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AFRICA'S PROSPECTIVE URBAN TRANSITION

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Abstract The headline demographics of sub-Saharan Africa appear to be reason for concern. Looking back, since Independence in the 1960s, the region has been the major exception to the global demographic trend of rising height: In some countries, average height has even been declining [eLife (2016)]. Looking forward, between now and 2050, the population is set to grow more rapidly than that of any other region. But the demographic transition that is typically of most concern to African governments is not about the size or stature of overall population, it is urbanization. Politicians fear the consequences of a restive urban youth: an Arab Spring repeated south of the Sahara. Many would like to slow the pace of urbanization.

Keywords: Africa, Urban transition

1. INTRODUCTION

The headline demographics of sub-Saharan Africa appear to be reason for concern. Looking back, since Independence in the 1960s, the region has been the major exception to the global demographic trend of rising height: In some countries, average height has even been declining [eLife (2016)]. Looking forward, between now and 2050, the population is set to grow more rapidly than that of any other region. But the demographic transition that is typically of most concern to African governments is not about the size or stature of overall population, it is urbanization. Politicians fear the consequences of a restive urban youth: an Arab Spring repeated south of the Sahara. Many would like to slow the pace of urbanization.

Irrespective of policies, sub-Saharan Africa will continue to urbanize rapidly. Indeed, during the next two decades, the absolute flow will probably be at its peak since many countries will be in the range where the population is fairly

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evenly split between rural and urban areas. For a given income gap, movement tends to be constrained by whichever sector is the smaller. Further, the preponderance of young people of working age will favor migration. On United Nations projections, between 2016 and 2050 Africa's urban population is projected to triple.

I will argue that the decisive demographic transition in Africa will not be, and has not been, urbanization *per se*. What matters is not the move to cities, but what happens within them. To date, Africa has urbanized in a manner that has not transformed productivity. On the contrary, by creating crowded and unhealthy environments, urbanization might have contributed to the worrying height demographics. That two-thirds of the urban population of 2050 has yet to arrive is a critical opportunity to make the transition to productive cities.

In this short paper, I begin with two analogous demographic transitions that, as with African urbanization to date, did not significantly raise productivity despite dramatic changes in the composition of economic activity. I then set out the basic analytics what must happen in order for urbanization to transform productivity. Using these building blocks as organizing criteria, I then discuss why African urbanization to date could not be productivity-transforming, and what would need to change it order for future urbanization to be so.

2. ANALOGOUS TRANSITIONS

I begin with analogies. The first global demographic transition was from the sparse populations of hunter-gatherer economies to those based on agriculture. We now know that this transition enabled a huge increase in population, but for thousands of years left most people with worse nutrition.[1] In economic terms, we can think of this transition as a change in technology that both shifted and flattened the marginal product of labor (MPL) schedule. At very low population density, hunter-gatherer technology literally enabled people to live like lords: supported healthily by their own vast estates. But as the Malthusian process drove incomes down a steep MPL schedule to subsistence, the switch to settled agriculture offered a significant initial increase in income. Further, being much flatter, the new MPL schedule could hold off Malthusian pressure until the population rose far beyond that of a hunter-gatherer society. But once it again reached the Malthusian equilibrium, individual lives were probably nastier, more brutal, and shorter. The higher population density transmitted disease more readily; the need to defend planted crops made territorial conflicts become more violent; and diet became dominated by stored grains rather than fresh fruits and meats. The transition to agriculture was a stepping stone to modernity, but not a step up.

The transition to urbanization which began globally around 9000 BC in Turkey, only got significantly underway in sub-Saharan Africa in the second half the 20th Century. The initial urban transitions were in economic terms similar to the transition to agriculture: The composition of economic activity changed substantially, enabling increased carrying capacity, but never raising incomes sufficiently to

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avoid the return to the Malthusian trap. For thousands of years, most people in cities were as poor as those working in agriculture. Meanwhile, the radical increase in density spread diseases rapidly, and food quality deteriorated, both reducing urban life expectancy below that in rural areas. For example, during the early 19th Century, working class life expectancy in Britain's new industrial cities was substantially shorter than that for agricultural laborers.

Only from the mid-19th Century did some cities pioneer a further transition. Through a range of public investments, they became platforms for a radical upward shift in the MPL schedule. It was this, rather than urbanization *per se*, that enabled societies to escape Malthus. The famous chart of per capita income in Europe over the past 2,000 years records not a staircase of gradual ascent, but a path to a rocket.

3. URBANIZATION AND PRODUCTIVITY

For a city to enable the dramatic increase in productivity that has historically enabled the escape from the Malthusian trap, it must radically enhance human productivity. The link between productivity and urbanization is not mysterious: Productivity depends upon energy and connectivity.

All activity requires energy, and the liberation of production from human energy was the foundation of the industrial revolution. By concentrating the demand for energy, urbanization enables the concentration of supply. In turn, this opens the scope for the exploitation of scale and specialization in the generation of energy.

These benefits of urbanization for the production of energy illustrate the generic advantages of the scale and specialization that are potentially enabled by a city. Scale makes people more productive. In part, this is technological, but more importantly, scale permits specialization. A fundamental feature of how productive a worker is in a task is how much time they have spent doing it: 'learning by doing'. This is true even for seemingly mundane tasks, but it becomes far more important with complexity. As a result, in aggregate, the workforce in which people are able to specialize accumulates far more human capital than if it were unspecialized. Modern economies have moved beyond the simple production technologies that impressed Adam Smith. Production has become more sophisticated through mastering complexity. In turn, mastering complexity depends upon being able to marshal vast amount of knowledge. The capacity to generate and retain knowledge is quantized: For most of history, the limit to knowledge was the capacity of the human brain. But the dramatic growth in the complexity of production over the past century has been driven not by bigger brains but by bigger firms. Scale and specialization have enabled a quantum increase in the capacity of firms to generate and store knowledge of production techniques [Hidalgo (2015)].

Increasingly, scale and specialization are being generated not only by what happens within firms, but what happens between them. Knowledge is quantized

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not just at the level of the brain and the firm, but in networks: As groups of firms specialize in interdependent activities, the productivity of the entire group is enhanced [Baldwin (2016)]. In turn, the emergence of interdependence depends upon a large market: Firms will be reluctant to specialize in a product that is so narrowly defined that it has only one customer. Similarly, workers will be reluctant to become completely specialized in a skill needed by only a single employer because they would lack bargaining power and be subject to 'hold-up'. These are examples of a further source of scale economies: The larger the market, the greater the specialization permitted without risk of 'hold-up'. Large markets bring other productivity gains. If to be technologically efficient, a firm must be above some minimum size, then the larger is the market the more firms can co-exist. If a firm could learn only from its own experience, change would be slow. But in a large market, firms can learn from each other. This introduces a second means of learning: In addition to learning-by-doing, firms can learn by observing and copying. Further, in a large market, they have a strong incentive to do so because scale makes markets more competitive.

Scale and specialization both have important spatial implications. Technological economies of scale can only be exploited if the product is produced, or the service performed, at a particular point. The various types of market economies of scale can only be exploited if a large number of producers are able to reach a common large group of consumers. Specialization in a particular skill is only possible if many complementary skills can be mustered together in the same location. Specialization in a particular product or service is only possible if the reachable market is sufficiently large. The common requirements for these conditions to be met are *connectivity* and *clustering*. Producers must be sufficiently well-connected with consumers that both can transact in markets that are specialized yet competitive; workers must be sufficiently well-connected with firms that both can transact in markets that are specialized yet competitive. People live together in households that are locations for both consumer demand and labor supply, while firms similarly are locations both for consumer supply and labor demand. Hence, transactions in both the consumer and labor markets share a common need: *connectivity between households and firms*. Additionally, to reap the gains of scale from interdependence within networks, firms need good connectivity with each other: They need to *cluster*.

Urbanization is the fundamental mechanism for good spatial connectivity and clustering. It generates connectivity in two different ways: it reduces the distance between households and firms, and it reduces the cost of transport per unit of distance between them. These two approaches require very different actions but they are complements rather than alternatives. Reducing the distance between households and firms involves increasing their *density* of occupation; *clustering* involves coordinating location according to specific characteristics. Reducing the cost of transport per unit of distance involves investment in *transport* infrastructure, such as roads and rail lines, and organizing the transport services that use it, such as bus companies and railway companies.

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A precondition for high connectivity is indeed that the city should have a substantial population – people must be connected to many other people. But an influx of people does not in itself generate connectivity. On the contrary, beyond modest population sizes, its direct effect is to reduce connectivity through mounting congestion.

4. AFRICAN CITIES: SIZE WITHOUT ENERGY AND CONNECTIVITY

The growth of African cities since the 1960s has corresponded to first stage of the urban transition in other regions. It has radically expanded the opportunities for low-productivity employment in craft, service trade activities, thereby increasing Malthusian carrying capacity. This has enabled Africa's population to increase very rapidly without dropping below subsistence levels of income. But it has not enabled the transformation to radically higher productivity generated by scale and specialization. Urban Africans work predominantly in small informal enterprises. While cities create the possibility for high productivity, they create the inevitability of health hazards unless these are offset by costly countervailing public measures. As with the initial urban transition elsewhere, the lack of investment in sanitation and water, and the lack of the electricity needed for food preservation have stressed living conditions, contributing to the distinctive path of population height in much of Africa noted above.[2]

4.1. Energy

The reason why African cities have not provided reliable energy is straightforward: Public electricity utilities have maintained monopolies which their managements have exploited through grand corruption. Over time, vested interests have built up that have locked dysfunctionality into place, with electricity under-priced, and consequently under-supplied. Even where private generation has been permitted, because public utility regulators are perceived to be politically captured, investors fear hold-up and so are unwilling to accept the modest rates of return conventional for utilities. Individual users, both firms and households, have been driven to self-generate electricity, but this has driven up costs because of the sacrifice of scale. One way of achieving a fundamental change in the political economy of electricity pricing would be to distribute shares in the public electricity utility to households, and for it to borrow on the domestic bond market, thereby creating constituencies with an interest in the commercial viability of the enterprise.

4.2. Connectivity

The reasons why African cities have not provided good connectivity are more complex: A range of policies have indirectly left residential densities quite low, have limited clustering, and have under-invested in transport infrastructure and services.

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As to density, in most of sub-Sahara Africa, most urban dwellers live in slums, largely composed of single-storey shacks. Moderate levels of density are achieved only by severe sacrifice of floor-space: Density per square kilometre averages around 9,000, against around 14,000 in South Asia. Straightforward legal impediments partly account for the lack of investment in multi-storey dwellings [Collier and Venables (2015)]. Very few cities have comprehensive registers of the ownership of urban plots. Much urban settlement has been informal, with households squatting on land that was previously farmed, and so occupancy is legally insecure, discouraging investment in structures. Lack of title rebounds onto lack of finance: Without title, investments cannot function as collateral.

As to clustering, the lack of clear title to land, and informal residential settlement in inner-city areas, make it difficult to reshuffle the location of activities so as to achieve contiguity of interdependent firms. An example is Kibera, an inner-city slum district of Nairobi. Using rental data, Henderson et al. (2016, 2016a) estimate that were the land tied up for low-quality residential use redeployed at prevailing market rates, the capital value of the gain in efficiency would be nearly $2bn.

As to transport, road infrastructure has been frustrated both by informal settlement and inadequate tax revenue [Collier and Venables (2016)]. As cities grow, an increasing percentage of the inner city needs to be devoted to the road network. Often this would involve displacing squatters, which some governments lack the practical legitimacy to enforce. Where there is a legally entitled owner, it involves compensation, and under pressure from Western NGOs, donors insist on full compliance with legal processes of appeal and redress. As an example, in Kampala, where much of the land is owned by a small number of wealthy and powerful individuals, judges have interpreted this compensation to require payment at market prices prevailing *ex post* of the announcement of a road improvement (contrary to international practice). Since this reflects the value of proximity to the proposed infrastructure, the government ends up paying both for the cost of building the infrastructure and for the ensuing benefit.

The roads that have been built are highly congested. There have been no attempts to segregate bus services from private cars, so that the congestion generated by the latter drastically reduces mass mobility. For example, in Nairobi, the modal means by which people go to work is on foot: On average, by foot only 11% percent of the city's jobs can be reached within an hour, so that although the labor market appears large, it is not well-integrated [World Bank (forthcoming)]. Even with the sacrifice of floor space, density does not compensate for the lack of transport. The result is less connectivity than the cities of other regions. Henderson and Nigmatulina (2016) compare 265 cities globally, and find that controlling for population and income, the central areas of African cities provide around 40% less connectivity than those in other regions.

While firms have less connectivity than elsewhere, but this is not offset by low wage costs. The poor liveability due to lack of floor-space and limited provision of public services drives urban labor costs up relative to rural incomes to compensate

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[Jones et al. (2016)]. As a result, African cities have not provided a competitive location for firms competing in global markets for manufactures [Venables (2016)]. Yet, breaking in to this sector would offer the best prospect of the rapid job growth that Africa needs given its overall demographics. Lacking their own export base, African cities have concentrated on supplying services, including the government sector, to the export sectors of natural resources and agriculture. Especially in the decade of the resource booms, they became 'cities of consumption' [Gollin et al. (2016)].

4.3. Public Health

A further consequence of informal settlement is that the foundational infrastructure of water, electricity and sewerage was not provided in advance. Retrofitting such infrastructure after settlement is costly and has proved to be unaffordable. Yet, the separation of drinking water from sewerage cannot readily be done by individual private actions: the required technology is by its nature a public good.

Contagious disease is intrinsically a public bad, for which the private incentives to take the necessary measures are inadequate. Globally, all effective provision of urban public health has therefore involved an element of compulsion combined with large public investment. However, compulsion is only feasible where the political economy permits. Government needs to have the accepted legitimacy to implement compulsory measures without facing widespread non-compliance, and the practical street-level power to enforce compliance on a residual minority for whom the pressures of self-esteem and peer-esteem are insufficient. Many urban authorities in Africa have neither. Lacking sources of finance, urban authorities have failed to keep pace with population so that in many cities the proportion of the urban population with access to piped water has been declining over the decades. For example, in Dar es Salaam, the proportion of households with piped water fell from around 90% in 1991 to around 40% by 2011 [Collier and Jones (2016)].

4.4. The Authorizing Environment

Overarching these policy issues of energy, connectivity and health, the authorizing environment for urban policies is fragmented. As low-density cities have grown through sprawl, they have spread well beyond their initial legal boundaries. For example, Dar es Salaam now covers four legal entities and so has four mayors. Further, the responsibility for policy is often shared between national ministries and city authorities without clear demarcation. The resulting fragmentation has impeded both urban planning and its implementation. For example, a bypass for Kampala, planned in 1972 was finally opened in 2011, while Dar es Salaam was without any plan during the rapid growth between 1999 and 2012 [Collier and Jones (2016)].

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Weaknesses in the authorizing environment and in the registration of land and property have constrained the revenue base. In China, where the government has built cities rapidly while investing heavily in the infrastructure for density, connectivity and health, the key component of urban public finance has been the prior public ownership of urban land which has been progressively sold off as its value has risen. In urban Africa, little land is publicly owned, and privately owned land has remained untaxed both because of the lack of registers and the political power of owners. The consequences of this lack of a revenue base are geared up by their implications for borrowing. Africa's urban authorities have limited ability to issue bonds.

5. CONCLUSION: THE TASK AND THE OPPORTUNITY

Africa's future is inevitably urban, but the transition to high productivity is not inevitable. Because structures are costly to change, the form of urban growth is path dependent [Henderson et al. (2016)]. It will be costly to convert Africa's existing urban space into providing the high-connectivity that globally competitive firms require. However, in rethinking their urban policies African governments have two opportunities.

One is that so much of the present urban space is occupied by single-storey shacks that in economic terms would be easy to replace. It has not yet changed from putty to clay. While the economic costs of change would be modest, the political costs would, however, be considerable. The other opportunity is that two-thirds of the urban population of 2050 has yet to arrive: most urban space remains to be built. There is scope for satellite cities to be built to standards that meet the requirements of energy and connectivity, while also providing better liveability.

Cities that work require substantial public investment. The Henry George theorem demonstrates that the resulting appreciation in urban land values must exceed the cost of any public infrastructure that is worth undertaking. Politicians thus have the technical scope to design urban taxation so that the costs of investment in public infrastructure can be fully recovered. Determining specifically which infrastructure is needed where remains a daunting task of urban planning. The underlying data for quantitative analysis of African cities is only now becoming available, and so there are still major gaps in our understanding of the returns to public investments. However, our understanding of the political economy of what would make them happen is arguably yet more deficient.

NOTES

1 For a recent overview, see Harari (2011).

2 For complementary discussions on the constraints to infrastructure access, and the role of demographics in the African urban transition, see Pariente (2017) and Fox (2017), both in this special issue.

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