

## **TFP myths for East Asia's fast-growing economies**

by

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A decade after the end of the Cold War, Soviet fear still stalks East Asia. The bogeyman now, however, is not Communist conquest and domination. Instead it is that East Asia may have unsuspectingly always been like the Soviets already. East Asia and the Stalinist Soviets both enjoyed high economic growth by putting to work more labor and driving into the ground more steel and concrete. Just as Soviet economic growth came to a crashing halt, so too will East Asia's.

Details differ but this, allegedly, is the dirty little secret of East Asia's putative growth miracle. In this reckoning—most identified with Paul Krugman's renowned 1993 *Foreign Affairs* article—East Asian total factor productivity (TFP) growth has ranged from tiny to non-existent. It is TFP growth that truly measures economic success. It is TFP growth that shows how creative economies are, beyond their merely building more factories and mobilizing more labor. TFP is where it's at. East Asia never got it.

Not unexpectedly, Krugman's challenge has provoked considerable reaction, from researchers and policymakers alike. A clarion call against complacency, it has had profound effect on East Asian policy-making and public debate. Increasing public awareness is always good. If, however, hype has snowballed from misunderstanding, and the challenge has unjustifiably raised doubts and engendered second-guessing, then a disservice has been done.

This article raises a warning on that second possibility. It provides no fresh TFP numbers to quibble with those already published by Krugman, Tsao, or Young (others like Sarel have already); it proposes no silver-bullet strategy for pumping up TFP (national boards have been set up, targeting  $x\%$  TFP growth here,  $y\%$  there). Instead, this article seeks only to tell the story differently, revealing in the process some lesser-known facts about TFP. It argues that TFP can mislead as an indicator of economic success. It points out that TFP myths are so pervasive that many worthwhile programs are bound to "fail", if only by TFP criteria. It calls for circumspection before writing off East Asia's economic miracle on the test tablet of TFP measurement.

**“Or do you just want to keep making sugared water?”**

To understand the model underlying TFP measurement, think of a national economy as a factory producing some unnamed soft drink. A big pounding machine draws in sugar, water, and a secret ingredient *A*. Emerging from the roar and hiss of activity comes the flow of output—a refreshing drink in the case of the factory, GDP in that of the economy. Think of sugar and water as physical capital and labor: these are the usual factor inputs. For a national economy, *A* is TFP. How much output is produced depends on the combination employed of factor inputs, including *A*.

This sugar-water analogy illustrates the importance of getting the factor mix right. If the sugar input pipes act up and start pumping many times more sugar, while the water pipes continue operating at original capacity, the output quickly becomes an undrinkable mess. The situation is saved only by draining off some of the sugar input, but then that excess sugar is wasted. A national economy too needs the right factor mix. Simply throwing more physical capital (sugar) at a fixed number of workers (water) wastes that physical capital. Depending on circumstances, there is some combination of factor inputs that is just right; deviating from that optimal mix is wasteful and unproductive.

Remember the secret ingredient *A*. Just adding only more sugar and water, without simultaneously increasing *A* gives as unpalatable a concoction as when the sugar pipes were acting up. Sustained growth is possible only if all factor inputs and *A* ramp up together. Sure, without TFP growth (more *A*), things might continue working in the short run: There might be spare *A*, previously unused, lying about the factory floor, or the soft drink’s consumers don’t immediately realize the flavor deterioration. However, in the long run, attempting to raise production—through increasing inputs of just sugar and water—without raising *A* is a dead end. Likewise, economic growth without TFP improvement must eventually slow down. Additional mobilization of capital and labor alone will get us nowhere.

This whimsical model of TFP tells the story over-simplistically. It covers ground that many readers already know, done elsewhere in more rigorous language besides. Its redeeming quality is that, unlike other descriptions, it highlights the obscure quality of TFP *A*. Outside observers, not themselves ladling *A* into the brew, never see what *A* is. There might not even be any *A*, really. They know about

A only indirectly—sugared water alone couldn't *be* this good. The soft drink's proprietors know, of course, but they're not telling. The situation for the national economy is worse: no statistician, economist, scientist, or policy-maker ever physically handles TFP; no ultimate proprietor can be found who knows for certain what economy-wide TFP is. Instead, TFP is measured as a residual: TFP growth is that growth in output left over after taking into account growth in quality-adjusted inputs of capital and labor. In other words, TFP is defined by what we cannot explain.

This has not diminished TFP luster one iota. TFP has become imbued with near-magical qualities: For countries, it is now associated with, not just overall productivity of a nation's resources, but with creativity and inventiveness. TFP might well be the killer ingredient behind the economic success of nations.

Conversely, however, what we think is TFP might be only statistical error—from our not properly understanding the engineering details of the soft drink factory or, indeed, of the national economy. Before committing national development strategies to TFP growth, it seems useful to get a better grip on TFP.

### **Where does someone have to go for good TFP these days?**

One obvious solution is to look elsewhere for TFP measurements. Step back from East Asia, and consider the OECD economies. From 1970 through 1987 the OECD country with highest TFP growth was France. Indeed, average French TFP growth rate almost doubled the US's. France is that country whose farmers, fishermen, and transport workers, going on strike regular as clockwork, bring all economic activity to a grinding halt. The French unemployment rate today is more than double the UK's and six times Singapore's. France is hardly the very model of a modern successful growth economy.

Over this same period and again across the OECD economies over all industrial sectors, agriculture had the highest TFP growth. Agriculture as the modern engine of growth? In which parallel universe?

Workers at the forefront of the computer-led New Industrial Revolution know that information technology (IT) has improved their productivity immensely. They *know* this, plain as day. These workers, if anyone, are the front-liners ladling in *A* in our factory metaphor, and in great gobs. IT investment as a fraction of total

investment has risen from 7% in 1970 to over 40% in 1996. What do TFP measurements show? Across the G7, TFP growth has plummeted to an anemic 0.8% per year from its 3.3% average over 1960–1973.

Maybe TFP isn't such a great measure of economic success.

### **TFP—who died and made it king?**

Are there direct signs that East Asian growth will slow? These economies are not crumbling with industrial decay. Singapore is the world's largest producer of computer disk drives; S. Korea invests heavily in semiconductor manufacturing; Malaysian entrepreneurs envision constructing networks of satellites, digital television, and telecommunications to link multimedia enterprises. All these industries are critical pieces of a fast-growing IT-driven world.

Consider, in particular, Singapore: Hi-tech electronic manufacturing comprises over 12% of GDP. Singapore's entire land area is blanketed with cheap and advanced invisible telecommunications links; its digital GSM telephony standard aligns it with that technology's Western European originators. Smart card usage is advanced beyond levels only now being experimented with in the UK and Canada, with the US far behind and playing catch up. Finance and business services comprise a third of GDP. Value-added in IT in Singapore contributes more to GDP growth than in the UK, and has a relative contribution almost two-thirds that in the US. Singapore has in place all elements of the "weightless economy", all essential ingredients for successfully riding the New Industrial Revolution. Even in the outdated, pre-postmodern international trade business of shipping physical molecules instead of bytes of logic, Singapore's virtual port program has generated dramatic improvements in turnaround efficiency, ranking it among the top three worldwide.

Be that as it may, shouldn't policy-makers go for growth by aiming for higher savings, better education and skills in the labor force, and greater imports of improved machines and human talent? Sure they should, very sensibly, but not in the misguided view that this will improve TFP growth. Remember, TFP is what remains *after* accounting for contributions due to quality-adjusted factor inputs. Thus, all these changes are just as likely to worsen measured TFP growth or leave it unaltered as they are to increase it. If low TFP growth is the disease, none of these proposals is a cure.

Microsoft has, over the last 20 years, been the single most successful economic entity on this planet. It achieved growth rates between 25% and 50% per year in the early 1990s. Microsoft's domination continues, now not just in its market narrowly-defined but in everything that every modern worker touches. Its products soon will be on hundreds of low-orbiting satellites circling the Earth. Microsoft achieved this success while hiring the smartest engineers, the brightest managers, the most hard-working, geekiest programmers. It spends unstintingly on the most advanced computer hardware. Microsoft attained superstar economic performance through massive infusion of labor and capital. If Microsoft's TFP growth were found to be low, what would we make of it? Not much, I suspect. Why do we think differently when it comes to the East Asian economies?

Sure, countries are not firms, but the difference here is meaningless. After all, TFP measurements are no more than mechanical production function accounting—and production functions apply to firms even better than they do to countries. Let's acknowledge successes where they are, and let them get back to doing what they do best. Growing.

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