Urbanisation, Vietnam.
Image: Tran Veit Duc, World Bank.

Essay 4

Tropical underdevelopment – is it a thing of the past?

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Introduction

In his 2000 paper on Tropical Underdevelopment, Jeffrey D. Sachs (Sachs 2000) concluded that there was a signi cant historical difference between temperate and tropical regions in terms of economic growth rates and per capita incomes. His hypotheses were based on a range of quantitative models and he suggested this historical divide would persist into the near and far future. 'The income gap has also been ampli ed because poor public health and weak agricultural technology in the tropics have combined to slow the demographic transition from high fertility and mortality rates to low fertility and mortality rates. The analysis suggests that economic development in tropical ecozones would bene t from a concerted international effort to develop health and agricultural technologies speci c to the needs of the tropical economies' (Sachs 2000). The time period used for much of his analysis ended at 1995 and correctly represented the situation at that time. He noted that tropical countries had grown more rapidly in the years leading immediately up to 1995 (per capita GDP both temperate and non-temperate regions had grown at 2.3%). He thought, however, that this growth should have been greater, given the natural tendency of per capita incomes to converge as a consequence of global trade, technology diffusion and capital ows from richer countries. You would expect the tropical countries to grow faster than the temperate zone but he believes 'this tendency towards convergence is muted, if not eliminated altogether' (Sachs 2000, pg. 9). He also highlighted the relatively poor performance of many African and Latin American countries.

I have used 1995 as the starting point for my analysis wherever possible. That period has not always been available in the data used for the State of the Tropics Report so I have used a similar period in these cases. Sometimes, I have also referred to data from more distant periods to emphasise the changes to tropical countries. It should be noted that I am a statistician not an economist and I have taken a statistician's perspective to this analytical essay.

The economic growth rates for the Tropics have greatly exceeded those for the Rest of the World since 1995, probably more so than expected by Sachs. Improvements have also occurred in a range of other progress indicators. The main purpose of this paper is to provide some explanation of the arguably surprising strength of this economic growth. I have primarily used the indicators in the

To be clear, the objective of the essay is not to criticise Sachs' signi cant paper; rather, it is to use Sachs' paper as a base and to provide some analysis of the main driving forces for the rel

(3) Temperate zone innovation has been favoured strongly by larger and richer populations. Technological innovation has an increasing return to scale. Therefore, the larger, richer population in the temperate zone, which has been integrated in a global market since 1800, has strongly favoured innovation. This has pis

In fact, the rate of growth for these regions has accelerated in recent periods. This is also true for Latin America. Looking at the more recent 2005-10 period, it can be seen that the growth has been 5.8%, much higher than the 2.7% experienced by the Rest of the World (see Table E4.1). Of course, per capita incomes remain much lower – it will take many decades of higher growth to catch up.

How does this compare with Sachs' analysis of

This relative improvement for tropical countries is also true for a range of other progress indicators, some of which are summarised by the UNDP's Human Development Index (HDI) (UNDP 2014). As can be seen from Table E4.3, the change in the HDI between 1990 and 2010 has been 0.10 (21%) for tropical countries (excluding those large countries straddling the tropical and temperate regions) compared with 0.07 (10%) for the Rest of the World. If you include the straddling countries, such as China, India and Brazil, the improvement would be 0.11. The regions showing the greatest improvement are South East Asia, South Asia and Northern Africa and the Middle East. The regional estimates in Table E4.3 include the straddling countries.

These findings are reinforced by the following two figures. In Figure E4.1, the countries with the greatest improvement in HDI scores are shown on the left. The tropical countries are

The *number of scienti f c and technical journal articles per 100,000 population* originating from authors in the Tropics has more than doubled over the 1990 to 2009 period, but this gure remains very low at 1.8 when compared with for the Rest of the World at 18.9. Consistent with research and development expenditure, the regions with the most rapid growth were South East Asia and South America.

Sachs' policy solution to develop technology in the Tropics was to have a much greater national and international focus on technological innovation directed at the problems of tropical ecology. The indicators discussed above suggest there has been considerable progress in this direction, perhaps because newer technologies are not so ecology dependent (e.g. a lower reliance on agriculture). The impressive increase in foreign direct investment implies that there has been signi cant technology transfer. The advent of air conditioning and additional protections from tropical diseases has also made it easier for people from temperate climates to work in the Tropics and transfer their knowledge. Furthermore, the large increase in tertiary enrolments suggests that there is growing capacity within the tropical regions to adopt new technologies. The other indicators suggest important increases in home-grown technical capability even though still considerably less than the Rest of the World. All these factors are likely to have contributed to the higher economic growth in the tropical regions.

I turn now to hypothesis (4), which relates to societal dynamics such as urbanisation and demographic transition. Have there been many changes since 1995? The indicators I will look at are as follows: *urban population, life expectancy, maternal mortality, child (under 5) mortality and youth literacy.* Although not one of the indicators in the State of Tropics Report, I will also look at *fertility* because it is an important part of the demographic transition.

Urban population (as a percentage of the total population has increased considerably over the past 30 years, much greater than Sachs would have envisaged when writing his paper, I think. It has been growing steadily at an annual rate of 3.3% and was 45% of the population in 2010 compared with 38% in 1995 and 30.5% in 1980. This is still less than the 56.2% for the Rest of the World. In relative terms, the biggest growth has been in South East Asia. The process of urbanisation has supported economic development by providing the labour needed for industrial activity, but has also been a factor in the expansion of slums.

With respect to life expectancy, there have been signi cant improvements in the tropical countries. Over the past 50 years, life expectancy has improved from 41.3 years to 65.2 years. Although this represents a considerable catch-up to the Rest of the World, it remains 7.7 years lower. Over the past 15 years, the improvement for the tropical regions has been about ve years, showing some acceleration. The relatively larger increase in life expectancy in the Tropics re ects greater access to vaccines and major improvements in many of the social determinants of health, including increased access to potable water and sanitation facilities, and enhanced public health infrastructure. There are two important exceptions. Whilst deaths from most of the so-called neglected tropical diseases (NTDs) have declined, this is not the case for dengue fever. Also obesity and non-communicable diseases such as diabetes are growing concerns. The rates have been growing steadily, although they are still well below those for the Rest of the World.

Sachs noted the signi cant improvements in public health in a number of tropical countries (mostly Asian) that preceded their economic take-offs. These improvements in public health have also now occurred in a number of other tropical countries and might have similar impacts. Reduction of maternal and child mortality has also been an important contributor to the improvement in life expectancy. All regions experienced signi cant decreases in both indicators with some regions now experiencing rates lower than the average for the Rest of the World.

Fertility has decreased signi cantly in the tropical regions and is continuing to fall. For the 1950-55 period, the fertility rate was 6.2 which had fallen to 3.2 by 2005-10. Much of the reduction occurred prior to 1990-95 when it had already dropped to 4.1. For the South 03-called neglectede235 TD [(been signi cant impr)1asd(

Sachs' hypothesis (5) is about geopolitical factors but I will not comment on this aspect of Sachs' theory because the State of the Tropics Report does not contain any relevant indicators except to note improved governance in many countries. Furthermore, Sachs' assessment is that "their role is often exaggerated when not considered alongside the underlying technological, demographic, and urbanisation processes".

Other factors

Sachs also mentions the importance of agriculture productivity to growth in the tropical regions, and notes that productivity had been much lower than the Rest of the World for a number of reasons including the lack of

certain services from developed countries to a number of tropical countries. This has been an important factor in South Asia, for example.

There are other important factors which are covered by the State of the Tropics indicators such as (i) education (mean years of schooling of adults), (ii) openness through international trade and investment (exports of goods as %of GDP, foreign direct investment, net in ows), (iii) infrastructure development (gross capital formation) and (iv) corruption.

The mean years of schooling as an adult almost doubled in the Tropics between 1980 and 2010 from 2.9 years to 5.9 years. This is still less than the Rest of the World (8.5 years). The regions with the

Asia, the decrease in the relative importance of agriculture occurred earlier.

The relative increase in the importance of industry started from the mid-1990s. For this grouping, the biggest increases have been in Southern and Central Africa, and Northern Africa and the Middle East. There were actually decreases in the relative importance of industry in the Caribbean and Central America.

On the other hand, for services, the Caribbean and Central America were among the regions with the biggest increases along with South East Asia from 1995 to 2010. The trend towards services started even earlier in South East Asia. There was a signi cant fall in the relative importance of services over this period in Northern Africa and the Middle East.

Differences between regions

In this section I rely mostly on information in the State of the Tropics Report. The approach I have taken is to arrange the regions by their annualised growth over the 1995 – 2010 period and then look at where the regions are relatively strong or weak, mostly in terms of the indicators in the Report (see Table E4.5). The economic performance of the regions is quite mixed and will use Table E4.5 to see whether there are any patterns that help explain this mixed performance.

It is worth noting the following pen pictures of the nature of the growth for each of the regions.

- South Asia: Very strong growth well before 1995, accelerating through the 2000s
- South East Asia: Very strong growth started well before 1995 and has continued with a slight setback during the 1997 Asian Financial Crisis
- Central and Southern Africa: Very strong growth only started during the 2000s but has been accelerating
- Caribbean: Strong but steady growth since 1995

[5] Industry includes mining, manufacturing, construction, electricity, water, and gas.

[6] Services include wholesale and retail trade (including hotels and restaurants), transport, and government, nancial, professional, and personal services such as education, health care, and real estate services.

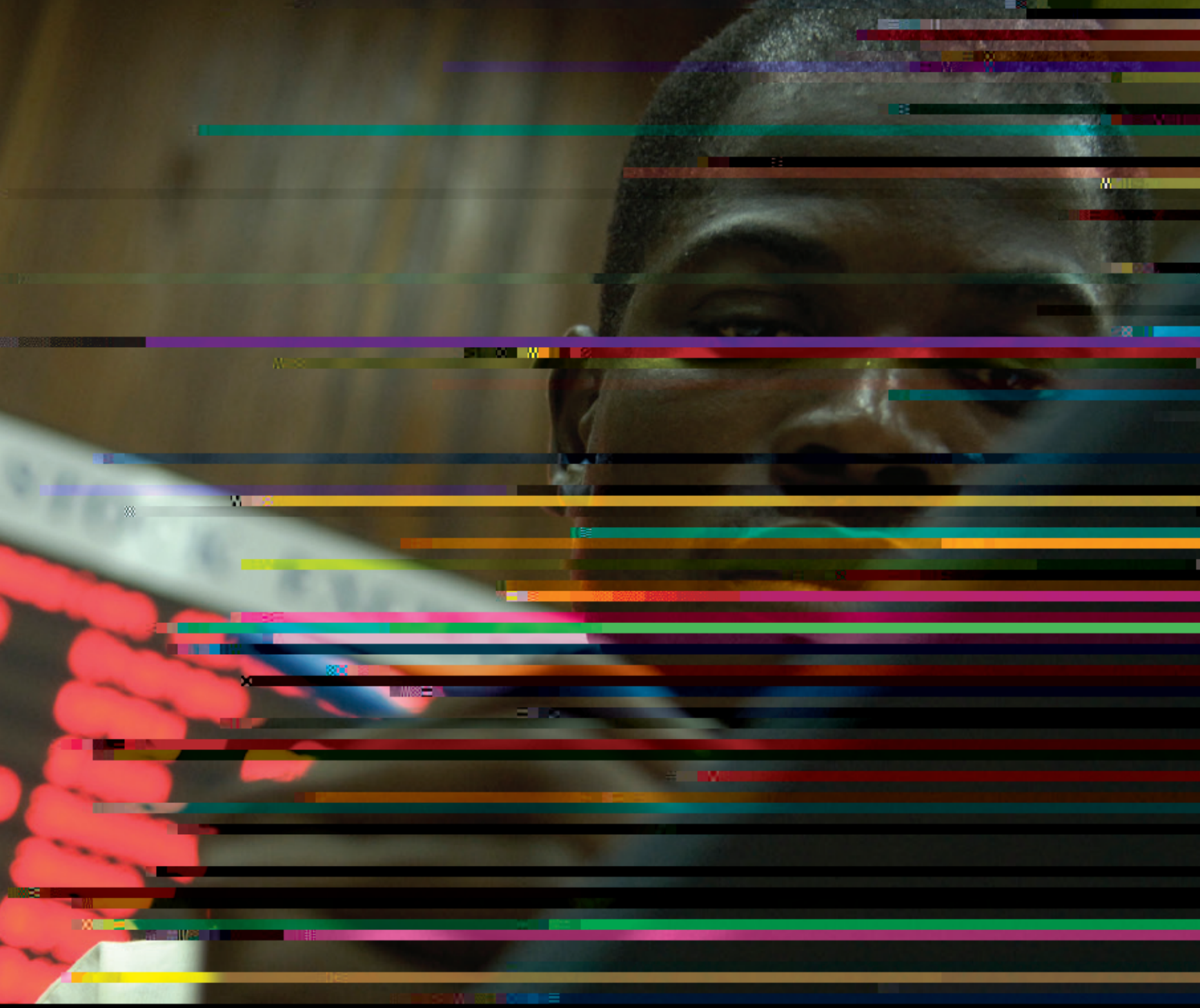
	1980			1995			2010		
	A			A			A		
Tropics	%								

- Northern Africa and the Middle East: Growth has been steady since 1995 but there has been

Table E4.5 A

	Relative Strengths	Relative Weaknesses
A (.0%)	• Large increase in exports • Low labour costs • Large increase in capital formation • Switch from Agriculture to Industry & Services • Increases in life expectancy and youth literacy	• Low level of Internet usage • Low level and relatively smallincrease in foreign investment
A (5.3%)	• High level and growth in foreign investment • Increase in R&D and technology indicators • High level and growth in capital formation • Increase in a range of social indicators • Increased urbanization • High level of exports • Switch to Services	• High (and increasing) income inequality
& A (, %)	• Increase in foreign investment • Switch from Agriculture to Industry • Low labour costs • Improvement in Agriculture productivity	• Technology still at low level • Tertiary education at low level but growing quickly • Fertility is high
(. %)	• High level and growth in tertiary education • High level for mean years of schooling • Switch from Industry to Services	• Net importer of goods
A & (, %)	• Large increase in foreign investment • Switch from Agriculture to Industry • Signi cant net exporter	• Technology indicators are relatively low • Fertility is high • Decline in exports as % of GDP
A (. %)	• Increase in a range of technology indicators • Increase in youth literacy • Large increase in agriculture productivity • Relatively high commodity prices	• High income inequality
A (. %)	• Increase in a range of technology indicators • Increase in youth literacy • Increase in mean years of schooling • Switch from industry to services	• Decline in foreign investment as % of GDP
(. %)	• High level of tertiary education	• Poor performance on a range of economic indicators • Imports growing faster than exports

Source:State of the Tropics project



Stock exchange, Ghana.
Image: Jonathan Ernst, World Bank.