Structural Transformation and Economic Growth (STEG)

STEG CEPR

STEG Virtual Course on "Key Concepts in Macro Development"

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Lecture 2: Development accounting: methods and findings

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Presentation Slides

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Video

Q: What is H/L?

A: Average human capital per worker. Or in other words, the total Human capital in the economy divided by the total Labour.

Q: Should a "pure" accounting exercise work both in the case of steady-state and in transition phase?

A: An accounting framework is always pure. The issue is when you try to interpret things, you typically need a model framework. Differences in K/Y could be transitional or persistent, e.g. because of persistent investment distortions.

Q: The model predicts that K/Y would be independent of TFP, but why would H/L be independent of TFP? Wouldn't investments in human capital also be affected by TFP?

A: The Neoclassical growth model does not explicitly incorporate H accumulation, but in general you are correct. She will not be estimating alpha, however, but instead taking it from standard accounting measures.

Q: What about endogeneity between H and A?

A: Yes, as I mentioned above. The endogeneity problems will have her calibrating alpha from national income accounts data rather than estimating it.

Q: Does that mean the contribution we calculate of human capital is not causal? Even if we have the "correct" alpha?

A: Because we aren't going to be estimating these econometrically, the endogeneity is not a huge issue. We typically will be calibrating these from national accounts data, rather than running regressions.

A: We aren't going to try to arrive at causal interpretations here... Everything is endogenous!!

Q: TFP will not be impacted by Capital?

A: A great question. TFP might be impacted if capital *embodies* techhnology. You could certainly imagine scenarios in which this would be true, but for the moment, let's think of capital as separate.

Q: The orthogonality issues still exist in the current accounting specification, no? If so, what's the motivation of the re-writing? Why don't we just use the simple lny logA logK logH specification

A: The re-writing is just a nice theory-based decomposition. She will not be estimating alpha but calibrating from national income accounts.

A: Because we are typically not going to be estimating these econometrically, the orthogonality conditions are not going to be hugely important. Instead, the goal of switching specification is to switch to measures that at least *ought* to be available from national accounts.

Q: Are we going to talk over multi-sector versions? I'm interested in knowing which notion of steady state should we use to do similar corrections to avoid endogeneity issues.

A: We will definitely get to multi-sector versions... But the endogeneity issues still apply!

Q: If our TFP estimation approach is only valid under steady-state, does this mean we are restricted to looking at countries we expect to be on their steady-state growth path? Wouldn't we expect many developing countries to be "catching up" and not in steady-state?

A: This is a challenging question that we wrestle with all the time. It's kind of a conceptual question about whether we think countries are in their steady state (or equivalently a balanced growth path)... And even if we don't literally believe that, is it a bad approximation?

Q: For Penn World Table, is this only dataset (Table) standard or recommended for learning productivity or measuring living standards in countries? What about World Bank or IMF dataset?

A: A lot of us find that the PWT is a more carefully curated data set that is harmonized more carefully. But it has a relatively limited set of variables, so there are sometimes needs to merge it with other data sets.

Q: Is it possible to study one single country instead of doing comparison? I see the Lecture is delivered with the perspective of comparing countries?

A: Yes, for sure. In looking in detail at one country, you can dig in more deeply into issues of measurement and really try to make the production function appropriate for the context. So definitely this is an important and useful direction to go!!

Q: How big a concern the reported bias in the CPI is for the calculation of TFP?

A: What's clear is that if you don't have real data on inputs and outputs, you aren't going to be able to calculate changes in TFP very effectively. Biases in the construction of CPI or other measures will always create problems for us. The broad point, in some sense, is that we can't measure TFP growth sensibly if we can't measure inputs in real terms.

Q: The difference for PPP and Exchange rate deflator for tradable goods should not matter, no?

A: Even tradable goods have a strong non-tradable component in their market prices. Also, there is pricing to market for tradables, so the law of one price fails on that front as well. The point is that even tradable prices tend to be lower in poor countries.

Q: Bigger picture question: the methods start from a Cobb-Douglas production function, but this is a strong assumption (for example it implies a constant labor share which is not necessarily true in the data). What if the true production function is different, e.g. CES? Would these type of accounting exercises still be valid?

A: With a CES, or any production function, the elasticity of output with respect to capital will depend on K/Y. The equation would be the same for very close countries, but for very different levels of K/Y, one would need to integrate over K/Y differences to get differences in Y/L.

Q: Then what is the best way to compare employment across countries in numbers or working hours?

A: I think the point is that you should always look critically at the data; it's not that there is an exact or correct way to do this, but you shouldn't assume that the numbers are unambiguous. Labor force surveys across countries use different methods and treat (for instance) household enterprises and self-employment very differently.

Q: Why should worked hours must decline with development, do we control for the working hours of other forms of labour like machinery?

A: Sorry. Not sure I fully understand the question. PWT measures labor hours, but I don’t think they adjust for capital utilization.

Q: Is informality contemplated in the data? In some countries I guess it might be important to consider this sector.

A: Different countries report data in ways that will do a better or worse job of picking up informality. This will be an important theme in this course over the weeks ahead. We may be very interested in the movement of activity from informal to formal, but we don't want to confuse it with brand-new economic activity.

A: Measurement is always a concern and challenge. There are various methods using both direct methods (surveys designed to capture informality) and/or indirect methods (imputing from labor force income, tax audit income, quantity outputs, etc.). Subsistence agriculture is estimated, for example, using land and yield per land estimates from surveys.

Q: Does self-employment/informal sector enter into the L measure in penn-world tables?

A: Great question. Typically, informal employment shows up in labour force surveys and census data as self-employment or work in own-account activities -- but it varies quite a bit across countries how exactly this is accounted. For instance, smallholder agriculture and subsistence agriculture are usually observed fairly well. What is trickier is the blurry area between home production and market production. We'll be talking more about this all through the course. It's obviously a huge issue for low-income countries!

Q: Is there a way to adjust inputs for actual usage, i.e. considering the output-gap?

A: A lot of work in macro-development has focused on trying to improve the ways in which we measure inputs. We need to adjust for quality and also for usage. Sometimes this is really difficult. For instance, we may want to adjust the for quality of land or the vintage of capital, as well as for usage rates. So the answer to your question is: yes, it's something that you can do... But there is no simple answer to *how* you do it...

A: In practice, PWT has different depreciation rates for different types of capital. As I mentioned, I think they have 9 types of capital that they distinguish. Depreciation rates for IT might be 20 times as high as structures.

Q: Is that tenable to assume all kinds of stocks have the same depreciation rate?

A: Probably not! But it's a simplifying assumption that doesn't necessarily matter a lot for most of the work we do. In a particular setting, though, it might matter -- and then you would want to consider it more carefully. For instance, in a context where you are looking at environmental issues, you might want to think about different depreciation of natural capital as opposed to physical capital... It's always an issue of making sure that you give adequate attention to the elements of your data (and model) that are important for a particular research question.!

Q: In the steady state, won't we take into consideration the rate of growth of population? (n)

A: Much of the analysis we do will be carried out on a per capita basis or per worker basis. So implicitly yes, we will take this into consideration.

Q: How many categories of 'types of capital' are there? Is there. a change that some "capital" from some countries doesn't fall properly into the categories? (thinking some IT in some countries, or some simple shovels in poor ones)

A: A great and complicated question. You could think of -- for instance -- soil organic matter in subsistence agriculture as a kind of capital. Or you could think of livestock as a form of capital. And you're right that you could also think about various kinds of information capital and other types of intangible capital. So potentially many different types of capital. Figuring out which ones are relevant in your particular context is important.

A: In the PWT 9.1, they distinguish 9 different types of capital. IT is one of them. PWT has good documentation on their website.

Q: I'm still not very clear about why using rental rate addresses the durable capital issue. Can anyone give some intuitive examples?

A: A machine that lasts 50 years will cost more than a machine that last 5 years, even if they are equally productive. So, you need to adjust for the rental rate/user cost. Practically, this matters because building last 50 years, while laptops last 5-10 years.

Q: Why are capital and labor share assumed to be the same across countries? I would imagine labor share to be much larger in developing economies.

A: You may be right. We don't really know what the labor share of the production function is.... Nor do we know that the world is really Cobb-Douglas. What is true is that, with Cobb-

Douglas, you would expect to see developing economies using much higher ratios of labour to capital than would be found in richer countries. So your intuition would hold even if the Cobb-Douglas share were exactly the same... Poorer countries would substitute labour for capital along the indifference curve, giving rise to the higher labour-intensity even if the share was the same.

Q: I would think alpha is really country-specific and time-varying. (maybe increasing alongside development) rather than 0.3 for all country for all time?

A: I would think alpha is really country-specific and time-varying. (maybe increasing alongside development) rather than 0.3 for all country for all time?

A: You may be right. Many of us have wrestled with this question, and ultimately alpha is not easily observed. Estimating production functions is pretty difficult. What is true is that even with the same alpha, you would see low-income countries producing goods more labour-intensively than high-income countries, because they would substitute labour for capital along the isoquant. So you need to separate the question of what alpha is from the broader intuition that poor countries might produce goods in a labour-intensive way.

Q: Is there any evidence on the difference in share due to TFP across industries?

A: Yes, and I think this is coming up in a minute... The TFP differences seem to be very large in agriculture, for instance.

Q: Hi, why is TFP larger in the least productive sector, agriculture?

A: Not that TFP is larger, but that TFP *differences* are especially large in agriculture, between poor and rich countries.

Q: Can we learn anything from asking the same questions within countries (i.e. regional differences in income shares) to understand what then might explain cross-country differences? One particular example being returns to human capital and investment are generally higher in urban areas, due to agglomeration, in countries of all income levels.

A: This is very much consistent with some of the work that you'll see later in the course. A lot of current research is trying to understand spatial and sectoral differences in the returns to (say) human capital and physical capital. So you are exactly right that these are interesting questions...

Q: The table with the main results shows that many (most?) developing countries have higher K/Y than the US - isn't this surprising?

A: It would be surprising if K/L were larger of course, but it is not so clear what to expect about K/Y. What this likely means is that savings/investment are not low, but instead productivity is quite low.

Q: So according to this should the developing countries actively pursue policies to reduce the share of output and labours in Agriculture?

A: What you might want instead would be to think about increasing the productivity in agriculture! But it's also true that the accounting exercise by itself does not tell us that what we are seeing is inefficient. The differences across sectors could still be consistent with

economic efficiency, in which case policies of the kind you suggest might actually *decrease* efficiency. So it's complicated!

A: This is a very interesting question, and an area of active research. The module on agricultural productivity in particular will address these issues.

A: Nothing in the accounting framework really tells us that what we are observing is efficient or not. Note that Julieta continues to talk about things 'in an accounting sense'. Nothing that comes out of this framework tells us that we are observing efficient or socially desirable outcomes. We should certainly be thinking about the importance of externalities... there is no presumption that what we see in the world is optimal!

A: the way we calibrate the elasticity of output using the payment share assumes away externalities. For example, a positive externality to human capital that exceeds what they earn would underestimate the aggregate output elasticity to human capital and the contribution of human capital. It would instead show up as a productivity difference.

Q: Are natural resource rents the only rents we want to remove? Don't we see rents in other sectors (e.g. financial, pharmaceutical)?

A: When markups are important, output elasticities exceed payment shares. This will show up as a residual, i.e. TFP. It is similar to the answer about externalities in that case.

Q: When we say per worker, how do we adjust the size of working age population, countries, because it varies across the countries and imply a significant impact on the growth outcomes

A: When we look at data in 'per worker' terms, this is typically using data on the actual labour force -- with data taken from labour force surveys and/or censuses. So it's not just taken from the working age population; labour force participation rates differ acrosss countries too. So we measure this directly.

Q: Hi! Thank you for this great lecture. There is a large literature on the value of institutions (defined as set of rules that govern societies). Where do you think the value of institutions could be incorporated in this accounting framework?

A: Institutions would show up here both in TFP ('good' vs 'bad' institutions) but might also show up in factors.... if they keep people from saving or investing in human capital. So this framework is only a starting point, and we'll need to dig in much more deeply to start to get to this point properly.

Q: Why is the Agriculture vs Non-Agriculture more relevant than any other sector comparison?

A: In lots of poor countries, there are large fractions of the workforce in agriculture, and their productivity appears to be particularly low. But there is no obvious reason why this matters more than other sector comparisons... You're right... We might also want to look at other splits.

Q: What are best research papers in this area of productivity ideas?

A: Have a look at the reading list. You'll see a ton of papers that relate to this. If you have specific areas you're looking for, shoot me an e-mail!!

Q: can you repeat the name of the paper you just mentioned about informal economy?

A: https://ideas.repec.org/a/eee/eecrev/v70y2014icp454-469.html

Q: I was wondering if there is any paper that has incorporated intangible capital for development accounting.

A: Great question. I don't have an answer off the top of my head... Anyone else??

Q: Hi, thank you for this great lecture and course! I have a question on PPP conversions. I apologize in advance if it isn't clear. Is there a way to convert a GDP time series based on the ICP PPP of a certain base year (say 2017) into a GDP series based on the ICP PPP of another base year?

A: Not sure if this is what you have in mind, but the PWT interpolates there data between benchmark years using domestic national income accounts data.

Q: Translog production function with extension and share equations. how to test endogenous growth models vs exogenous growth models?

A: We aren't going to be testing models against each other in a formal econometric sense. There are an infinite number of models that can be written down... so impossible to test them all!

Q: Taking advantage of the question that was asked previously, is there any evidence that the informal sector has a larger labor share (β) than the formal sector?

A: Great question. Seems plausible, but we don't have great data on the informal sector, sort of by definition!!