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Finance in Society

An Anthology in Honour
of Thore Johnsen

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Policy Consistency and Economic Growth

Finn E. Kydland

I'll be surprised if more than one or two of the contributors to this volume has known Thore for longer than I have. We had met at NHH, but I really got to know him during the year we overlapped as PhD students at Carnegie Mellon. After I returned to NHH year by year as Professor II, lasting for two decades, Thore was always the one with whom I hung out and discussed economics and other matters. I'll be curious to know what he thinks of this piece. I trust his opinion more than just about any person in the world. If it turns out he thinks I'm on thin ice with this chapter, I'll certainly have to take him seriously!

In the long run, nations prosper, in the sense of higher per-capita incomes, lower unemployment, lower poverty levels, and so on, the fewer the impediments are to steadily higher productivity, along with growing productive capacity to take advantage of the productivity growth. In large parts of the world today, however, the private-sector business environment is characterized by an extent of uncertainty that is unprecedented over the past several decades. The main reason is lack of clarity in economic policy making. In order to be properly informed and well founded, important growth-promoting decisions, such as innovative activity, investment in new productive capacity, choice of new markets, and so on, require an assessment – an expectation – of the policy environment years into the future. Important policy dimensions are tax policy, spending and debt policy, extent of trade restrictions, and the regulatory environment in general. In this chapter, I'll contend that, based on economic theory, the increase in policy uncertainty over the past decade was quite predictable. Contexts from various parts of the world, such as China, the United States, and members of the euro zone, are used as illustrations from which one can learn what may work and what's unlikely to.

In doing so, I'll draw primarily on two theoretical foundations: the aggregate production function, which is central to all of macroeconomics, including growth theory, and the finding that optimal government policy is time inconsistent. (Given that the intended target audience for this volume includes non-doctoral students, I'll spend a little extra time on the intuition of what that's all about.) For the growth of nations, I'll attribute a significant role to economic policy. I'll be motivated in part by the tremendous economic differences, for decades, if not centuries, seen across the world, differences that are hard to explain without reference to the nations' political environments. But also, considering more specifically the most recent decade, and especially what led up to, and transpired after, the global financial crisis, my contention is that what has evolved economically in various parts of the world is sufficiently different that variations in the respective nations' economic policy surely must have played a significant role. A conclusion is that it's not clear the extent of uncertainty that has faced, and is still facing, those making growth-promoting decisions in the private sector will disappear any time soon.

Income Inequality Across the Globe

The disparity in nations' income levels is astounding. To be sure, measured income (or GDP) may provide a skewed picture of the associated welfare of the typical citizen of that nation. In some countries, an extensive informal sector means that many are better off than the statistics suggest. In other cases, the statistics on per-capita income may mask considerable inequality within that nation. Still, we have to take the statistics seriously, especially when the differences are large. Western European nations, along with countries such as the United States, Canada, Australia, Japan, Korea and Taiwan have annual per-capita incomes exceeding \$30,000. Many nations hover in the \$10,000–20,000 range. And then we have all those poor nations, many in Africa, with per-capita incomes under \$5,000, some even under \$1,000.

Figures 1 and 2 display some of these contrasts. Figure 1 graphs per-capita real GDP in a diverse set of nations. (All the numbers are in constant 2005 dollars, adjusted for purchasing-power parity.) Some are notable for rather healthy and steady growth rates, doing a good job trying to catch up with the United States and Canada, which one may think of as reasonable benchmark countries. These include Korea, Hong Kong, and Japan, although Japan has faltered in the past 20

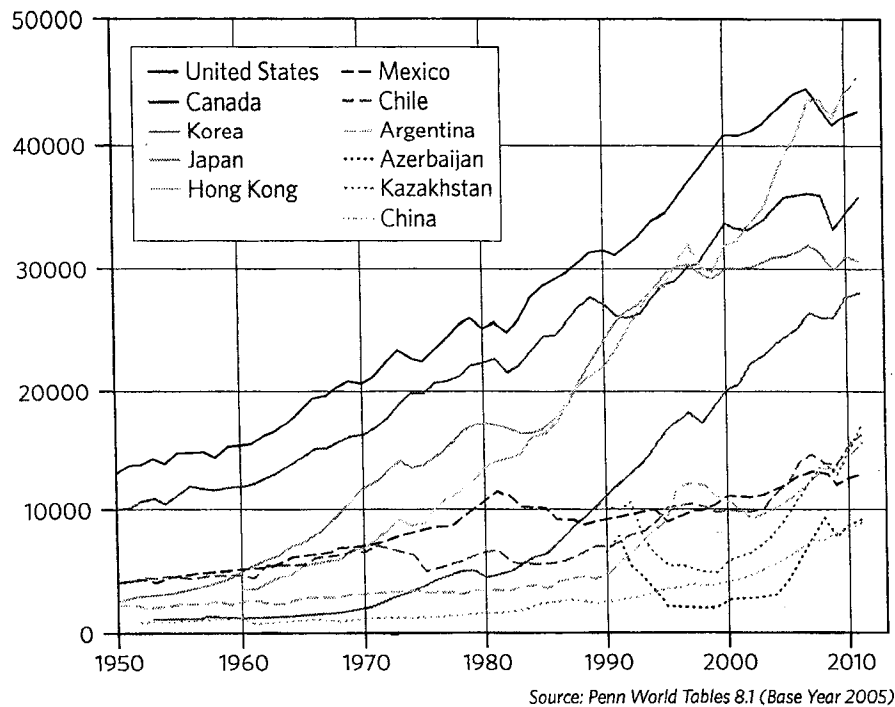


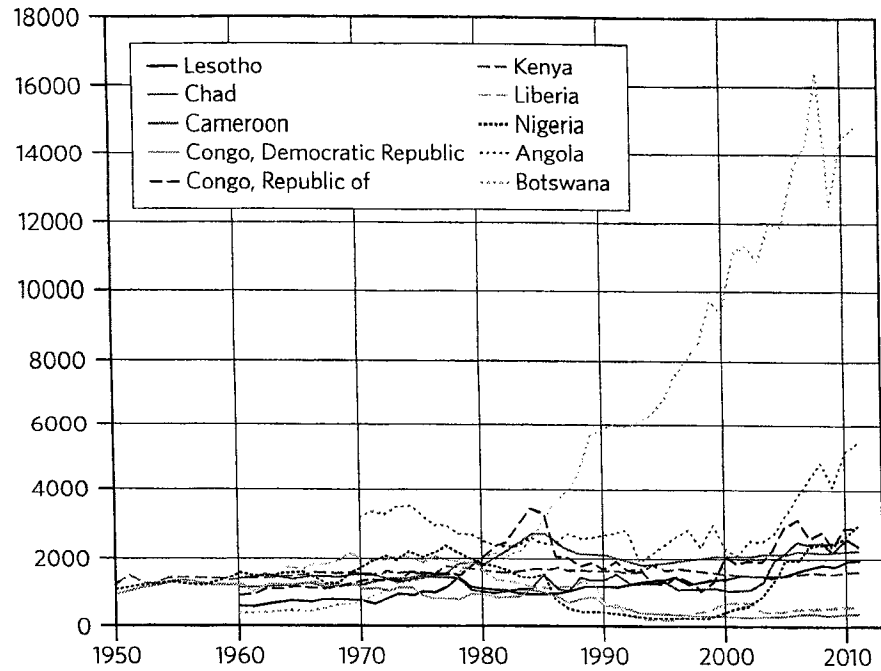
Figure 1: Per-capita Real GDP for several countries.

years. Some countries were at fairly similar levels around the 1960s, but have since grown much more slowly than those other countries. They include Argentina, Chile, and Mexico. Included in the figure are two nations that were created after the break-up of the Soviet Union, namely Azerbaijan and Kazakhstan. These are both resource-rich nations that seem to have put that wealth to reasonably good use. (Note that, as the graphs are not on log scale, a given steepness of a curve near the bottom of the chart corresponds to much higher annual rate of growth than does that same steepness near the top of the chart.) Finally, in light of the attention China gets for its economic size, it may surprise you to see its low *per-capita* GDP.

Figure 2 graphs a set of sub-Saharan nations. Observe the different scale on the vertical axis as compared with Figure 1.

A way to organize our empirical knowledge about the growth of nations is in terms of the aggregate production function, which can be written as:

$$Y_t = A_t F(K_t, L_t),$$



Source: Penn World Tables 8.1 (Base Year 2005)

Figure 2: Per-capita Real GDP for African nations.

in other words, the nation's aggregate output (say, as measured by real GDP) in any time period t is a function of its capital and labour inputs, but importantly enhanced if the technology, A_t , grows, as it should in a well-functioning economy.

Especially interesting from the perspective of this chapter is that behind the production function lie decisions by millions of households and thousands of businesses, decisions that by their nature must be very much forward looking. The activities are costly as they take place, and the returns come over years, perhaps decades, into the future. The capital stock is the sum of nondepreciated factories, machines, office buildings, accumulated as investment over the years leading up to period t . Behind the technology level lie past innovative activities whose outcomes by their nature were uncertain and in principle informed by the decision makers' view about the future environment. In the case of the labour input, as a first approximation one may think its growth is more or less

in line with the nation's population growth (or perhaps better, the growth of the working-age population). But even here, a dynamic aspect plays an important role. It's desirable for the nation and for the workers themselves that, at least in the long run, L grows faster than the population growth, as people become more skillful at market production, because of improving education levels, on-the-job learning, and so on. In other words, the accumulation of human, as well as physical, capital are important for long-run growth. (As an anecdote, the last time I was in Kazakhstan to attend the Astana Economic Forum, I was told by government officials that because of their exceptional growth, it had become difficult to find people with the right skills to keep the growth momentum going. This is of course in some ways a benign problem for a nation. As I could observe myself, at least at the university level, in recent years they've been busy improving and expanding their educational system.)

Time Inconsistency of Optimal Policy

There's a lot of knowledge available in the world. Why can it not be transferred to any place in the world, perhaps with some adaptation to local circumstances? What can account for the immense disparities we saw in Figures 1 and 2? In large part, it comes down to the nature of nations' governments, political systems and institutions, the presence of corruption or lack thereof, the kinds of restrictions they place on economic activity and trade, and so on. (An interesting account of these issues can be found in Parente and Prescott [2000].) But, perhaps surprisingly, there's a potential source of problem even for the more well-to-do nations. I'll refer to this problem as *The Time Inconsistency of Optimal Government Policy*. (See also Kydland and Prescott [1977].) It is intimately related to the forwardlookingness, just pointed out, of growth-promoting decisions as they affect aggregate A , K , and L . For example, the streams of future returns of such high-expense decisions are affected importantly by the tax and regulatory environments.

For some intuition about the problem, for now let's imagine an "ideal" world as our abstraction. Suppose there were a way to quantify, using a mathematical formulation, the welfare of the nation's citizens, today and indefinitely far into the future. A benign policy maker could then select policy (including tax policy) for the indefinite future so as to maximize this expression, that is, citizens' welfare. We may call the result *the optimal policy*. Naturally, this policy would take

into account the effects of its future portion on earlier private-economy decisions, such as the effect future capital-income taxes have on current investment. In general, such a policy would represent a prescription for what to do under various pre-specified circumstances (as governments aren't the *only* source of uncertainty in the world!)

As this policy is being implemented, suppose everything is moving along hunky-dory. But suppose also, after five years, say, the policy maker (or some hot-shot quantitative expert in his office) gets the bright idea of recalculating the optimal policy from that point on. That really ought to be unnecessary, as in our ideal world, the economic environment has not changed (in terms of the relations describing the motion of the economy) and the original calculated plan includes a blueprint for what to do also for the upcoming future. But suppose one goes ahead anyway. To everyone's surprise, perhaps (except those who understand time inconsistency!), a completely different policy path will be found than the continuation of the original plan. The implication seems to be, policy must change, in the interest of the nation's citizens. Not!!! Indeed, theory suggests that if the policy maker falls for the temptation to change, it would be bad, perhaps *very* bad, for society, as policy becomes much too focused on the short run at the expense of the long run.

What's the intuition for this inconsistency over time? Suppose we refer to year 0 as the year in which the original policy plan was determined. As mentioned, this policy took into account, among other things, the effect policy (for example tax policy) from year 5 and beyond would have on private decisions (such as capital formation) in years 0, 1, 2, 3, and 4. But when year 5 arrives, those decisions for years 0–4 have already been made. So in the reoptimization in year 5, only the policy effects on investment and other private-economy decisions in year 5 and beyond would be taken into account, resulting in a completely different policy prescription than the continuation of the original plan. In particular, the new plan would surely suggest raising taxes on the income from capital that has already been built, with the promise of reducing taxes again in the future. It might suggest increasing the inflation rate significantly so that the real value of outstanding government debt issued at fixed nominal interest rates would be dramatically reduced, indeed almost to zero if they went so far as to create a hyperinflation – not uncommon in Latin America in the 1980s. The government might try to justify the change by arguing that it's facing a near-emergency situation. But potential investors would have to worry: Might the policy maker pull

that one off again in the future? Even the mere uncertainty about whether or not it will happen again is enough to depress investment activity and therefore longer-term growth of the economy.

Now you may ask (and it's a good question): If this is the situation under "ideal" circumstances, then what about the more realistic world where policy is chosen under all kinds of political pressure from interest groups? Well, that should make it all the more likely that time inconsistency will rear its ugly head, especially in nations with weak institutions and poor property rights. In practice, the way this problem manifests itself is by making policy focused on the short run. Indeed, once one has understood this principle, an amazing number of developments in nations' economic histories can be seen in a new light.

Here's a paragraph from a comment (published in *Public Choice* 1983) I made as an assigned discussant on a conference paper by James Alt on "The Evolution of Tax Structures":

Since the government would like any change of policy to be considered a once-and-for-all change, it is natural that it would find an excuse (for example, an emergency such as a war) or another explanation in an attempt to make the new policy credible for the long run. In this sense, the above framework for thinking about changes in tax structures is complemented well by Alt's discussion on pp. 199–200. Policymakers might also argue that our understanding of the economic structure has changed and that a change of policy is necessary for that reason. It is hard to believe, however, that this could be done more than a couple of times and still achieve the intended "optimal" effects of the new policies. A likely eventual outcome is the time-consistent policy, which Kydland and Prescott (1977) showed could be quite suboptimal.

Doesn't this sound amazingly like what has happened in many parts of the world since the global financial crisis?!

Benefits of a Commitment Mechanism

An implication of this theory is that it is advantageous to shield policy making from political pressure – a kind of commitment mechanism to ensure that promised good policy will be carried out both currently and in the future. This principle has been understood and implemented by several nations in the arena of monetary policy, which is then carried out by central banks that are independent, to varying degrees, depending on the nation. For example, the Bun-

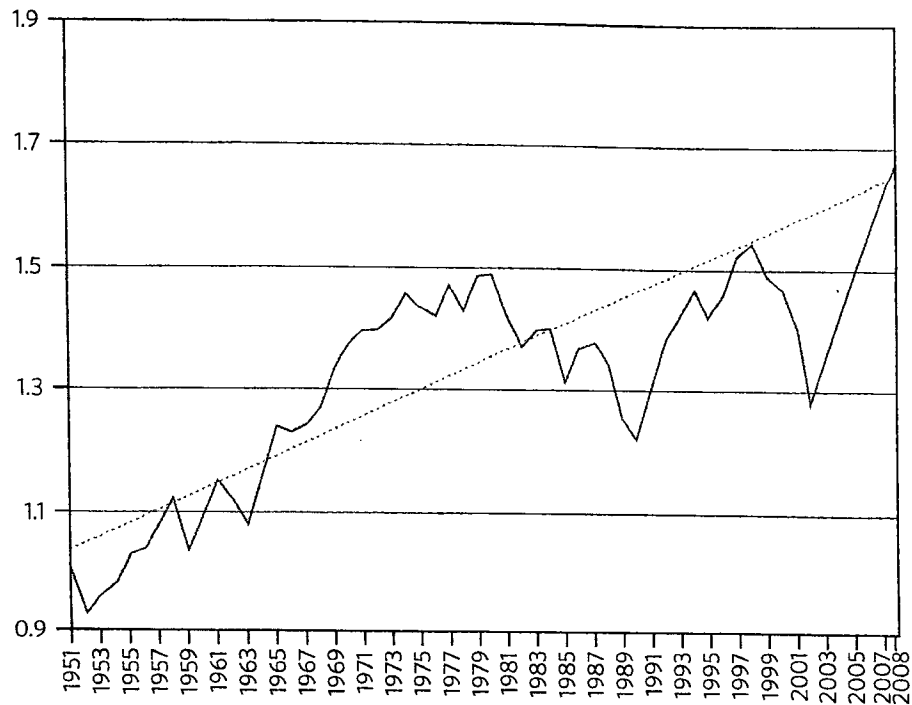


Figure 3: Argentine log real GDP per working-age person, 1951-2008.

desbank in Germany for decades was regarded as the champion of consistency and transparency. The Federal Reserve Bank in the United States hasn't been far behind. The Bank of England was formally made independent in 1997. The central banks in Scandinavia generally have been made quite independent.

At the other end of the spectrum are central banks such as that of Argentina. One sign of a central bank's independence and consistency is that the president or chairman remains in that position for a considerable number of years. In the United States, for example, Janet Yellen is only the seventh chairperson since 1951. In contrast, over the 70-year period 1945-2015, Argentina's central bank had 56 presidents – an average of only 1.25 years per president. In the especially tumultuous year of 2002, the central-bank president changed three times!

Argentina is an interesting case in that it tried a different commitment mechanism – a currency board. In 1990, the nation was recovering from the decade of the 1980s – the so-called Lost Decade – which ended in hyperinflation, defaults on government debt, losses of pensions, and during which the nation's output per capita had dropped by over 20%. Figure 3 shows real GDP per working-age

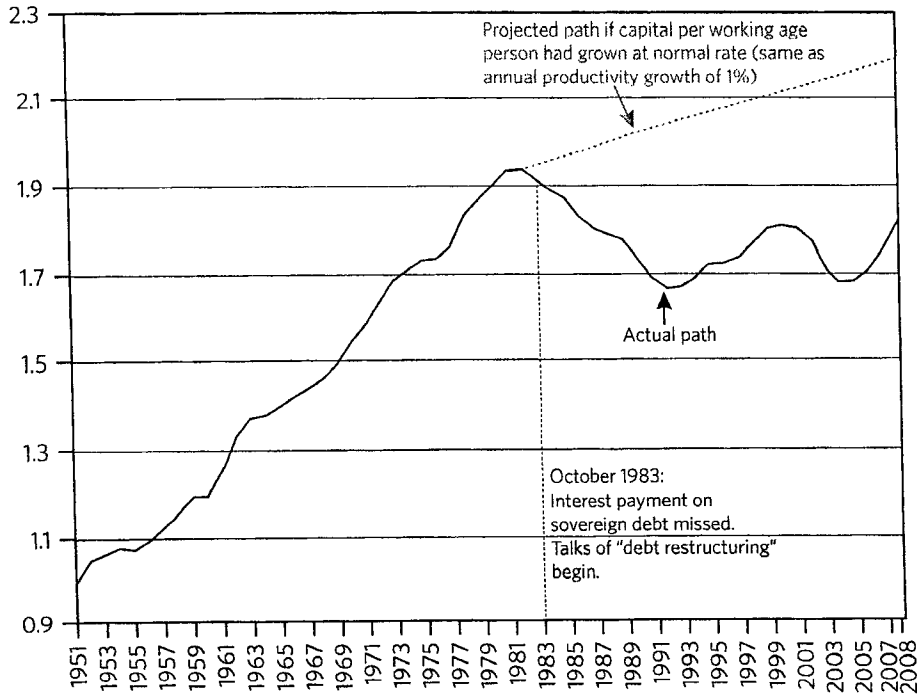


Figure 4: Argentine log capital stock per working-age person, 1951–2008

person over much of the post-World-War-II period. (Note that, unlike Figures 1 and 2, this chart is on proportional (log) scale. In such a plot, constant growth rate will be represented by a straight line, for example that drawn, with the slope of the average growth rate over the entire period.) As newly elected president, Carlos Menem decided, in 1991, in order to raise the confidence among investors in his nation, to make the Argentine peso exchangeable one for one with the dollar, accumulating enough dollar reserves to make that policy credible. To the naked eye (as in Figure 3), growth rates over the next half-dozen years look like this policy worked. But then, starting around 1998, it all fell apart. Output per capita fell again by over 20%, this time over a much shorter period of about four years, the peso had to be devalued, bank deposits were frozen, and all sorts of bad things transpired to the economy.

The explanation usually given for the failure of this “commitment mechanism” is that, while Argentina seemed to have fixed its monetary problems,

they forgot about fiscal policy, that is, tax and spending policy. Monetary policy cannot be completely separate from fiscal policy. For one thing, both are part of the same budget constraint. The provinces borrowed heavily, even in the seeming good times of the 1990s. When it became clear they wouldn't be able to pay back their debt, they came running to the federal government who had to bail them out. Federal debt ballooned and everything fell apart.

As an indication of how bad things can get when the "time-inconsistency disease" attacks, consider the behavior of Argentina's stock of business capital per working-age person (a per-capita picture would look essentially the same), which in a healthy nation ought to grow steadily over the long run. Its level peaked in 1982. As of 2008, the last year for which comparable data are available, this ratio was still about ten percent below its 1982 level. It's a good bet that, even more than three decades after 1982, it's still lower.

An opposite example is Ireland over that same time period, from 1990 until the early 2000s. Starting in the 1960s and 1970s, Ireland had made secondary education free of charge. As a consequence, by 1990 the nation found itself with a potentially skillful work force, but not enough factories and equipment with which to put all of these skills to use. So the government decided to do their best to remove any uncertainty about future taxation. They announced that if you, Irish or foreigner, set up shop here, these will be your (not very high) tax rates in 1992, 1993, and so on, all the way to 2009. Of course there may have been other favorable factors as well. The bottom line is that Ireland grew spectacularly (Celtic Tiger), in the course of one decade going from being one of the lower per-capita-income countries in Western Europe to one of the very highest (see Figure 5), surpassing Germany, the U.K., and France, for example. But alas, this story does not have a happy ending, on account of policy makers panicking at the onset of the financial crisis in 2008. In the 2000s a debt-driven property boom had taken hold. When property prices plunged in 2008, in part affected by what happened in the rest of the world, major Irish banks faced insolvency. The government made the highly questionable decision to bail them out, in the process saddling tax payers with a huge increase in government debt. This ending, however, doesn't take away from the lesson from the experience in the 1990s, when removal of uncertainty about the tax environment for the foreseeable future encouraged companies, foreign and domestic, to establish and expand productive capacity in Ireland.

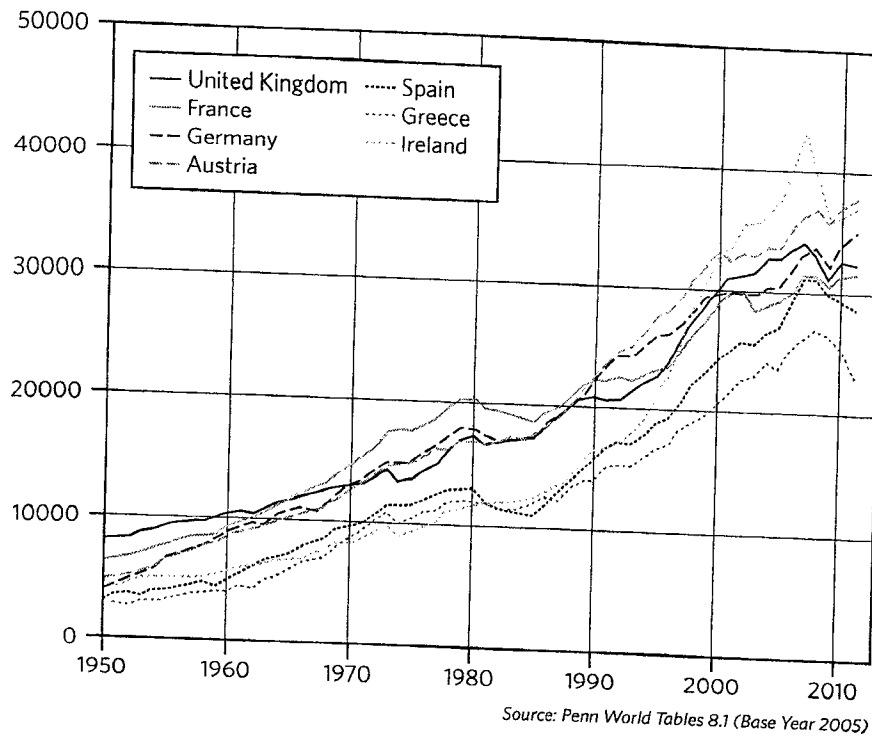


Figure 5: Per-capita Real GDP for European nations.

Note the important role of fiscal policy in the adverse outcome in Argentina and in the good thing that happened in Ireland. It's hard to see how the solution to the time-inconsistency problem for monetary policy – independence from political pressure – could be implemented in the fiscal arena. So how to commit to good fiscal policy? (I sometimes suggest that if some hot-shot young economist comes up with a solution to that problem, then in 30 years he may get to stand before the King of Sweden and accept an important prize!) At this point, at least, the case of Ireland seems too much like an aberration. How many nations would be likely to commit to something analogous?

Rebuild Credibility?

An interesting question is: If a nation, such as Argentina, falls prey to the “time-inconsistency disease,” how easy is it to rebuild its credibility? The answer has to be, not easy at all. As already mentioned, Argentina, after the Lost Decade of the

1980s, seemed to grow at acceptable rates. It is possible, however, to “check the temperature” of a nation using a standard growth model as the “thermometer.” As reported in Kydland and Zarazaga (2007), with the aid of the best available measurements, this “thermometer” showed that Argentina was “ill,” that in light of its technology level it should have grown much faster even over the 1990–98 period. Especially the capital stock grew much more slowly than the model said ought to have been the case. This finding indicates that, in spite of President Menem’s best intentions, the nation still suffered from severe lack of credibility among potential investors.

But the Mere Consistency of Policy Is Not Sufficient

It is important to emphasize that policy consistency is not *sufficient* for healthy growth. Notice the word *optimal* in the description of the basic time inconsistency problem. It won’t be good if a country carries out a policy that’s consistent, but *bad*. I will argue that China is such an example. Its economic policy certainly appears quite consistent. Admittedly, China has made important strides in its development, although its per-capita income is still low by international standards.

A stylized description of how nations grow in the long run is as follows. Entrepreneurial and innovative activity takes place, resulting in new and better ways of producing things, new production processes, new products, often with the help of research and development. Factories, machines, and office buildings are needed to implement these innovative ideas. Workers are hired. Incomes grow. And so on. In order to facilitate all of this activity, however, a healthy banking system, or financial system, more generally, is important, as these costly decisions cannot be undertaken without the required funding.

As described in an article by Song, Storesletten, and Zilibotti (2011), in China banks are generally state-owned. These banks favor the state-owned companies. The state-owned enterprises have easy access to credit and, until recently at least, to cheap labor. In the meantime, the entrepreneurs with the really innovative ideas for products or ways of doing things have a hard time getting the necessary loans. They often have to save up in advance before they can implement their ideas. Naturally, activities that are relatively intensive in labor rather than capital are easier to finance. The overall result is a huge waste of resources. In

other words, with the same use of resources, China could have grown substantially faster than their already high growth rates. It's a good bet that unless China opens up for more competition in the financial sector, this problem will eventually impede their ability to grow at acceptable rates in the long run.

Some Comments on Recent Events

These ideas provide food for thought about what has been going on more recently in many areas of the world, including in the United States and Western Europe. Starting with the United States, Figure 6 plots real GDP per capita post WWII. The straight line represents average growth 1947–2007 and is extended to the present. There are of course ups and downs about that straight line – what we call business cycles – but it does an amazing job in accounting for the long-run growth over these 60 years. The startling part, as further emphasized in Figure 7, which “blows up” the most recent time frame of Figure 6, is how far below the trend line the economy fell in 2008 and after – by on the order of 12 percent. And worse, unlike prior recoveries, which were typically quite rapid once the bottom was hit, so far there's not been any sign of moving back towards the old trend. On the contrary, the two curves are still diverging more than a half-dozen years on.

Of course there are several factors contributing to the severity of this recession. One thing is remarkable: Unlike past recessions, the severe decline happened without an initial slowing of productivity. Another aspect has got some attention: The decline in consumption was relatively small by recession standards. The recession is largely investment driven.

As Zarazaga and I (2016) show, a large portion of the recession can be accounted for as follows. Around 2008, the growth in the debt/GDP ratio, partly because of stimulus packages, partly for other reasons, started to generate attention in the press and elsewhere. Indeed, even before the financial crisis, the US debt had been projected to rise substantially, largely as a consequence of the “baby boomers” retiring in ever larger numbers. The Bush tax-reduction law of 2001 already called for taxes to go back up starting Jan. 1, 2011. (As it turned out, this increase was postponed until 2013.) Suppose capital owners in 2009 were struck by the sentiment that taxes would rise in the future in order to keep the debt from growing further (say, as estimated by the Congressional Budget Office). Suppose, to be specific in our model experiment, they thought

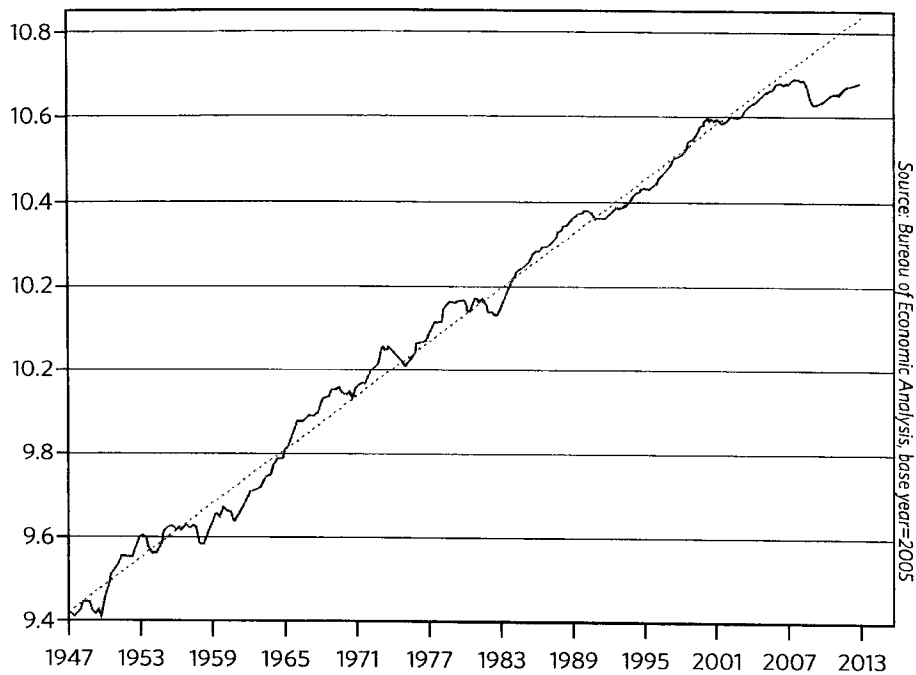


Figure 6: US log real GDP per capita, 1947–2013.

the required tax increase would last for ten years, starting in 2013. The time-inconsistency insight indeed suggests that capital income would be the main target. Our experiment, using a standard neoclassical growth model calibrated to the US economy through 2007, accounts for most of the decline in investment, about half of the decline in labor input, and it is the only explanation we're aware of that is consistent with consumption not falling much. Moreover, the experiment indicates it could take a long time to move back to the vicinity of the old trend (whose slope, we show, ought to be reduced somewhat because of demographic factors). In summary, the culprit, in large part, seems to be a sentiment that developed soon after the financial crisis that capital-income taxes would have to rise in a few years' time, which, by the way, is in line with the insight from the time-inconsistency principle. Interestingly, when we modified our experiment to make all of the tax increase fall on labor income instead of capital income, then it didn't account at all for what has happened over these years.

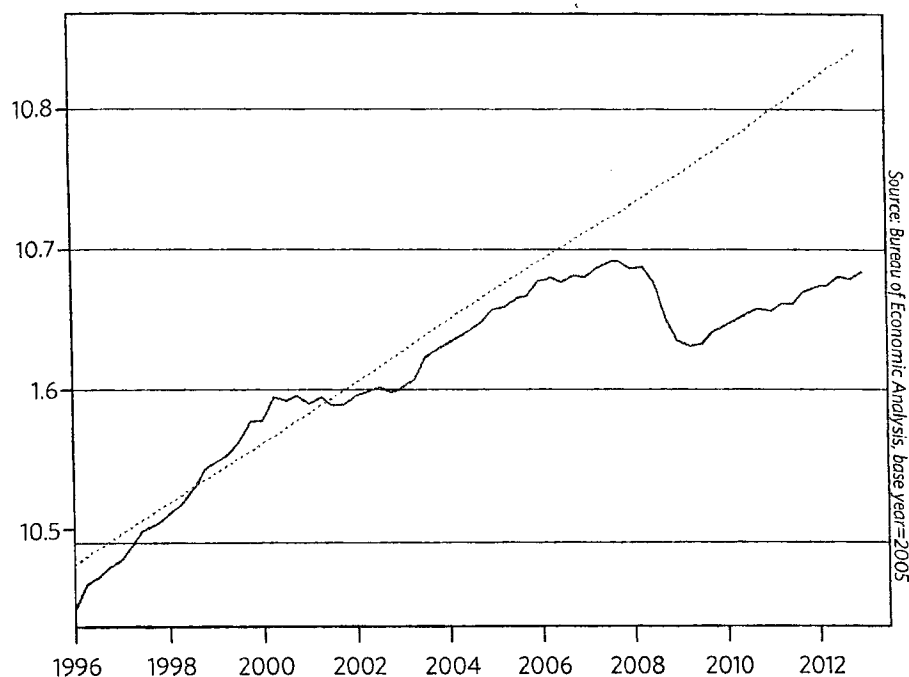


Figure 7: US log real GDP per capita, 1996–2013.

In Europe, the euro zone, with its fixed exchange rate among a large number of countries, was conceived with seemingly little attention to enforceable fiscal rules to accompany the new monetary arrangement. As we know, some nations borrowed heavily and have had to be bailed out. Even *within* a nation such as Spain, much unchecked accumulation of debt by the provinces has taken place. One is reminded of Argentina in the 1990s.

Since the failure of Greece, one often heard mentioned as potential additional problem nations Italy, Spain, Portugal, and Ireland. Let's get a sense of their backgrounds in terms of the main driving forces for sustainable growth: innovative activity and technological progress, as reflected in total factor productivity (TFP) and in labor productivity (output divided by hours worked). Figures 8 and 9 graph the logs of those two data series for each of the four nations. The average growth from 1960 to 1990 is indicated as a straight line and extended to the present. The shocking thing is that, for Spain, Portugal, and Italy, growth in both TFP and labor productivity basically came to a full stop in the early 1990s!

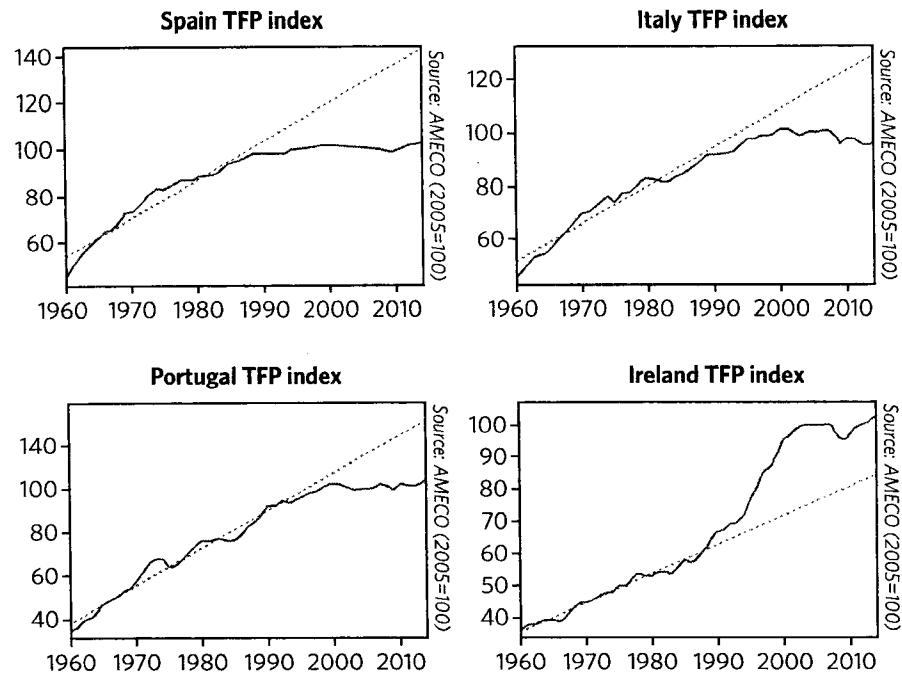


Figure 8: Total Factor Productivity.

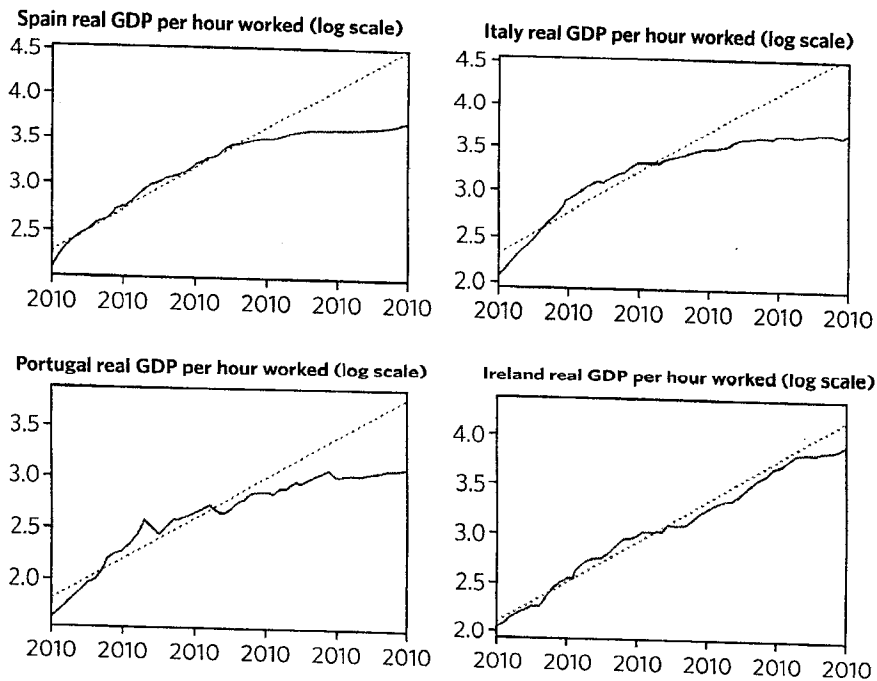
One might have suspected that the slowdown in these nations was partly a consequence of them having been tempted to take advantage of the low interest rates after joining the euro area and “live the good life.” While there could be something to that, these charts show that these nations’ problems are much more deep-seated and appear to date back to well before the euro. It’s tempting to conclude that the attention, even blame, on the euro one has heard from many sources is only a “red herring” which, if anything, has distracted from dealing with more fundamental underlying structural problems. Until these three nations figure out how to make their respective curves in Figures 8 and 9 turn back to significant positive slopes, sustainable growth will be lacking.

Now, in cooperation with Enrique Martínez-García of the Federal Reserve Bank of Dallas, I decided to entertain the idea that euro wasn’t entirely a red herring. Although memberships in the euro zone actually started in the late 1990s, their announcements were made some years before, resulting in a significant decline in the country-risk components in these nations’ interest rates. It turns out that this feature, and its subsequent repercussions, in large part can account for the productivity slowdown. In Spain, for example, one dramatic way

in which it manifested itself was as follows: Suppose we divide economic activity into two sectors – tradable and nontradable. In the late 1980s, the relatively more productive tradable-goods sector accounted for ~~two-thirds~~ of the nation's output. Twenty years later, this fraction had sunk to about one-third.

half

For comparison in Figures 8 and 9, I include the plots also for Ireland, a nation that after 2008 was sometimes mentioned in the same breath with these other three countries. TFP displays an impressive pick-up in the 1990s, but then flattens out. Eventually, so does labor productivity. Ireland surely has its problems because of the large debt, but at least from a productivity standpoint, the situation looks much less dire than for the other three nations, as the flattening started only relatively recently and from a substantially higher level. These labor-productivity numbers for Ireland currently are on the order of 40–50 percent higher than those for the other three countries. This suggests that, if Ireland makes sure not to harm investors' confidence in them and credibility as a reliable nation in terms of its future policy environment, Ireland should be in good shape over the long run.



Source: Penn Word Table 7.1 (base year=2005)

Figure 9: Labor Productivity.

The Road Forward

It is probably fair to say that an unprecedented amount of uncertainty prevails about future economic policy in European Union countries as well as in the United States. In Europe, we have seen politicians reacting to short-run developments without any clear plan for next year and beyond. As has been argued in this chapter, this kind of uncertainty is bad for growth. One cannot fault potential innovators and investors in business capital if they choose to wait on the sidelines for a while. Worse, the insights from the time inconsistency literature give reasons to be pessimistic as to whether this uncertainty will be removed soon in any meaningful way.

As already suggested, fiscal policy is the key. But unlike with monetary policy, it's difficult to see how a nation can commit to good long-run fiscal policy. Since the global financial crisis, it's too easy to claim that we're in a near-emergency situation and therefore to argue for a change of policy. Another approach is to suggest that past modeling approaches have been at fault, that new approaches are needed, and that these models call for a change of policy.

A problem with time inconsistency, even for countries with strong institutions, is that although we understand the nature of the temptation, we don't know if, or when, the country might actually fall for that temptation. Hence, growth-promoting private-sector decisions that require looking far into the future are likely to be affected, to be postponed perhaps, or even completely discarded. The most shocking thing would be if even Ireland, with its relatively high productivity, not to mention well-deserved built-up credibility, were to fall for the temptation!

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