies on resource exports. In the previous section we argued that linkages between natural resource production and other sectors were typically weaker than, say, between manufacturing and the rest of the economy, helping to explain why there is typically such a large gap between the state of technology in the mining and natural resource sector and other sectors of African economies, and explaining in part why the abundance of natural resources has often not been accompanied by the hoped for increases in standards of living.

The latter failure, which has become known as the “resource curse” or the “paradox of plenty” (Humphreys, Sachs, and Stiglitz 2007; Karl 1997)] is partly explained by macro-economic problems of high volatility and non-competitive exchange rates that mark resource rich countries. We have explained why volatility and high exchange rates are especially bad for creating a learning economy, and thus for long run increases in standards of living. But there are well known effective policy responses, including stabilization and sovereign wealth funds and care in borrowing from abroad, especially in periods of commodity price booms.

But industrial policies have not played as important a role in addressing the problems of the resource curse that they should. This is partly because the issues on which we have focused in this paper (and this conference more generally) have not received the attention that they should.

Historically, African countries were thought of simply as a source of raw materials. In the development of the mines, little or no attention was given to how that development might affect the broader development of the economy (other than through the availability of resource rents.) Transportation systems were designed to move the resources out of the country, not to promote the broader development of the country.

Trade policies in developed countries in the post-colonial era reinforced these colonial era policies. Escalating tariffs, for instance, discouraged the development of value-added activities within the country. Neo-classical economics has provided a rationale for reinforcing policies:

because most African countries do not today have a static comparative advantage in these value-added activities, they have been discouraged from developing them. The only circumstances in which such activities might make sense (from that perspective) are when transportation costs offset these disadvantages, i.e. it may make sense to do some processing if in doing so the costs of transportation are thereby reduced.

But from a learning-development perspective, matters look markedly different. One of the reasons that African countries may not have done as well as others is that the “natural” (market- driven) learning spillovers from mining and natural resource industries to the rest of the economy are less than those from, say, manufacturing. In this view, then, the high exchange rate and high volatility marking most natural resource dependent countries has led to an economic structure that has discouraged activities with large learning spill-overs. Better macro-policies (leading to less volatility and lower exchange rates) can go some way in correcting this distortion. But so can industrial policies, by leveraging off the countries’ resource base (in which at least some countries have a degree of monopoly power.)

This entails exploiting upstream, downstream, and horizontal linkages (Hirschman, 1958), and linkages that might be associated with processing and resource extracting itself. Some developing countries (like Malaysia) have actually succeeded in developing capabilities in resource extraction, by imposing employment and training conditions on foreign operators.

Even if much of resource extraction technology itself is not closely linked with other technologies which might provide the basis of broader growth and learning, many of the sub-activities entailed in the long and complex process of removing natural resources do. Buildings have to be built and people have to be hired. Workers have to be fed. There is a demand for people and vehicles for transportation and logistics. In short, for many African countries, the exploration and development of these linkages can be the basis of an effective industrial policy, one which enhances the capabilities of the people and firms within them. (For a more extensive discussion, see Jourdan, 2013.)

VI. Distribution, employment and Environmental Concerns

Standard industrial policy focused on changing the sectoral composition of GDP to enhance growth—in our case, to enhance learning. But it should be emphasized that the failure of markets to incorporate learning externalities is only one market failure, one instance in which private rewards and social returns are misaligned, and any misalignment provides a rationale for industrial policy.

Of particular relevance for many African countries are distribution, the environment, and employment. The market, by itself, seems to be creating too few jobs, is associated with socially unacceptable levels of inequality, and has adverse impacts on the environment. Industrial policy can and should be directed at each of these; and in some cases, policies directed at mitigating one problem may have benefits in addressing another.

More generally, what matters is not GDP, but the quality of life, “well-being” and the enhancement of individual and societal capabilities. What that entails—and how performance can be better measured²⁸, and how better measured performance can be increased through industrial policy— should and can be a subject of rational inquiry.

For instance, environmental impacts are important for all countries, but especially for developing countries. The fact that natural resources and the environment are “underpriced” means that there are insufficient incentives to allocate resources (including those devoted to learning) towards the environment and natural resources—so more get expended on saving labor, even though labor is in surplus.

This highlights a difference between developed and developing countries, and a reason why it is important that developing countries have their own innovation policies. Much of innovation in advanced industrial economies has been directed towards saving labor. But in many

²⁸ See, in particular, Stiglitz, Sen, and Fitoussi (2010).

developing countries, labor is in surplus, and unemployment is the problem. Labor saving innovations exacerbate this key social problem.

Even when labor saving innovation does not result in unemployment, it will have adverse distributional consequences, lowering wages. With inequality already so high in many African countries, this should be of concern.

But there are further reasons that we should be concerned about growing inequality. It can lead to increased political and social instability. There is, moreover, a growing understanding, even within the IMF, that inequality may lead to lower economic growth, more economic instability, and a weaker economy. (Stiglitz 2012b; Berg and Ostry 2011). While there are many channels through which these adverse effects operate (e.g. inequality diminishes the aggregate demand for domestic non-traded goods), one may be of particular importance in developing countries, where there is a need for heavy public investments in infrastructure, education, and technology.

In a society with very little inequality, the only role of the state is to provide collective goods and correct market failures. When there are large inequalities, interests differ. Distributive battles inevitably rage, and to prevent redistribution, wealthy elites often try to circumscribe the powers of government. But in circumscribing government, the ability to perform positive roles is also circumscribed. As we have argued here and elsewhere, government needs to play an important role in any economy, correcting pervasive market failures, but especially in the “creative economy.”

Thus, our critique of non-inclusive growth goes beyond that it is a waste of a country’s most valuable resource—its human talent—to fail to ensure that everyone lives up to his or her abilities. Non-inclusive growth can lead to democracies that do not support high growth strategies. There can be a vicious circle, with more inequality leading to a more circumscribed government, leading in turn to more inequality and slower growth.

The analysis of this section has several obvious but important implications: (a) Developing countries cannot just “borrow”/adapt technology from the North. There is a need for a new

“model” of innovation. (b) In particular, innovation needs to be directed (through industrial policies) at saving resources, protecting the environment, and improving the distribution of income. (c) These objectives may be intertwined—industrial policies that promote more inclusiveness may promote more learning; better environmental policies may lead to a better distribution of income.

VII. Political Economy

One of the standard objections to industrial policies in the past has been political: the potential for misuse. The question is raised, can there be effective industrial policies in countries with significant deficiencies in governance. The argument has been put that even if such policies contributed greatly to the success of East Asia, elsewhere they were less successful, because they were abused. Critics suggest that industrial policies were largely to blame for Latin America's lost decade. The implication is that, while with Ideal Government intervention might improve matters, in the “real world” interventions do not necessarily do so. Given the widely acknowledged deficiencies in governance in many African countries, they should shy away from such policies.

There are several responses to these objections. One is methodological: such political economy objections may be true—but the conclusion is based on political analysis, not economic analysis. And the political analysis is often more simplistic than economic analysis. The first question is not whether in some cases such interventions have failed, but whether in some instances they have succeeded, and the answer to that is unambiguously, yes. The second question is, whether there are policies and institutions that can be adopted that are more likely to lead to success, that at least reduce the likelihood or extent of abuse.

Moreover, similar questions can be raised about every other aspect of policy. Many governments have not used monetary and financial regulatory policy well; in some cases, the misuse can be traced to problems of governance (some have argued that regulators and central banks in some advanced industrial countries were captured by special interests in the financial market, and this played an important role in the 2008 global economic crisis.²⁹ But few would argue that as a result, governments should eschew the use of monetary and financial regulatory policy.³⁰

Historical interpretation

We observed earlier that there is ample evidence that countries have successfully used industrial policies. Indeed, there are few successful economies in which the government has not successfully employed industrial policies, broadly understood.

Moreover, it is widely acknowledged that at the time that many of the East Asian countries began their industrial policies, not only was their economic development lower than some of the less developed countries today, but so too was their political development.

The conclusion that industrial policies were a failure in Latin America is, at best, contentious, at worst, simply wrong. Brazil, the most ardent adopter of such policies, had an impressive growth rate of almost 6% in the three quarters century before 1980. Industrial policies played an important role in that country's success in this period. The lost decade was a result of Latin American countries' excessive indebtedness in the 1970s, the period of the oil shock --- understandable, perhaps, given the low, or even negative, real interest rates at which the petro-dollars were being recycled--followed by the unprecedented increase in interest rates, a result of the United States suddenly switching its monetary policy regime to monetarism. The lost decade of the 80s was, in short, a result of a macro-economic shock, not a failure of micro-economic policies. The subsequent adoption of the Washington Consensus policies, which eschewed industrial policies, prolonged the subsequent period of slow growth. The more

²⁹ See, e.g. J. E. Stiglitz (2010).

³⁰ Though some conservatives do argue, on this basis, that there should be a return to the gold standard, and that there should be no role for discretionary monetary policy. However, since the failure of monetarism, these extreme positions have garnered little support among economists.

recent revival of growth, for example, in Brazil, has much to do with the government once again undertaking activist policies (Bértola and Ocampo, 2012).

In short, the historical experience shows that industrial policies can work. Even instances of failure need to be interpreted with caution. Good policies involve some risk — if every public or private investment succeeded, it would be indicative of insufficient risk taking. There are undoubtedly instances where industrial policy has failed because of abused. But the relevant question is: are the problems inherent in political processes? The historical record suggests strongly that failure is not inevitable. The historical record does suggest caution, especially in countries with poor governance. And it suggests that countries do what they can to improve governance; there are institutional reforms in the political process that would reduce the risk of failure.

Implications of governance deficiencies for the design of industrial policies

But reforms political processes are slow. The implication of deficiencies in governance is that one needs to tailor the design of the instruments of industrial policy around the capabilities and governance of the public sector.

This poses an important trade-off. Broad-based measures such as exchange rate interventions require only that the government ascertain that the sectors that would be encouraged by such interventions have more societal learning benefits than the sectors that would be discouraged—and there is ample evidence that that is the case (evidenced by the success of export-led growth strategies). Firms and sectors within the economy self-select, and the expansion of firms and sectors with greater learning enhances the dynamism of the economy. On the other hand, more targeted interventions can lead to even more learning and faster rates of growth.

Of course, no intervention completely “solves” the political economy problem: Sectors that benefit from exchange rate intervention may lobby for the maintenance of that intervention even in the absence of learning benefits.

Some countries have shown that they can manage the political economy problems of more targeted interventions. The East Asian countries did so by using rule-based systems in which interventions were linked to past export success.

The East Asian countries used the quest for "rents" in a positive way: competition for rents led to firms that learned more and became more competitive in the global market place. In other countries, though, rent-seeking has diverted resources away from growth inducing innovation. Firms have devoted their resources to learning how to circumvent regulations designed to make the economy more stable and to learning how to exploit consumers and their monopoly power better. Markets don't work well when private returns are not well aligned with social returns; and in those circumstances, incentives to innovate and learn are also distorted.

Liberalization and political economy

Finally, we note that liberalization is itself a political agenda. As we previously commented, markets do not exist in a vacuum. There are always going to be rules and regulations, even in a liberalized world. And the design of those rules and regulations will shape markets. The rules and regulations that were adopted in the process of "liberalizing" and deregulating financial markets in the US and UK led to bloated financial institutions backed by implicit guarantees from the monetary authority and ultimately the taxpayer — a perhaps unintentional industrial policy that distorted the economy.

V Concluding Comments

The central thesis of this paper is that pervasive market failures (and other distortions which result in private rewards being misaligned with social returns) provide a rationale for industrial policies --- government interventions in sectoral allocations. We focused on one particular set of market failures, those that arise in the process of learning: Learning is especially important for developing countries as they strive to close the gap between their incomes and those of the more developed countries. A central focus of development policy should be, how to promote learning, how to create a "learning economy and society." We noted that much of the advice of

the past, based on neo-classical models, not only gave short shrift to these concerns, but may actually have led to counterproductive policy prescriptions that were adverse to learning, and hence to long term increases in standards of living.

A focus on creating a learning society has broad implications for financial and capital market liberalization, the design of monetary policy and institutions, macro-economic policies, intellectual property regimes, investment treaties, taxation, and expenditures on infrastructure, education, and technology, legal frameworks for corporate governance and bankruptcy—indeed for the entire economic regime. All need to be viewed through a learning perspective. Some have direct effects on learning, some have longer term effects on learning capabilities or how they impact the acquisition of learning capabilities, while some have indirect effects, e.g. as they create more macro-instability, which has adverse effects on investments in learning. Some have multiple effects.³¹

For Africa, as it attempts to reindustrialize, to restructure its economies to become more integrated into the global economy and move away from excessive dependence on commodity exports, to raise standards of income, increase employment, reduce poverty and inequality, and protect a fragile environment, industrial policies are of especial importance. We have explained why the widely cited objections—that though industrial policy may have worked in East Asia, they are inappropriate for Africa because of deficiencies in governance—are unpersuasive. Governance issues are, of course, relevant in all countries, and are important in shaping the form that industrial policy takes and the instruments that are appropriately used.

The belated recognition of the potential of these policies comes at a fortunate time, for changes in the global economy may afford the countries of Africa a distinct opportunity to transform their economies in a way that will, at long last, narrow the gap that separates standards of living in the sub-continent from that of much of the rest of the world.

³¹ That is the case, for instance, for financial liberalization, which may lead to more macro-economic volatility, and less access to finance by domestic small and medium sized firms, thus impeding the development of domestic entrepreneurship capabilities. See Rashid (2012) and Emran and Stiglitz (2009).

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