

# **Introduction to Economic Growth- I**

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## **Lecture-4**

### **The stylized facts of economic growth**

So, next, we move on to another subsection for today's lecture, which is about the stylized facts of economic growth. These facts are taken from the book by Charles Jones, which I will also mention towards the end of today's lecture, when we discuss how this course will be conducted. So what are these stylized facts? By stylized facts, we mean that these are common observations, okay? One of the objectives of this particular course is to explain some of these observations. So fact 1. Fact 1 is that there is an enormous variation in per capita income across economies. The poorest countries they have per capita income that are less than 5 percent of the per capita income in the richest countries.

How is that so? Let us take a look at some of the data. So these are the affluent countries or the rich countries, or sometimes we also call them the developed nations, and this is how some of them look like in terms of per capita GDP, which is in 2008 numbers. We will talk more about these numbers in the second week, where we will talk about how exactly this income is measured, how growth is measured, etc. But right now, at least one thing that we can clearly observe here is that these per capita or per head numbers are quite high for all these countries.

The other columns that we have in this particular table they are GDP per worker. So, sometimes there is a distinction that is made between per capita GDP and per worker GDP. So, typically, for per capita GDP, we divide the absolute GDP of a nation by its entire population. Whereas, per worker GDP, for that, we divide the absolute GDP of an economy by the number of workers. So, naturally, the number of workers in an economy will be less than the total population.

Why? Because the total population also has children. Who are not categorized as workers, they also have retired population. So, that is why, from the second column here, if we just take a look at the first row, which is the United States, we see that GDP per worker number is, you know, almost double that of per capita GDP. So, these are like fine distinctions that we make in terms of the terms that we are using, but with that, as we can see, the numbers also keep changing. Lf part rate is the labour force participation rate.

And then, in the next column, we have the average growth rate between the years 1960 to 2008, and the average growth rate for the US during this entire period is around 1.6 percent. In next week's lecture, we will also see how we can calculate these numbers by ourselves. Whereas for Japan, we see that this average growth rate during the same period has been 3.4 percent, it is one of the highest, at least in the list of countries that we see here.

For France, it has been around 2.2 percent; for the UK, 1.9 percent; for Spain, it has been 2.7 percent. There is also another very interesting concept, which we will explore again in the second week, and we will see for ourselves how we can calculate this, which is about the last column here, which is about the years to double.

What does it mean that year to double? It means how many years does it take for the GDP to double for an economy? So, for the US, it has taken 43 years, and one of the least here is Japan, which has taken about 21 years to double its income, and so on and so forth. So, this was about the affluent or the rich economies. So, before we move on to the other slides, let us try and just remember at least one number from here. Maybe let us say for the US, let us take this. So, it has been around 44,000 US dollars, which is per capita GDP.

Let us just remember that number. So, here again, here is a quick recap: What are we doing here? We are mentioning the stylized facts of economic growth, and the fact one was that there is a great disparity in these per capita numbers across nations. So, we are looking at its evidence, okay? This table is about less affluent countries. And of course, there are a bunch of such countries. Only a few have been selected here so that we can see the numbers here.

So, the columns are very similar to the earlier table that we saw. So, we will not go over each column here once again. But very quickly, we can just take a look at the numbers, and we can see how it compares remember, in the last slide, we said let us just keep in mind that for the US, it was around 44,000 US dollars per capita GDP. For China during the same period, it is important to note that when we are comparing across nations, the time period considered should also be similar. So, the time period considered here is the same as we had seen in the previous table, which is between the years 1960 and 2008.

During this time, the per capita GDP of China has been around 6,000 GDP dollars, right? For India, that has been around 3,000 US dollars. And remember, if we go back and compare in the first table what we saw, US was 44000 US dollars. So, this is the meaning of disparity that has been mentioned as stylized fact 1. And also another thing that we would like to draw attention to, if we take a look at Nigeria in this particular table, we will see that it not only has one of the lowest per capita GDP but also the average growth rate between the years 1960 and 2020 has been less than 1 percent, okay? Also, the number of years it would take to double its GDP is over a century. So, these numbers are in stark contrast to the numbers that we had seen in the previous table.

This was the previous table, and this is what we have been discussing. Now, there is also another set of countries that are known as growth miracles. Which are these countries? So these countries are Hong Kong, Singapore, Taiwan, and South Korea. Why are these known as miracle countries? Because for a very fairly long time, they were not in the category of developed countries. Their per capita GDP was fairly moderate, but then suddenly it shot up, okay? Because, it is been very sudden, because you know growth is generally it is a very gradual phenomenon.

It takes time for an economy to grow right, but these miracle countries they have grown enormously over a very short period of time. Now, this itself is an area of research that how come you know they could manage such a miraculous growth rate, which means that a very high growth rate in a very short span of time. So, this is another category. Now, if we take a look at their numbers, we will see how it compares to some of the richest economies. For instance, for Hong Kong, we see that per capita GDP is about 38,000 US dollars.

Again, remember from the first table, if we take the US as some kind of a benchmark for comparison, for the US, it was around 44,000 US dollars. For Hong Kong, this is around 38,000 US dollars, fairly close, because if we go back to the previous table, China still is 6,000 US dollars, India even lesser than that, Nigeria, Uganda are far lesser than that. So, we are now talking about comparisons. For Singapore, the per capita GDP exceeds that of the US during this time period that has been considered. It is very close to almost 50,000 US dollars.

Taiwan is close to 30,000 US dollars, so on and so forth. What we will also observe here, and that is why they fall in the category of growth miracles, is the average growth rate between the years 1960 and 2008. If you look at the numbers here, it is been in the range of 4 to 5 percent. So, this is the rate or pace at which they have grown. What is even more stark is this last column, that is pretty much why they are known as growth miracles.

We see the years to double, right? All have been less than 20. So, if we now just go back to the previous tables we had seen and try and compare them. Even here for the most developed nations, the numbers are fairly high. Whereas, for these growth miracles, these numbers are, on average, you know, about 15 to 16 years. This is why they are known as growth miracles.

As we again said, they are a group of countries where growth took place, you know, very quickly, at a very high pace or a high rate within a very short span of time. So, this is again, we are trying to make the point which is about fact 1, which is observed that there is a huge disparity in per capita income across different nations of the world. Now, these countries that are mentioned here in this particular table, they fall under the category of something known as growth disasters. Why growth disasters? Because you know, in many cases, to begin with, some of these countries, like Venezuela, were doing fairly well, but then

something went wrong, and their growth actually declined. By growth, we generally imply it is a positive number, no matter how small it is, but if something is growing or an economy is growing, it means that it is moving in a positive direction, right? So, it is inching forward.

But there are countries in the world, and this is the point of this first stylized fact that there is a huge amount of disparity that we also talked of towards the beginning of this lecture. So, these are the countries that fall under the category of growth disasters. So, there has been as we can see here the average growth rate during the same period of 1960 to 2008 has been actually negative. What it means was that previously, wherever it had started from, starting from 1960, every year in every decade, the growth rate has been lesser; negative means that you know it had gone down actually over time. So, some of these countries are Venezuela, Haiti, Madagascar, and Zimbabwe, okay? So, this is the point that we have been trying to make here that a lot of disparity in terms of not just per capita income but also in terms of growth rates is observed around the world.

This is a comparison of because the time period that was considered was between 1960 and 2008. So, this is a comparison of the world population by GDP per worker during these two time periods. The second fact that is observed is that the rates of growth that vary substantially across countries. So, data wise a part of which we have already seen in the previous four tables, we can go back there and revisit the numbers, and we will see there that for the growth miracle countries as we saw growth rates were very, very high and they were also countries that were growth disasters where growth rate has actually been negative. And for other countries more or less in general it has been positive and it has been moderate.

And since we are talking of growth and how growth rates vary across countries I just thought it makes sense. to you know represent a very popular news headline here because all the time a lot of comparison is made between you know India and China. So, this is the cover story of a very well known magazine known as The Economist. So, here as we can see the title is how India's growth will outpace China's. So, this is in the context of growth rates that we are talking about.

Stylized fact 3, growth rates are not generally constant over time. For the world as a whole, the growth rates were close to 0 over most of history, but they have increased sharply in the 20th century. For individual countries, the growth rates also change over time. So, one good thing is that the growth rate is not constant.

So, it changes over time. And the big changes in growth rates over history, they are from the pre-industrial revolution. We had seen this graph before, we had seen a very flat curve. So, that was from the pre-industrial time, when the world growth rate was close to 0 percent, to modern times, roughly about 1.85 percent. So, approximately about 2 percent per year, it is for the developed countries.

Also, big changes in growth rates have occurred within countries and these countries they tend to be they are transitioning from poor economies to rich economies like Japan, it is considered as a developed nation. China also the growth rate has been very, very high in the last decade on an average it was growing for around 9 to 10 percent. after which the growth had slowed down. So, the point being growth rate is not constant, not for any particular economy, neither is it constant for the entire world. For the entire world in the pre-industrial you know industrialized era, the growth rate of the entire world was very very low, in fact hardly any growth had taken place.

But since industrial revolution that has taken off and today also in general if we consider the developed economies, they grow on an average for around 2 percent. The rest it varies from country to country. This is something we have seen before this particular graph this is again another representation and here also we see that the beginning you know from the 20th century as we can see that this line the slope of this line has been very sharp. The slope has always been positive which indicates that there has been positive growth, but the slope tells us that how fast it has been growing. And, as we can see the starting 20th century, this you know it becomes far more steep compared to what we have seen earlier.

So, this is about the world GDP. Stylized fact 4, a country's relative position in the world distribution of per capita income is not immutable. Countries can go from being poor to being rich and vice versa. This is a very important point and it also reminds us that you know we should not be complacent in terms of growth rates. What it means is that If we are talking of economies and let us say if economies are doing well or on the contrary there are economies that are not doing well. It is not like it is cast in stone, it is going to perform like that forever because things can change over time.

Countries which remember even towards the beginning of this lecture we said in those other related questions that there are many instances in the world history where countries were affluent earlier. but then they are not so affluent now. And the reverse is actually more common that countries were not so affluent earlier, but now they are richer. So, this is the fact that is stated here that it is not cast in stone. So, for countries that are doing well, there is no guarantee that they will continue to do well forever, and also, at the same time, it is a story of hope for countries that are not doing that well.

Because, it also does not imply that they will not do well in the future. Continuing with this fact, this is what we also saw under the growth disasters table. Remember just a few slides back we were taking a look at that particular table. So the growth disasters table, this just you know gives an example of that where they were very well off in 1960s actually when compared to East Asian countries and now they are well behind compared to the East Asian countries. talking about especially Venezuela many times, people talk about Venezuela; we talk about Zimbabwe because at the beginning of the 1960s, they were doing fairly well, and then, you know, something happened.

What is that something that is very important, and that is what these courses try to explore. And these are the growth miracles just like we said that there were countries that were affluent earlier and then their performance dipped. Similarly, there were countries that were not that affluent earlier, but suddenly they became affluent. So, this is also table that we have seen before.

This is from the growth miracles table in 1960. They were from the path of starvation and destitution. Now, they are some of the richest economies of the world ok. So, the message at least I take from looking at such kind of data is that complacency when it comes to economic you know performance, growth rate etcetera should never set in because you know fates can turn. The fifth stylized fact is growth in output and growth in the volume of international trade.

They are very closely related. This is also a very interesting fact because if you go back in history we will see that trade has played a very important role and by trade I mean international trade you know explorers have gone out in the seas and oceans and explored new lands etc., and then it opened up new trade routes, we have the silk route here in Asia. So there has been a very close connection between international trade and economic growth. So, this is what it mentions that growth in trade is associated with growth in output, but not necessarily the level of trade. Level of trade means just the absolute volume that is different from growth, and we will talk more about these distinctions in the second week.

So, Japan actually does not trade much, but it is rich. So, this is the point that is being made here. Also, rapid growth in trade is not necessarily just growth in exports from East Asia like China; Korea also imports a lot more than they used to earlier. And this is a graphical representation of the correlation between the growth in trade and growth in output. And all that we can figure out from here is that it definitely does show some kind of a positive correlation.

The sixth stylized fact is both skilled and unskilled workers, they tend to migrate from poor to rich countries or from poor regions to rich or more affluent regions. This is another stylized fact. It implies that returns to both kinds of labor which it is higher in developed countries, and also, we ask the question that shouldn't scarcity in poor countries imply a large premium to skilled workers? Is that actually the case? What we mean by that, that if skilled workers has migrated from poorer regions to or, say, from, you know, less affluent countries to richer countries, then those of those, you know, workers who have stayed back and who are skilled, shouldn't they be commanding a higher premium, right, because there is scarcity now of skilled worker. So, that is both a question being asked and something that we will explore. So, now that we are done with the stylized facts and we are almost coming towards the end of the discussions for this first week.

So, what we will do is we will summarize the three big questions. That we ask ourselves in a course like this. That is why they are marked in red. The first big question is, why are some countries so rich and others so poor? Now, some of the answers that is why there is a question mark right next to it because So, these are not the comprehensive or complete answers, but perhaps some answers that we might find to this particular question.

It might be because of level difference. The level difference means that difference in just per capita GDP, the difference in income. It might be because of different levels of human capital. Now, human capital plays a very important role and human capital again is education and health. Because, ultimately when we talk about income or growth of an economy, now economy consists of people like you and me. So, what will be the income of an economy that depends on our income and our productivity? And if we think about it from a very fundamental you know angle or level.

Then our productivity or our capability to earn pretty much depends on both we should be first be healthy in order to earn, and second you know our level of education and skill. So, that is why human capital is a very, very important, you know factor, and that has been found in the literature. Apart from that, it is not just enough that you know we are earning well or we are being productive; the system should also be supportive. So, systems are very, very important in an economy and the term that we generally use in economics for this kind of system that we are referring to those are known as institutions. So, that is why the last bullet point talks about the different institutions supporting innovation or technology or adoption, technology adoption, and entrepreneurship.

So, the role of institutions also becomes important. The second big question that, okay, we understand that there is a lot of disparity around the world in terms of income, in terms of growth rate. So, naturally we ask ourselves the question that what is the engine of growth? What are the factors that propel economic growth? Again, answers and there is a question mark because this is not a comprehensive list. This is just some evidence that has been found. For instance, technological progress has been found to be one of the most you know sustainable one can say sources of economic growth. So, we will talk more about this in the third week of this course where we talk about the Solow growth model.

So, what do we mean by technological progress? So, it can be new goods; it can be better versions of old goods, or anything that enhances our productivity. Not accumulation of more physical or human capital because you know they can sustain growth only up to a certain level, but not beyond that. So, we are not just talking of growth, but we are also talking about sustainability of growth. So, it is not just that we will grow for 20 or 25 years and then there will be a slowdown. If countries want to grow forever, then there has to be sustainable sources of growth.

And ultimately, technological progress will rely on population, more people, more ideas. So, we ask ourselves the core question that: where does technological progress come from? It comes from people who innovate. And how do people innovate? How do people come up with new goods and new services, new products? It comes or the origin is always from new ideas, okay? So, the hope is that more the number of people and people also have to be skilled, that is very, very important, then there will be more ideas, and more ideas will lead to higher productivity. And then the next big question, is what creates growth miracles in some countries? This is a very interesting question.

A lot of work has been done in this particular area. Remember, a few slides back, we did take a look at that table, and we saw that on average, these growth miracle countries take about 15 to 16 years to double their income, right? So, that is a very, very short span of time. And again, what are some of the possible answers? Well, you know, just to answer this question slightly differently, that reversing all the factors that made them poor. Changing institutions to foster better technology adoption this is a point that keeps on coming back repeatedly, and in this context, I do not think it will be totally out of context here because it mentions institutions that this year's, you know, Nobel Prize you know recipient in economics, Professor Darren Acemoglu has a huge contribution in this area, actually. So therein lies the importance of institutions for fostering technological adoption and of course, changing institutions to create larger markets, and that can happen through international trade, that can happen through internal markets, so reforms are also very important, but everything should be geared up for supporting innovation and adoption. So why are we emphasizing so much on innovation and technological progress? At least theoretically, it will become clearer to us in the third week of this course, when we will talk more about this.

So, now we come to the last bit of this week's lecture. So, you can relax now well because we are going to talk about that how are we going to answer these questions. So, as we said that this particular week we are setting the stage for this course. So, by now, we have enough of background information. We did go over the motivation of this particular course, and I hope now you are curious enough to find out some of the answers to these questions. So, naturally, now the question that comes to mind is, well, we have set the stage; we have presented a lot of facts by now.

And if we are promising that we are going to find answers to at least some of the questions here, then the next question is how is it that we are going to do that. Now, a course in economic growth can be structured in several ways. There is no one single way of arriving at answers. The way I generally prefer is to build a course which is an interplay of both theory and observations. So, with that in mind, what we will do here is we will go over at least one very significant theoretical model, which is like the starting point for economic growth, and we will also combine it with some data.



Like today also we did see some data because without data, the picture will never be clear to us. Now, when we talk of the theoretical models very generally speaking, these are the broad theoretical categories because you know there are several types of growth models one can find in various textbooks or in various courses. So, there has to be, you know, some kind of streamlining for them. So, this is how they are generally streamlined. So, one category of these models, they are for countries that were rich and they continue to be rich.

Now, these are what we call the developed countries. So, this is also very intriguing that they have been able to maintain their status and that is no mean achievement so as to say. So, what really helps them to remain developed economies? So, a set of models they look into this particular question. Another set of models are there to explain the kind of growth story that we are experiencing right now that countries, which were less affluent earlier, but they are gradually on the trajectory of becoming an affluent economy. So, classification wise these countries are known as developing countries.

So, how is it that these countries are transitioning? That is the question here. I hope you can see the difference between the questions we are asking ourselves here because compared to developed countries there, the question was, you know that they are doing well, and they continue to do well. So, what are those factors that help them in doing well? Whereas for developing countries, the question is different. They were not doing that great earlier, but now they are doing well, and in the future, perhaps they will do even better. So, what is it that changed, and what are the factors that are assisting in this process? So, the class of models will fall in this particular category, where the objective is to answer the growth trajectory of developing nations. Another category that we generally find for all these theoretical models is the one that explains the story of these miracle countries.

We have already taken a look at some of the data earlier, that is, the countries that have suddenly become rich. Very few countries are in that category per se, but still, it is a miracle, right? And that is why it is interesting to note and interesting to see that what did they do differently. Because at that same point in time there were other countries as well. But clearly, these countries did something very different, which led to this growth miracle. So, some of the theoretical models fall in this category that try to explain the journey of these countries which fall under growth miracles, okay? And lastly, there are also countries that have stagnated.

We have most of the sub-Saharan African countries actually fall in this particular category where not much change has been observed for the last few decades, right? So, at the same time where there are countries that have been growing, there are countries which you know have had or they are maintaining a steady growth rate, in the same world there are countries that have completely stagnated. So, naturally there are also theoretical models that try to answer this particular question. So, why this classification has been presented here, as I said, because when we talk about growth models, okay. There are many models.

So, we first have to understand that what kind of question are we asking ourselves. So, are we looking into the story of the developed nations, are we looking into the story of developing nations, or are we looking into the story of growth failures, that is, the nations that have stagnated? Because depending upon the objective we have, depending upon the questions that we are asking we have to choose our theoretical model wisely. That is why I thought that before we proceed any further, we should clarify this, especially in terms of theoretical models. So, we will delve into, as I mentioned that in week 3, we will look into one of the most important and most celebrated theoretical models. So apart from theoretical exposure, which is also very important, we also take a look at data because without data, we would not know whether the predictions of a theoretical model actually hold true, yes or no. As far as data is concerned, we will be looking at data in the table format, which we just did a few slides back.

In some cases, the data will be represented in the form of graphs. And also by the end of this particular course, we should be comfortable in generating some graphs. So, many data sources will be mentioned. I will also show some of the data sources, how it looks like, what are the things that we should be careful about while working with data, and we should also be able to do some basic data calculations. For instance, how to calculate growth rates? There are several ways of calculating growth rates which we will see next week. So, we should be comfortable doing these exercises, okay? So, this is how we plan to conduct this course.

There will be some bit of theoretical exposure alongside with data, okay? So, what is the organization for this particular course? How will this course proceed? So, after this introductory lecture, next week we will be talking about measuring and comparing economic growth. Now, since this is a course in economic growth and repeatedly we are using the term economic growth, we should also know how is economic growth measured. After that week 3, we will be considering a framework for analysis. As we said that apart from empirical analysis, that is, you know data based analysis, we should also know that how can we explain certain things that are going on in terms of theory.

So, we do need some kind of a framework for analysis. And for that we will be introducing the Solow growth model, sometimes it is also known as the Neoclassical growth model. In week 4, we will be talking about the concept of convergence, what is known as convergence, what are the types of convergence, and whether there has been evidence of convergence, yes or no, across nations. We will also take a slightly deeper look into the concept of productivity because productivity is a very important factor; it is, in fact, one of the most important factors that drives economic growth. So, we will be spending some time on analyzing productivity, and also, towards the end, we will do a quick introduction to something known as the class of new growth models. We will be covering the Solow growth model at great length because that is like the foundation for any course in economic growth.

But we will also talk very quickly about what are these new growth models and how they differ from the new classical or the Solow growth model. Now, for this purpose, I generally use two textbooks. One is Introduction to Economic Growth by Charles Jones. In fact, some of the facts and figures that were mentioned here today are from his textbook.

There is a recent version as well or an edition, but an older edition will also do. As far as data is concerned, most of the time, I generally go back to this textbook by David Weil, which is Economic Growth. So, I generally use both these things in combination, and of course, the latest data is taken from different sources, which I will keep mentioning as and when we proceed, okay? So, to conclude this week's lecture, what we are planning to do is we would revisit some of the questions that we presented here today towards the beginning of this particular course, and we will check at the end of this course if we could find at least some satisfactory answers, not all, because to answer all these questions you know growth economics in itself, is a huge area, okay? So, one has to just keep walking if one is trying to find answers to all questions. So, we will perhaps not be able to answer all questions that we posed here, but at least we will get a flavor of how some of these questions are answered in this particular course.

So, with that, we come to the end of the first week's lecture. Hope you enjoy this lecture. Thank you very much for your attention and I will see you next week. Okay. Bye, everyone.