

Commentary on Gregory Tassej's "Rationales and mechanisms for revitalizing US manufacturing R&D strategies"

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Greg Tassej's "Rationales and mechanisms for revitalizing US manufacturing R&D strategies" is a scholarly, well researched, and well argued article documenting how the United States is losing global market share in advanced manufacturing and what the US should do about it. But he also astutely analyzes the predominant neoclassical model and how holders of it fundamentally not only misread the problem, but more importantly, prescribe the wrong solution. As David Audretsch and I have argued, the neoclassical economics doctrine is a fundamentally flawed guide to making economic policy in a global, innovation-driven economy.¹

Tassej starts by documenting the extent of the problem of declining US high-tech manufacturing leadership. He documents the hollowing out of many advanced production supply chains, as more advanced manufacturing has moved offshore than has expanded in the US.

The challenge though, with effectively communicating this message is that advanced manufacturing loss in the US is a bit like the eroding foundations of beach house, every year a little bit more erodes but it goes unnoticed. It takes the arrival of the big storm that knocks the house down for people to finally become aware of what has been happening. As such, even with the bankruptcy of companies like Chrysler and GM, it's easy for the public and policy makers to be unaware of this trend. Even more troubling are the many neo-classical economists who rationalize away this trend. Many argue that we're not actually losing manufacturing share.

But this view is normally based on in part on a misreading of national output data that overstates output in the computer and semiconductors industry. Manufacturing output as a share of GDP has stayed somewhat constant between 1994 and 2008, at around 13.7%.² But when looking in more detail the picture changes. Over the last 25 years the share of

¹ Robert Atkinson and David Audretsch, "Why Washington Can't Agree on Economic Policy: Economic Doctrines and Economic Policy," Washington, DC: The Information Technology and Innovation Foundation, 2008.

² U.S. Bureau of Economic Analysis, "Real Value-Added by Industry."

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non-durables peaked around 1993 and declined from around 7 to 4.7% in 2008. The share of durables, in contrast, increased to just over 9% in 2007, with a very slight decline in 2008, leading many to the rosy conclusion that while manufacturing employment may have declined, that manufacturing output is still strong and that employment declines were due only to productivity. But taking out computers and electronic products shows a very different picture, with durable goods output share declining from 7% in 1998 to 5.3% in 2008. Overall manufacturing output minus computers and electronic products declined from 13% of GDP in 1998 to just 9.7% in 2008. Neoclassical defenders will respond that the proper measure is overall manufacturing, not manufacturing minus computers. But does anyone really think that the real inflation-adjusted value added of computers and electronic products really doubled between 2003 and 2007? The problem is that BEA counts output of computers based on improvements in Moore's law and when processing power doubles every 18 months or so it counts that in the value-added. But this clearly overstates output and provides an extremely misleading picture of the real health of the US manufacturing sector. But for those who want to ignore the real threat to the US manufacturing base, these statistics provide reassuring comfort.

Even if the deniers were to accept that properly measured manufacturing output has fallen as a share of GDP, most would offer the defense that manufacturing doesn't really matter and that the US is specializing in services. Tassey effectively rebuts this claim, by demonstrating the importance of manufacturing to running a positive balance of trade, to overall productivity and income growth, and to innovation.

Whether neoclassical economists will be able to overcome their cognitive dissonance and accept that the US high-tech manufacturing base is in trouble is a different question. For convincing most neoclassical economists that industrial composition should be a matter of concern for policy makers is a more difficult proposition. For most of them, the right industrial structure is the one that "the market" provides, because by definition market exchanges engaged in by two parties are Pareto optimal. Why else would the parties engage in them? Any attempt by policy makers to try to alter this invisible hand by increasing high tech manufacturing output can only reduce, not increase, economic welfare. This view, it should be noted, is almost unique in the world. In no other nation, perhaps with the exception of the British Commonwealth nations, does the economics profession counsel such blind faith in market processes. Tassey convincingly argues that the sectoral and occupational composition of an economy matters and that high-tech manufacturing matters and that because of a host of "market failures" market forces alone can and in the current case of the US do lead to suboptimal performance.

The next question is what has led to the decline in US high-tech manufacturing. Tassey notes that "US manufacturing firms are attempting to compete largely as independent entities against a growing number of national economies in Europe and Asia in which government, industry and a broad infrastructure are evolving into an increasingly effective technology-based ecosystem." Over the last 15 years in particular, a large number of other nations have woken up the fact that they need to compete for internationally mobile high technology manufacturing, and they have put in policies that reflect that determination. For example, in 1992 the US had the most generous R&D tax credit among the 30 OECD nations. By 2007, its rank had fallen to 17th, as nation after nation put in place more generous incentives.

Neoclassicalists will respond that global welfare is maximized by individual firms acting as independent utility maximizers, doing what is best for them individually. In fact, according to this view most efforts by policy to influence this will only make things worse. Indeed, the worst possible sin, at least in the eyes of neoclassical economists is to "pick

winners and losers” (an absurd characterization since nations only pick winners, not losers). Substituting for the wisdom of the market can only lead to a worse, not better allocation of resources, they opine.

Tassey notes that one reason neoclassical economists have been so blasé about the decline in high-tech manufacturing is that simply assert as a matter of faith that domestic resources left idle by offshoring will automatically shift to new higher productivity industries. The magic of the market will emerge. But only if one believes that economies are largely made up of “Coasian” factors of production that assemble and reassemble on the basis of prices could one take this view seriously.

In fact, losing corporate competitions in knowledge-based industries means losing much more than just the firms. It means losing deeply embedded and hard to replicate knowledge. It means that it can be very difficult to recreate value from these dispersed pieces of value now represented by unemployed workers, vacant offices, and underutilized suppliers. As John Zysman notes, “If the production of one sector using highly trained science-based engineering drops, those workers and the training they embody cannot easily be used in other sectors.”³ Perhaps the simplest way to put it is this way, if America were to lose a company like Boeing for example, in all likelihood it could not rely on market forces, even a dramatic drop in the dollar, to later recreate a domestic civilian aviation industry. For to do so would require recreating not just the firm, but it’s complex web of suppliers, professional associations, university programs in aviation engineering and other knowledge-sharing organizations.

In fact, many neoclassicalists will go so far to suggest that if Boeing were to go out of business that the US would not be worse off if resources went to lower value added activities. This is because for them the key is that the market is supposed to determine where those resources go. If they shift from Boeing to McDonalds this is fine because the market determined that this is our comparative advantage and any effort to alter the invisible hand can only lead to suboptimal results. Pangloss would be right at home.

But let’s examine this claim for a minute. First, even if this were true it’s irrelevant. For as long as some nations are acting to create robust national innovation systems—creating what regional economists have long identified as external economies (of urbanization and localization)—firms acting alone will have a hard time competing. For as Tassey points out an individual US firm (with equity market pressures to get high returns in the short term) will be competing against individual foreign firms supported by a host of other actors in a tight innovation ecosystem.

But it’s also not true. As Tassey correctly illustrates, there are a wide range of market failures, including but not limited to externalities, that are endemic in high tech industries and markets. Policies that effectively address these market failures will all else equal, lead to superior results for firms that benefit from them than for firms that are simply atomistic utility maximizers.

Moreover, Tassey points out is that many other nations engage in a host of unfair trade practices. It’s one thing to have an innovation policy for manufacturing; this benefits the entire world. But to systematically distort trade and investment, as China is the current leader in, through tariffs, currency manipulation, intellectual property theft, protectionist standards, forced production offsets, etc., is quite different.

³ John Zysman and Abe Newman, *How Revolutionary is the Revolution: Will There Be a Political Economy of the Digital Era*, Berkeley Roundtable on the International Economy, Working Paper 161 March, 2004.

Why aren't neoclassical economists taking to the streets protesting this blatant attack on the invisible hand. The answer is two-fold. On the one hand they don't believe that countries actually compete, only nations do. As Paul Krugman argued in 1994, "it is simply not the case that the world's leading nations are to any important degree in economic competition with each other, or that any of their major economic problems can be attributed to failures to compete on world markets."⁴ Problem solved. It doesn't matter. But Krugman is wrong. Of course countries compete. If international competition leads to changes in industrial composition in a nation so that high wage jobs decline and low wage jobs grow, this clearly leads to a reduction in national economic welfare.

The second and more cynical reason neoclassicalists turn a blind eye to blatant foreign mercantilism targeting US technology leadership is that they worry so much that any critique would embolden protectionists at home. So they keep their mouths shut and pretend that all is fine. In fact, it is their silence that drives many parties towards the protectionism they fear. If we aren't going to fight foreign protectionists, advocates reason, then at least let's protect our own economy.

Finally, Tassej provides a framework for structuring a manufacturing-focused innovation policy. Tassej's technology elements model is much more sophisticated and accurate than the neoclassical model which not only posits an overly simplistic innovation process (the linear model) but assumes that it is only basic research which requires a government role. As Tassej correctly points out, generic platform technologies, infra-technologies and risk reduction all also require a public-private approach. What are essentially ideological statements put forth by neoclassical economists, such as the role of government is not to support applied research are supported by little logic and even less data and only serve to stop, not advance, needed reasoned analysis and discussion.

After documenting the risk to the US economy of the continued loss of high-technology manufacturing, Tassej turns to what policy should do about it. He correctly lists a range of areas of focus for federal manufacturing R&D policy, starting the fact that the US government should have an explicit one, which it does not now have. These areas include agile manufacturing system, multidiscipline-based manufacturing, advanced non-traditional manufacturing technologies, smart assembly systems, modeling and simulation, etc. Not only is there no strategy, there is no institution currently that would be able to take ownership of this strategy. To the extent any of these research areas are pursued in current federal agencies, Tassej correctly points out that it is either related to federal missions other than competitiveness. Or I would argue related to NSF whose central mission is to support university research, not innovation.

Tassej also rightly argues for should increase the R&D tax credit. As ITIF has demonstrated, the US R&D tax credit is no longer generous when compared to other nations. But rather than create a flat 20% credit, as Tassej proposes, I would instead allocate the same amount of tax expenditures and expand the Alternative Simplified Credit from 14% to more than 20% and allow process R&D to be a qualified expense. The advantage of doing this is that because the ASC only applies to R&D expenditures above 50% of base period expenditures (defined as the average of the last 3 years), a higher rate can be instituted for the same cost, thus having a larger incentive effect for companies to expand their R&D. Second, under current law only product R&D is eligible for the credit. But a key source of US manufacturing renewal will come from more advanced production

⁴ Paul Krugman, "Competitiveness—A Dangerous Obsession," *Foreign Affairs*, March/April 1994 Vol. 73, no. 2.

process. Allowing companies to take a credit against process R&D investments would spur more of this kind of research.

Tassey rightly critiques the failure of analysis and logic on the part of the neoclassical camp. However, their failure stems from more than faulty analysis, it stems from more fundamental problem. If neoclassical economics is anything it is the study of price-intermediated markets and the allocation of goods and services in those markets. And for many parts of the economy this is a useful field of study. If the price of wheat goes up, people consume less wheat and more barley. But what determines economic prosperity now is not so much what happens in price-intermediated markets, but rather what the institutions in markets are doing, particularly what they are doing to be more productive and innovative and where they are doing it. This is why Tassey can say that “the central failure of current economic growth models is the assumption that shifts in relative prices will automatically elicit a Schumpertarian-type efficient reaction from domestic private markets—namely an adjustment involving development/assimilations of new technologies to replace offshored ones.” When all you have is market, everything is a price response. In contrast, when all you have are institutions embedded in a complex system, then everything is complicated and not prone to ideological proclamations.

Finally, while I believe that this is an excellent and important article, let me point to two issues that Tassey may want to think more extensively about. The first relates to currency. Tassey states that no economy has ever prospered from depreciating its currency. He is right in the sense that the ultimate goal is to have a strong currency, but only a strong currency if the nation can afford it without running a trade deficit. Otherwise it is simply borrowing from the future generation to pay less for its imports now. The key issue regarding currency is that it should match the level of inherent competitiveness of a nation. Right now on this account the dollar is significantly overvalued, especially compared to China, Japan and some other Asian currencies. Fixing currency imbalances does not relieve the US from the responsibility of putting in place a robust high technology manufacturing policy. For the more effective that policy is, the more the dollar could go back up, making imports cheaper for US residents.

The second point concerns how nations become richer. Tassey states that “a high-income economy must be a high-tech economy.” Actually, it must be a high productivity economy, for it is only by raising productivity that per-worker income can go up on a sustained basis. Productivity grows two ways. The first is what Tassey is writing about: the shift from low value added activities to high-value added, in other words, the replacement of a low wage service job with a high wage high-tech manufacturing job. But the second, which Tassey does not mention is the across-the-board effect: the increase in productivity in both low wage services and high tech manufacturing. Virtually every other nations in the world makes the mistake of focusing the lion’s share of their efforts on shifting from low to high value added, ignoring the more important effort of raising productivity across the board, especially in non-traded sectors like retail, banking, wholesale trade, insurance, transportation, and government. In contrast, the challenge for the US is just the opposite. We have some of the most productive non-traded sectors in the world (e.g., retail), but face real challenges in the manufacturing sectors, particularly high-tech manufacturing where by the laws of comparative advantage should be strong. In this sense, a key imperative for US economic policy is to boost the competitiveness of our traded sector, particularly high technology manufacturing. And Tassey provides an excellent guide on where to start to do that.