Center for American Progress

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A Wide Array of High-Tech Imports Overtake U.S. Exports

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Introduction

Against the backdrop of slowing U.S. economic growth and rising economic uncertainty among most working Americans, we as a nation at least find comfort in the underlying resilience of an economy traditionally strong in creativity and innovation. After all, a skilled and innovative workforce has fueled American productivity and economic growth for decades, allowing the United States to remain at the forefront of global competition, especially since the mid-1990s.

Why should the first decade of the 21st century be any different?

Alas, it is. A snapshot of global trade statistics in advanced technology products since 2002 reveals that U.S. economic competitiveness in innovation may be slipping away. Surprisingly, the United States has recorded a deficit in high-technology products over the past five years. By the end of 2007, our nation's high-tech deficit reached new record highs, measured either in absolute terms or as a share of the overall trade deficit. Specifically:

- **The high-tech trade balance is growing apace.** Prior to 2002, the high-tech trade balance kept the total U.S. trade deficit lower than it otherwise would have been. While the high-tech deficit accounted for less than 4 percent of the total trade deficit in 2002, it accounted for more than 7 percent in 2007.

- **The deterioration in the high-tech trade deficit is spreading.** The growing trade high-tech deficit from 2002 to 2007 included a widening of the deficit in information and communication technology products by $57.5 billion, in opto-electronics products by $16.5 billion, and in nuclear technology products by $2.2 billion.

- **The United States is losing ground to a range of countries, led by China and Mexico.** Mexico in particular has skyrocketed onto the scene, now surpassing Malaysia as our country's second-largest high-tech trade deficit partner, with a deficit of over $21 billion in high-technology products in 2007. From 2002 to 2007, the rate of increase in the U.S. high-tech trade deficit with Mexico—at 492 percent—was higher than China's 473-percent increase.

- **There is no single reason for our growing and widening high-tech trade deficit.** The high-tech trade statistics indicate that our trading partners are moving up the value chain in high-tech products, possibly by identifying individual product niches they can concentrate on to boost their competitive edge over the United States.

What do these trends mean for U.S. economic policymakers? A rising trade deficit in our most competitive products requires a deft policy response. Our nation's total trade deficit remains high despite a recent export boom due to the declining value of the dollar, in part because the high-tech trade deficit is increasing rapidly. High-tech products that once were our most competitive exports are losing their innovative edge in world markets.

In part, we can attribute this deterioration in the U.S. high-tech trade balance to the offshoring of high-technology jobs. As more high-tech manufacturers lower production costs and use increasingly qualified workers overseas, the high-tech industry in the United States suffers.

A larger and more deep-seated problem, however, has been the dramatic difference between U.S. innovation policies and those of our global competitors. As other countries have been investing in innovation to create a skilled workforce and encourage more research and development, the United States has, by and large, neglected to make innovation a policy priority. The U.S. high-tech trade deficit finds its roots in the negligence of our innovation policy and requires a strong policy response.

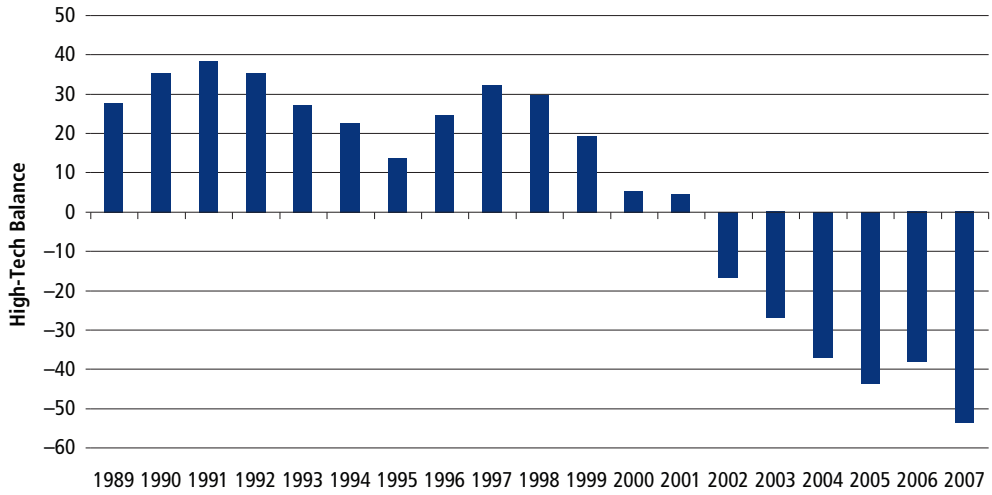
Our Nation's Surprising Technology Trade Deficit

High-Tech Trade Balance Turns Increasingly Negative

The U.S. trade balance in high-tech products turned negative in 2002 and has continued to deteriorate. By the end of 2007, the United States was running a high-tech deficit at a record $53.5 billion in nominal terms (not factoring in inflation), a drastic change from the surplus of about $20 billion a year on average in the preceding decade (see chart below).

As a percentage of the total U.S. trade deficit, the high-tech deficit had also increased to over 7 percent in 2007 from below 4 percent in 2002. Prior to 2002, the surplus in high-tech products helped to reduce the overall trade deficit to below where it was, which explains why the table below shows the U.S. trade balance in high-tech products prior to 2002 in negative territory (see chart, page 4).

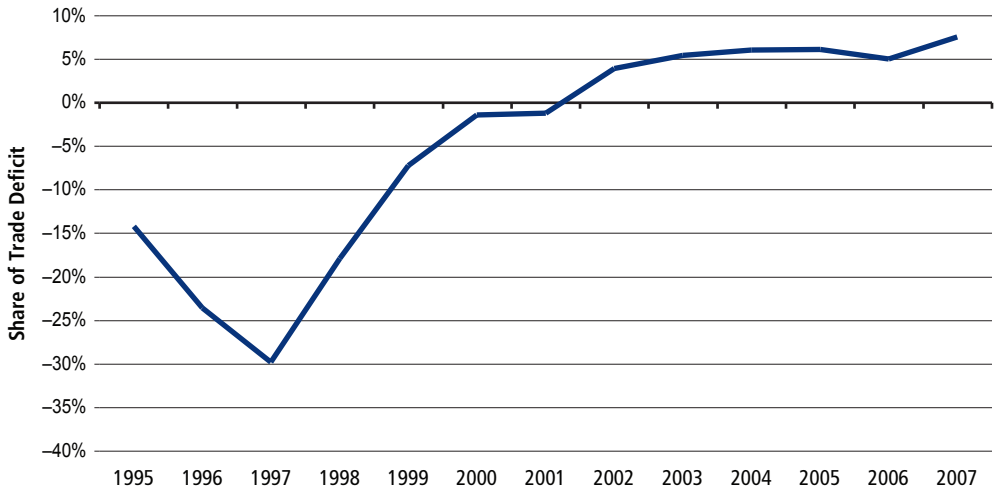
HIGH-TECH TRADE BALANCE HITS THE SKIDS
Total Trade Balance in High-Tech Products, 1989–2007



Notes: All figures are in billions of current U.S. dollars.

Source: U.S. Census Bureau's "FT900: U.S. International Trade in Goods and Services" (various issues) available at http://www.census.gov/foreign-trade/Press-Release/current_press_release/press.html.

THE IMPORTANCE OF HIGH-HIGH-TECH U.S. EXPORTS
High-Tech Trade Deficit as a Share of Total Deficit, 1995–2007



Notes: Figures are percent of total U.S. trade balance.

Source: U.S. Census Bureau's "FT900: U.S. International Trade in Goods and Services" (various issues) available at http://www.census.gov/foreign-trade/Press-Release/current_press_release/press.html.

High-Tech Trade Deficit Contributes to Record High U.S. Trade Deficits

For years, the trade surplus in U.S. high-tech trade products was a beacon of hope in a sea of ever-rising annual trade deficits. While the United States has recorded aggregate trade deficits for many years, the total trade balance fell to new record lows starting in 2000, exceeding 4 percent of gross domestic product for the first time on record. The total U.S. trade deficit received a brief reprieve during the 2000–2001 recession, but accelerated again as the economy started to recover, reaching new record highs. The ever-increasing aggregate U.S. trade deficit climbed to over 6 percent of GDP in 2006, before falling back to about 5 percent of GDP in 2007.

Even the lower total trade deficit of 2007, though, was very high from a historical perspective. The total fourth quarter trade deficit that year amounted to over 5 percent of GDP. This is higher than any total U.S. trade deficit recorded prior to the second quarter of 2004 (see chart, page 5).

United States Loses Global Edge in an Array of Products

By 2007, the United States faced deficits in five high-tech product categories. These included information technology and communications, life sciences, opto-electronics, advanced materials, and nuclear technology.

Importantly, the 2007 deficit in information and communication products such as disc drives and telecommunications equipment of nearly $105 billion exceeded all other high-tech deficits combined. These other high-tech product deficits in 2007 included $19.5 billion in opto-electronics, such as optical scanners and solar cells,

TRADE DEFICIT DRAG ON U.S. ECONOMY
Trade Balance Relative to GDP, 1947–2007

Notes: Figures are percent of GDP.

Source: Bureau of Economic Analysis's "National Income and Product Accounts" (2008) available at http://www.bea.gov/national/index.htm.

and $14.7 billion in life science products, such as Magnetic Resonance Imaging machines and microscope equipment (see table, page 6 for complete list of high-tech products by category).

Similarly, the trade balances in these same five high-tech product areas widened from 2002 to 2007. The largest decrease, totaling $57.5 billion, came in information and communications, the area also with the largest high-tech trade deficit, and exceeded all other decreases. These other decreases included a widening of the trade balance in opto-electronics by $16.5 billion—a deterioration of over 500 percent.

U.S. exports of high-tech products, by comparison, grew by only $40.7 billion during the same time period. Much of the offsetting impact came from a widening trade surplus in aerospace products, which grew by $30.6 billion. Almost all of these gains could be attributed to improving surpluses in airplanes and parts. Overall, the U.S. aerospace industry received its largest export boost from trade in aircraft, which saw a $33.1 billion surplus in 2006, the last year for which data are available. Large civilian aircraft accounted for the majority of this surplus, totaling $29.4 billion in the same year.

Additionally, the United States has been a consistent exporter of aerospace parts, especially engines. Still, these surpluses were not enough to offset the deficits in other sectors to stop the high-tech deficit from reaching new record highs. The loss of the U.S. global high-tech competitive edge results from widening trade deficits in a number of important areas and cannot be attributed to any single product area (see table, page 7).

HIGH TECHNOLOGY PRODUCTS
A breakdown by categories

CATEGORY	DEFINITION
Biotechnology	Focuses on medical and industrial applications of advanced scientific discoveries in genetics to the creation of new drugs, hormones and other therapeutic items for both agricultural and human use.
Life Science	Concentrates on the application of scientific advances (other than biological) to medical science. Recent advances, such as nuclear resonance imaging, echocardiography, and novel chemistry, coupled with new production techniques for the manufacture of drugs have led to many new products for the control or eradication of disease.
Opto-Electronics	Encompasses electronic products and components that involve the emitting and/or detection of light. Examples of products included are optical scanners, optical disc players, solar cells, photo-sensitive semiconductors and laser printers.
Information & Communications	Focuses on products that are able to process increased volumes of information in shorter periods of time. Includes central processing units, all computers and some peripheral units such as disk drive units and control units, along with modems, facsimile machines and telephonic switching apparatus. Examples of other products included are radar apparatus and communication satellites.
Electronics	Concentrates on recent design advances in electronic components (with the exception of opto-electronic components) that result in improved performance and capacity and in many cases reduced size. Products included are integrated circuits, multi-layer printed circuit boards and surface-mounted components such as capacitors and resistors.
Flexible Manufacturing	Encompasses advances in robotics, numerically-controlled machine tools, and similar products involving industrial automation that allow for greater flexibility to the manufacturing process and reduce the amount of human intervention. Includes robots, numerically controlled machine tools and semiconductor production and assembly machines.
Advanced Materials	Encompasses recent advances in the development of materials that allow for further development and application of other advanced technologies. Examples are semiconductor materials, optical fiber cable and video discs.
Aerospace	Encompasses most new military and civil helicopters, airplanes and spacecraft (with the exception of communications satellites that are included under Information & Communications Technology). Other products included are turbojet aircraft engines, flight simulators and automatic pilots.
Weapons	Primarily encompasses products with military application. Includes such products as guided missiles and parts, bombs, torpedoes, mines, missiles, rocket launchers and some firearms.
Nuclear Technology	Encompasses nuclear power production apparatus. Includes nuclear reactors and parts, isotopic separation equipment and fuel cartridges. Excludes nuclear medical apparatus, which is included under Life Science Technology.

Source: U.S. Census Bureau's "Advanced Technology Product Definitions" available at http://www.census.gov/foreign-trade/reference/glossary/a/atp.html.

High-Tech Trade Deficit Deteriorates with a Number of Countries

An examination of high-tech trade by country shows significant increases in the U.S. high-tech trade deficit with several trading partners. This deficit with China stood at $67.7 billion by 2007, or over $1 billion more than all of the United States' top high-tech deficit partners combined. Yet we can also trace our nation's rising high-tech trade deficit between 2002 and 2007 to a number of countries in Asia and Europe as well as to Mexico.

U.S. high-tech trade deficits with several Asian countries, including South Korea, Taiwan, Indonesia, and Singapore, have in fact slowed over the past five years, but these improvements are dwarfed by worsening deficits with other countries. In 2007, improvements in the high-tech trade deficits with these four countries since 2002 amounted to only $8 billion, or only 15 percent of the deterioration in the high-tech deficit with China alone.

Indeed, by 2007 the United States recorded high-tech trade deficits with a wide range of geographically diverse trading partner countries. Consider the rapidly deteriorating high-tech trade balances with Mexico, Malaysia, and Ireland. High-tech trade deficits with these countries were the second-, third-, and fourth-largest in 2007, respectively (see table, page 8).

DECLINING COMPETITIVE ADVANTAGE
U.S. Net Trade Balance in Advanced Technology Products, 2002–2007

CATEGORY	2002	2003	2004	2005	2006	2007	2002–2007 DIFFERENCE	% CHANGE 2003–2007
Biotechnology	$0.267	$0.681	$1.8	$0.374	$0.263	$1.1	$0.835	313
Life Science	–$13.6	–$17.8	–$18.3	–$13.9	–$14.9	–$14.7	–$1.1	8
Opto–Electronics	–$3.0	–$2.8	–$4.3	–$7.5	–$14.5	–$19.5	–$16.5	547
Information & Communications	–$47.4	–$57.0	–$73.3	–$83.2	–$91.6	–$104.9	–$57.5	122
Electronics	$16.2	$21.4	$21.1	$20.9	$25.5	$23.5	$7.4	46
Flexible Manufacturing	$2.0	$2.1	$5.5	$3.0	$4.4	$3.9	$1.9	91
Advanced Materials	–$0.380	–$0.475	–$0.657	–$0.649	–$0.774	–$0.718	–$0.338	89
Aerospace	$28.2	$27.1	$30.5	$37.2	$53.7	$58.8	$30.6	108
Weapons	$1.2	$0.990	$1.3	$0.904	$1.3	$1.2	$0.061	5
Nuclear Technology	–$0.066	–$1.1	–$0.667	–$1.5	–$1.4	–$2.2	–$2.2	3,276
Total	**–$16.6**	**–$26.8**	**–$37.0**	**–$44.4**	**–$38.1**	**–$53.5**	**–$32.1**	**193**

Notes: Amounts are in billions of current dollars. Changes are percent changes. Authors' calculations based U.S. Census Bureau's "FT900: U.S. International Trade in Goods and Services" (various issues) available at http://www.census.gov/foreign-trade/Press-Release/current_press_release/press.html.

Mexico in particular skyrocketed onto the high-tech export scene, surpassing Malaysia as the United States' second-biggest deficit partner in high-technology trade after China, with a negative balance of over $21 billion in 2007. From 2002 to 2007, the rate of increase in the U.S. high-tech trade deficit with Mexico (492 percent growth) was higher than with China (473 percent growth).

We also examined high-tech data on product categories and deficit countries to see if there is one particular driving force for high-tech trade deficits among the top deficit countries. Specifically, we looked at the five countries with the largest high-tech trade deficits in 2007. In each of these five countries, we considered the three high-tech product categories in which the United States has the largest bilateral high-tech trade deficits (or smallest surpluses) with the respective countries.

The results show that the high-tech trade deficit composition varies from country to country (see table below). For instance, information and communications technology is the largest high-tech deficit category in three out of the five countries—China, Japan, and Malaysia. In high-tech trade with Ireland, the United States has the largest deficit in life sciences, and in the case of Mexico, it is opto-electronic products.

Furthermore, a number of high-tech deficit categories are unique to only one of the top high-tech deficit countries. For instance, weapons technology rises to the top three high-tech deficits in the case of China, but in none of the other top four countries. Advanced materials are unique to Malaysia, flexible manufacturing and electronics only show up in trade with Japan, and biotechnology only takes a top spot in trade with Ireland. The upshot: One-third of the top three high-tech deficits with the top five high-tech deficit countries are unique to one country.

There is also substantial variation with respect to growth rates in the top high-tech deficits with these large high-tech

TOP TEN HIGH-TECH DEFICITS BY COUNTRY IN 2007
The top four countries are from three different continents

COUNTRY	2002	2003	2004	2005	2006	2007	2002–2007 DIFFERENCE	% CHANGE 2002–2007
China	–$11.8	–$21.1	–$36.3	–$46.9	–$55.1	–$67.7	–$55.9	473
Mexico	–$3.6	–$4.4	–$5.6	–$7.4	–$12.2	–$21.4	–$17.8	492
Malaysia	–$7.9	–$8.6	–$10.6	–$15.6	–$16.6	–$15.4	–$7.5	95
Ireland	–$9.8	–$11.2	–$9.7	–$9.8	–$10.2	–$11.7	–$1.9	19
Japan	–$6.8	–$5.5	–$5.7	–$6.8	–$6.3	–$8.1	–$1.3	19
Thailand	–$1.3	–$0.982	–$2.1	–$3.3	–$3.3	–$4.3	–$3.0	219
Taiwan	–$4.2	–$3.8	–$2.9	–$2.3	–$3.7	–$2.6	1.5	–37
South Korea	–$4.2	–$4.8	–$7.6	–$2.6	0.408	–$2.4	1.8	–42
Indonesia	–$1.1	–$0.868	–$0.903	–$0.833	–$0.656	–$0.258	0.803	–76
Singapore	–$1.9	–$2.0	–$0.646	0.077	2.4	2.3	4.3	–222
Total	**–$52.7**	**–$63.3**	**–$82.1**	**–$95.5**	**–$105.4**	**–$131.6**	**–$36.0**	**68**

Notes: Amounts are in billions of current dollars. Changes are percent changes. Authors' calculations based on U.S. Census Bureau's "FT900: U.S. International Trade in Goods and Services" (various issues) available at http://www.census.gov/foreign-trade/Press-Release/current_press_release/press.html.

deficit countries. For example, from 2002 to 2007 the deficit in information and communications technology products grew by less than 6 percent in Japan, but increased by over 400 percent in China.

The data also shed some light on the rapid deterioration in the high-tech trade balance with Mexico. Since 2002, the deficit in Mexican opto-electronic goods has risen from $274 million to $13.8 billion, a change of $13.5 billion—nearly 5,000 percent—and the second-largest absolute change in a high-tech product category for any of the five largest high-tech trade deficit countries.

This cross-tabulation of countries and products shows that each of the high-tech trade deficit countries seems to have followed its own unique path to generating a surplus for itself with the United States, and that there is no "one size fits all" explanation for the deterioration of the U.S. high-tech trade position.

Federal Policy Ignores Innovation

While other countries have been pushing a broad-based science and technology agenda for years, preparing upcoming generations for careers in a global innovation economy, the United States has done just the opposite. After falling behind our global competitors in math, science, and technology education, our skilled workers are entering the workforce with less education and in smaller numbers. A country that once led the way in education, the United States now finds its students ranking 24th out of 40 countries in a standardized international test of math skills.[1] The federal government invests only 0.03 percent of K-12 expenditures on R&D.[2]

This puts our country at a disadvantage that may be starting to show up in the form of our increasingly worrisome high-tech trade deficit. This policy neglect

shows up in several areas. The birthplace of the Internet, the United States now finds itself unable to provide broadband access to many of our less privileged citizens, while our broadband runs at only a fraction of the speed of that in Japan and South Korea.[3] And a look at the federal budget over the past several years reveals a stunning lack of focus on research and development. Federal investment in R&D has actually declined as a percentage of GDP, especially in important areas such as the physical sciences and engineering. Meanwhile, our nation's strict immigration policies force the most talented foreign students who come here to receive advanced technical degrees to return to their home countries, rather than staying in the United States and contributing to our economy.

The United States has been headed down a path of declining economic security and decreasing economic mobility for several years, and we are finally starting to see evidence of our neglectful economic policies in one of our most important long-term economic indicators—the high tech products trade deficit. While the U.S. economy has grown in recent years, this growth has been slow. And Americans continue to struggle at home, now facing a crumbling U.S. housing market and skyrocketing gas prices, among other problems.

TOP THREE TECH EXPORTS BY COUNTRY
Five countries boast high trade surpluses in key tech sectors

CATEGORY	2002	2003	2004	2005	2006	2007	2002–2007 DIFFERENCE	% CHANGE 2003–2007
China								
Information & Communications	–$14.7	–$24.3	–$39.2	–$50.8	–$61.2	–$74.5	–$59.8	406
Opto–Electronics	–$1.7	–$1.2	–$1.5	–$2.5	–$4.1	–$5.5	–$3.7	214
Weapons	–$0.001	–$0.011	–$0.010	–$0.062	–$0.098	–$0.097	–$0.096	10,622
Mexico								
Opto-Electronics	–$0.274	–$0.316	–$1.9	–$4.6	–$9.8	–$13.8	–$13.5	4,926
Information & Communications	–$6.5	–$7.0	–$7.7	–$7.0	–$7.0	–$10.3	–$3.8	59
Life Science	–$0.741	–$1.1	–$1.3	–$1.3	–$1.7	–$1.9	–$1.2	159
Malaysia								
Information & Communications	–$9.6	–$11.7	–$13.4	–$17.6	–$20.3	–$18.1	–$8.5	88
Opto-Electronics	–$0.267	–$0.185	–$0.094	–$0.173	–$0.156	–$0.042	$0.226	–84
Advanced Materials	–$0.020	–$0.016	–$0.014	–$0.019	–$0.018	–$0.022	–$0.002	10
Ireland								
Life Science	–$10.0	–$12.5	–$11.5	–$11.7	–$11.6	–$12.5	–$2.5	25
Biotechnology	–$0.243	–$0.289	–$0.438	–$0.520	–$0.521	–$1.4	–$1.2	478
Information & Communications	–$0.612	–$0.008	$0.060	–$0.083	–$0.291	–$0.054	$0.518	–85
Japan								
Information & Communications	–$8.6	–$8.1	–$7.9	–$8.0	–$7.6	–$9.1	–$0.496	6
Flexible Manufacturing	–$1.7	–$1.4	–$1.2	–$2.1	–$2.6	–$2.8	–$1.1	66
Electronics	$0.131	$0.063	–$0.555	–$0.874	–$0.916	–$1.3	–$1.4	110

Notes: Amounts are in billions of current dollars. Changes are percent changes. Authors' calculations based on U.S. Census Bureau's "FT900: U.S. International Trade in Goods and Services" (various issues) available at http://www.census.gov/foreign-trade/Press-Release/current_press_release/press.html.

Our country's declining productivity and widening gap between the rich and the poor are deeply rooted problems that are catching up with us quickly, evidenced by our record-low national savings rate and stagnant income growth. Meanwhile, American workers and products also face intense competition abroad. Our lack of dedication to the new global innovation economy is beginning to catch up with us and to threaten the average American's ladder to economic mobility.

The innovation agendas of many of our global competitors, in contrast, are picking up speed and, in some cases, have been doing so for years. Take Ireland, for example, the country with which we now hold our fourth-largest high-tech deficit and our largest deficits in life sciences and biotechnology products. For 20 years Ireland has been committed to transforming itself into a knowledge economy, building new universities and training centers, making huge investments in scholarships and fellowships, and increasing the sophistication of its scientific training programs.[4] Once one of the poorest countries in Europe, Ireland's dedication to an innovation agenda has now made it one of the most prosperous.

Similarly, a closer look at the specific R&D and education policies of other European and Asian countries reveals an emphasis on innovation that is lacking in the United States. In 2006, China spent over 10 percent of its GDP on R&D, surpassing Japan to become the largest investor in R&D worldwide in this category. The United States spends less than 3 percent of its GDP on R&D, ranking behind our European and Asian competitors as only the 11th largest R&D spender as a percentage of GDP.[5]

Our competitors also outshine the United States in education. The Chinese education system, for example, stresses science and technology throughout a student's academic career, bringing in science specialists to work with children as early as third grade. In many of the East Asian countries with which we compete for global high-tech trade, 90 percent of 8th grade science teachers hold science degrees and have had science education training, compared to only 60 percent of U.S. 8th grade science teachers who even hold a degree in a science-related field.[6] As the United States has neglected its innovation agenda, our competitors have continued to press forward aggressively with their own innovation policies.

Conclusion

Like the aggregate U.S. trade deficit, the deficit in high-tech products is large, broadly based, and growing rapidly. Our largest high-tech trade deficit by country is with China, and by product in information and communication products, which together account for a large portion of the overall high-tech trade deficit. Yet this deficit cannot be attributed to any single country or industry. This is worrisome since it shows that many of our trading partners are eating our lunch in the high-tech competition where they can develop individual niches.

A broad-based and rapidly rising aggregate high-tech trade deficit puts stress on an already slowing U.S. economy that in the past has relied upon America's competitive edge in high-tech manufacturing. The trade data tell us that the competitive edge seems to be slipping away in a variety of directions. Yet the high-tech trade figures at the intersection of geography and products do not fit one single explanation.

The United States is losing ground with a wide range of countries and in a broad array of product areas. There is no single explanation for this widespread deterioration. Instead, the data are more consistent with an explanation arguing that U.S. trading partners have begun to move up the value chain by finding their competitive advantage on a case-by-case basis.

From a policy perspective, the answer to reversing this high-tech trade deficit has to mirror the analysis of the problem. U.S. policymakers need to provide individuals, companies, and the government with the tools to remain innovative and competitive on a broad basis. And beginning the effort to provide such tools amid an economic slowdown could be especially important.

Persistently high trade deficits are especially worrisome during an economic slowdown. As long as U.S. companies and consumers are buying more products and services overseas than foreigners are buying in American products and services, the United States needs to borrow money from foreigners to pay for all those extra imports. U.S. companies, the federal government and state and local governments need to sell domestic assets, including not only bonds and stocks but also hotels, ports, and many other valuable fixed assets to cover the trade deficit.

So far, foreign investors have been willing to bring their money to the United States while growth remained solid and investment rates of return remained strong. But the

recent economic slowdown, following on the back of the sub-prime mortgage crisis, may change this equation. Slower economic growth and greater economic risks could make investments in the U.S. economy less attractive to foreign investors, but the opposite choice does not exist for the United States—not borrowing from overseas is not an option because the United States still has a massive aggregate trade deficit.

The United States has experienced an export boom over the past four years, in which exports expanded annually by about 7 percent to 10 percent above inflation.[7] Yet the trade deficit kept growing—in part because the high-tech trade deficit deteriorated at an eye-popping speed.

Consequently, the Federal Reserve may have to allow interest rates to rise to attract money from overseas, but taking that step could further contribute to a slowdown in economic growth.

There is little that short-term monetary policy can do to alter the long-term economic consequences of our persistent trade deficits, but policymakers today do need to consider some long-term options to reduce the overall U.S. trade deficit. Focusing on lowering the high-tech trade deficit obviously must be part of this effort.

This will require a complete rethinking of our nation's technology innovation policies, details of which the Center for American Progress presented in one of its Progressive Growth reports titled "A National Innovation Agenda." Specifically, the last few years have shown that the United States cannot simply rely on economic fundamentals, such as faster economic growth overseas and a depreciating dollar to systematically lower the trade deficit.

Instead, we need to make a strong innovation policy agenda a top priority. To do this, U.S. policy makers should:[8]

- **Increase government investment in R&D.** Focus on increasing the size and duration of National Science Foundation grants, improving understanding and use of advanced technology in K-12 schools, and supporting programs that foster excitement about and provide scholarships in science and engineering.

- **Encourage the "best and brightest" foreign students to stay in the United States and contribute to the economy.** Encourage international scientific exchange and expand the HB-1 visa program, accounting for the differences between countries with a large population of potential students and those with smaller populations.

- **Foster relationships between universities and industry.** Use federal funding to develop customized job training and associate's degrees for technicians at community colleges and provide grants to support small, focused research teams providing solutions to industries.

- **Make high-risk research high-reward research by creating incentives to pursue long-term research projects.** Expand programs such as the National Institutes of Health Director's Pioneer Award and work to create a competitive, merit-based system that rewards the most promising research projects with federal funding.

- **Build upon the potential of the green economy.** Involve the scientific and technical community in decisions

about the direction of the American energy and environmental policy. Train American workers in green jobs and green technology.

This increased federal support for research and development, education, and job training programs in 21st century industries must be complemented by policies that will spark private-sector investment in research and innovation, such as a permanent Research and Experimentation tax credit, a commitment to build thriving regional economies, and a strategy for promoting the deployment of broadband networks. Finally, we should increase the capacity of our government to understand the forces that are shaping America's economic competitiveness, particularly as it relates to our surprising high-tech trade deficit. The data should be a serious wake-up call to U.S. policymakers.

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Endnotes

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