

A photograph of a modern industrial factory floor. In the foreground, a large orange robotic arm is positioned on a metal platform. In the background, several other robotic arms are visible, working on a production line. The scene is filled with industrial machinery, metal structures, and various cables, creating a complex and busy environment.

# THE NEXT GREAT EMERGING MARKET? CAPITALIZING ON NORTH AMERICA'S FOUR INTERLOCKING REVOLUTIONS

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HARVARD Kennedy School

**BELFER CENTER** for Science and International Affairs

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Cover photo: Kuka robots work at Tesla factory in Fremont, California, Thursday, May 14, 2015. (AP)

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*A man takes a photo of the logo on a Tesla Model S sedan at a debut event in Beijing, China, Tuesday, April 22, 2014. AP Images*





## INTRODUCTION

We live in a period of considerable uncertainty about the global economy. China's growth is slowing. Japan—despite some promising signs due to “Abenomics”—and most of the Eurozone could epitomize the “new mediocre” of which IMF Managing Director Christine Lagarde has warned. India, perhaps on the threshold of the “Modi Moment,” has yet to develop convincing momentum. And Brazil is sliding into recession. There is, in short, much about which to be pessimistic.

While these traditional sources of global growth are slowing, the North American economy remains solid—and is even poised to accelerate. Some of our continent's strength is due to structural advantages, such as U.S. entrepreneurship and labor-market flexibility, the soundness of the Canadian banking system, and the competitiveness of the Mexican manufacturing sector. But the lion's share of renewed growth springs from dynamism in four key sectors: energy, manufacturing, the life sciences, and information technology.

*...the North American economy remains solid—and is even poised to accelerate.*

Unleashed, these sectors amount to four interlocking revolutions that could make North America the next great emerging market. The rapid pace of technological innovation is setting the stage for new, even unimaginable opportunities—though, to be sure, they are by no means assured. Policy choices will, in many cases, determine whether we capitalize fully on the opportunities at hand.

In brief, this report argues that:

- Technology-fueled innovation in energy production, advanced and digital manufacturing, the life sciences, and IT will drive substantial economic growth in North America.
- These technology transformations are synergistic. The technology that enabled the exploration and drilling advances that have enabled vastly

increased U.S. and Canadian energy production are not only increasing the continent's energy independence but enabling a resurgence in manufacturing, where advanced robotics and 3D printing are raising engineering standards and lowering costs. Technological advances are also the keys to development of new wonder drugs and personalized medicine, as well as to a host of breakthroughs in agriculture and food production. Meanwhile, expanding applications for IT, cloud computing, and big data portend the emergence of the "Industrial Internet" and the "Health Care Internet."

- Unrecognized by most, the United States is the leader in each one of these four technological revolutions.
- Thanks to strong political and economic relationships, this leadership gives substantial advantages to the North American economy. By further integrating their markets, Canada, the U.S., and Mexico can ensure that they sustain them.
- American policymakers and legislators can do much to make the most of these trends, many of which today are tacking against policy headwinds. Government

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funding for basic and applied research, for example, has fallen substantially. Likewise, high corporate tax rates and a low quantity of H1B visas directly undercut the competitiveness of U.S. firms. By improving our long-term fiscal outlook, sustaining high quality human capital, ramping up and better integrating the North American energy market, and improving the country's infrastructure, Congress and the White House can help promote these revolutions and seize the opportunities they present.

This paper will examine these issues in the four sections that follow. First, it will provide a brief overview of the economic situations in China, Europe, Japan, India, and Brazil. Second, it will discuss the comparative economic strengths of the North American economies. Third, it will explain the role that developments in the four key sectors have played in establishing North American competitive advantages. And, fourth, it will provide a series of recommendations for U.S. government action to capitalize on these advantages.

## GLOBAL GROWTH SLOWING

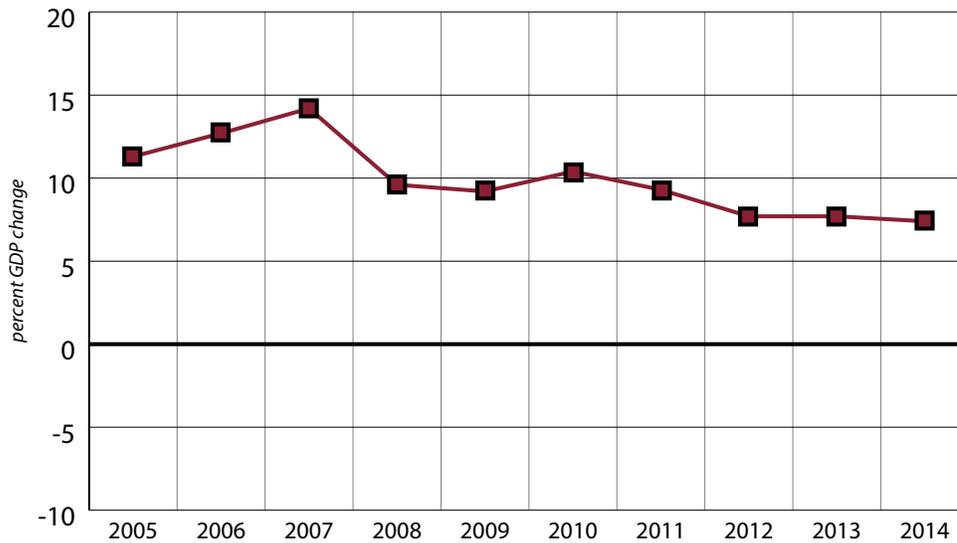
Many of the major economies of the world are either experiencing periods of lower growth or struggling to achieve sustained recoveries. In China, diminishing returns to investment-led growth, high levels of corporate and public debt, significant increases in labor costs, growing demographic challenges, and various other obstacles mean that the country is not likely to regain its extraordinary double-digit rates of growth, even as President Xi Jinping provides a steady hand at the tiller and China transitions to a value-added economy increasingly reliant on domestic consumption. In Europe, the continent's notable bright spots, like Spain, the United Kingdom, and Germany, are overshadowed by continued challenges along the periphery of the Eurozone, in addition to lingering questions about the competitiveness of major continental European economies such as France and Italy. Japan has seen a new burst of confidence with the implementation of "Abenomics," but the most challenging parts of the country's reform program are still works in progress. And while other developing countries, especially India and perhaps Brazil, may become major contributors to global growth, neither country has yet undertaken the economic reforms needed to achieve sustained double-digit GDP growth, though there is hope that Indian Prime Minister Narendra Modi's government may deepen the country's economic reforms and enable the kind of growth long hoped for in the world's second-most populous nation.

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### *China: The Slowing Engine*

China, one of the key drivers of global growth over the past decade, has seen its rate of expansion decline considerably in the past few years. Since 2010, China's growth has fallen to below 8%, compared to double-digit rates for most of the preceding decade.<sup>1</sup> Last year, China grew at 7.4%, its slowest growth in nearly 25 years, and the first time in as many years that the country missed its own growth projection.<sup>2</sup> China's growth rate is expected to continue to decline further in 2015, with the International Monetary Fund projecting a rate of 6.8%.<sup>3</sup> While an enviable growth rate compared to most other countries, it may not be enough to ensure that China gets rich before it gets old.

*GDP Growth Rate, China*



Source: World Bank

The following five factors, in particular, will conspire to prevent the return of stratospheric growth rates. As a result, while China's growth will continue to contribute substantially to global growth, that contribution is likely to be lower than in the 1990s and 2000s.

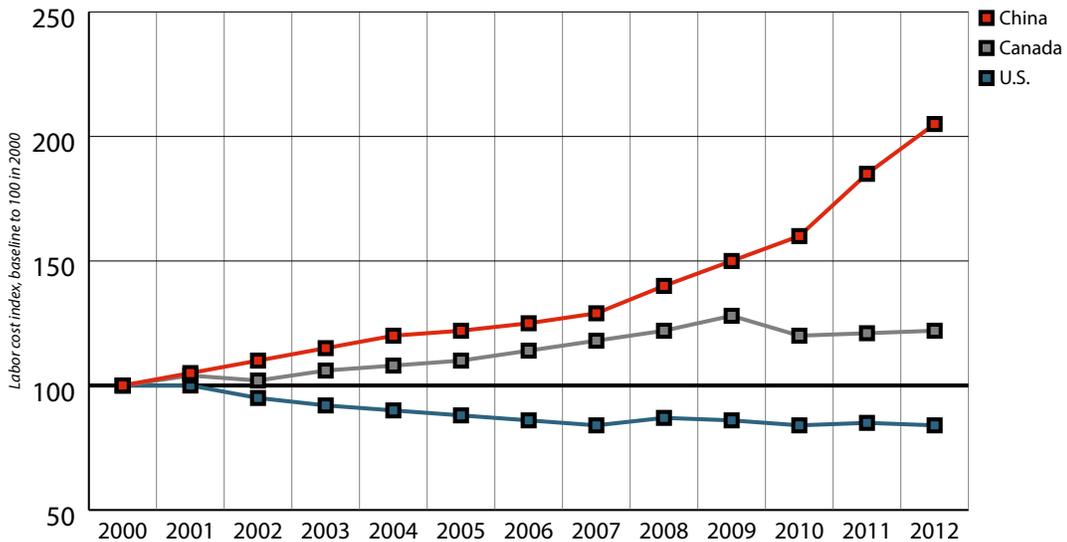
First, investment-led growth, while still powerful, is achieving diminishing returns. Fixed investment in assets like factories and infrastructure has accounted for a disproportionate share of Chinese economic growth for years, reaching nearly 50% of GDP in 2011.<sup>4</sup> By comparison, fixed investment peaked at only about 40% of GDP in South Korea during that country's similar, investment-led industrialization.<sup>5</sup> China's stimulus program—which reached nearly \$600 billion, or 16% of GDP in 2008<sup>6</sup>—has greatly improved Chinese productivity and has provided the country with far more extensive infrastructure than existed prior to the recession. At this point, however, neither investment nor public works spending can be powerful drivers of Chinese growth. Many policymakers in China want to see more balanced growth. Indeed, domestic consumption has recently increased to 51% of GDP from 48%.<sup>7</sup> Though still comparatively low (in the U.S., consumption exceeds 70% of GDP<sup>8</sup>), this increase is a positive development, but the trend has to continue to enable strong growth.

Second, both the Chinese public and private sectors have significant indebtedness, in part due to the stimulus. Cumulative Chinese debt levels have now far surpassed 200% of GDP, compared to about 125% of GDP in the years leading up to the great recession.<sup>9</sup>

Moreover, these debt levels are spread widely throughout the economy. On the corporate side, Chinese companies have surpassed American companies as the largest global issuers of corporate debt, even in the face of deteriorating profitability.<sup>10</sup> Total Chinese corporate non-bank debt rose to \$14.2 trillion last year, compared to \$13.1 trillion for American companies (which are considerably larger), and corporate debt is projected to hit \$20 trillion by 2018.<sup>11</sup> On the public side, debt levels have soared as well, especially at the sub-national level; according to the Chinese government’s National Audit Office, local and provincial government debt hit \$3 trillion in 2013, up by more than 67% since the end of 2010.<sup>12</sup>

Third, China has seen significant increases in its labor costs over the past decade: from 2004 to 2014, manufacturing wages tripled, rising from \$4.35 to \$12.47 per hour.<sup>13</sup> As a result of the higher wages, a number of companies manufacturing in China have begun to “offshore” their production to even lower-cost countries, such as Vietnam. At the same time, China’s rising labor costs have made manufacturing in North America much more competitive. One international consultancy even argues that the U.S. and Mexico are the “rising stars” best poised to benefit from rising Chinese wages, especially given North America’s higher productivity level and lower energy and transportation costs.<sup>14</sup>

*Labor Costs, China vs. Canada and the U.S.*

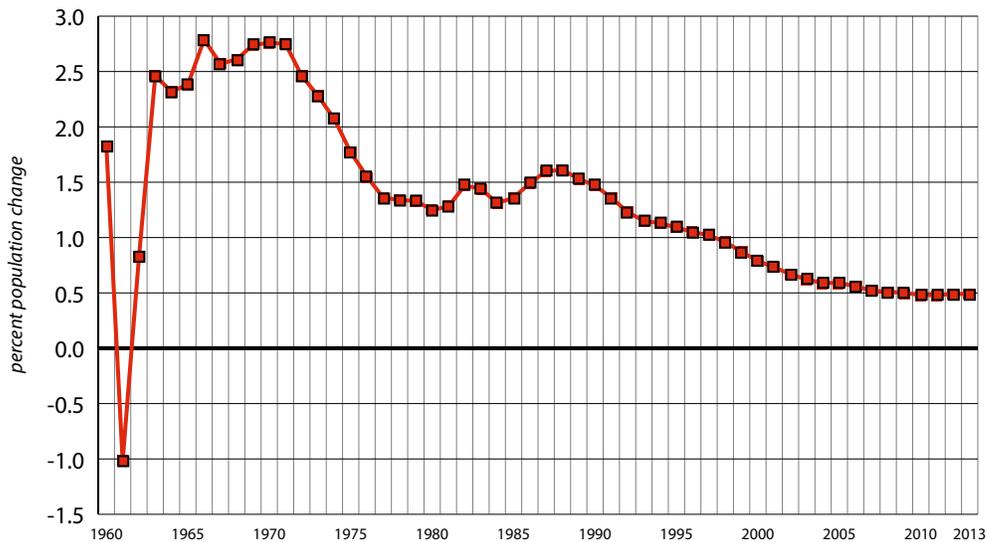


Source: Bureau of Labor Statistics, U.S. Department of Commerce

Fourth, in addition to purely economic challenges, China is facing significant demographic challenges that result from the (now slightly modified) One Child Policy. As a

result of the policy, first introduced in 1978, Chinese birth rates per woman fell from 5.8 in 1950 to 2.3 in 1980<sup>15</sup> and to 1.2 in 2010 (and 0.7 in large cities like Beijing and Shanghai).<sup>16</sup> The effect of such a considerable and rapid decline is now being seen, as the Chinese labor force has already been declining for the past five years, and is currently losing 3.7 million workers per year.<sup>17</sup> Reforms to the One Child policy notwithstanding, this problem is likely to continue: at 1.2, the fertility rate is more than 40% below the 2.1 replacement rate that would stabilize the population.<sup>18</sup> And, unlike the United States or Canada, China has never had any significant immigration to augment its population in the absence of organic growth. The decline in the working-age population will be exacerbated by the significant increase in the number of elderly. In effect, instead of “getting rich before it grows old,” as has been the case in Japan, China is at risk of “growing old before it gets rich.”

*Population Growth Rate, China*



Source: World Bank

Finally, the backlash resulting from severe environmental damage and corruption has created substantial challenges for the Chinese government. Extreme pollution has resulted in widespread protests: one retired Chinese official estimated that there were over 50,000 environmental protests in 2012 alone,<sup>19</sup> and half of the protests with more than 10,000 people in 2013 were about environmental issues.<sup>20</sup> Pollution has also received widespread social media attention, with a Web documentary on China’s pollution crisis registering 100 million viewers in just two days in early 2015.<sup>21</sup> High levels of graft remain a challenge as well; China ranks 100th out of 175 nations on Transparency International’s 2014

Corruption Perceptions Index.<sup>22</sup> The current government has started to address many of these social issues—notably by introducing concepts such as “green GDP”<sup>23</sup> and embarking on a massive campaign to root out corruption<sup>24</sup>—but the depth of both problems means that they will remain major issues for the foreseeable future.

While China has had an extraordinary run of economic growth and its growth will continue, albeit at slower levels, its expansion will likely be insufficient to be the engine for the rest of the world. Indeed, China’s capable leadership will likely focus on rebalancing the country’s economic growth, while addressing long-term threats such as corruption and environmental damage, transitioning to China’s so-called New Normal.

### *Europe: Signs of A Differentiated Recovery?*

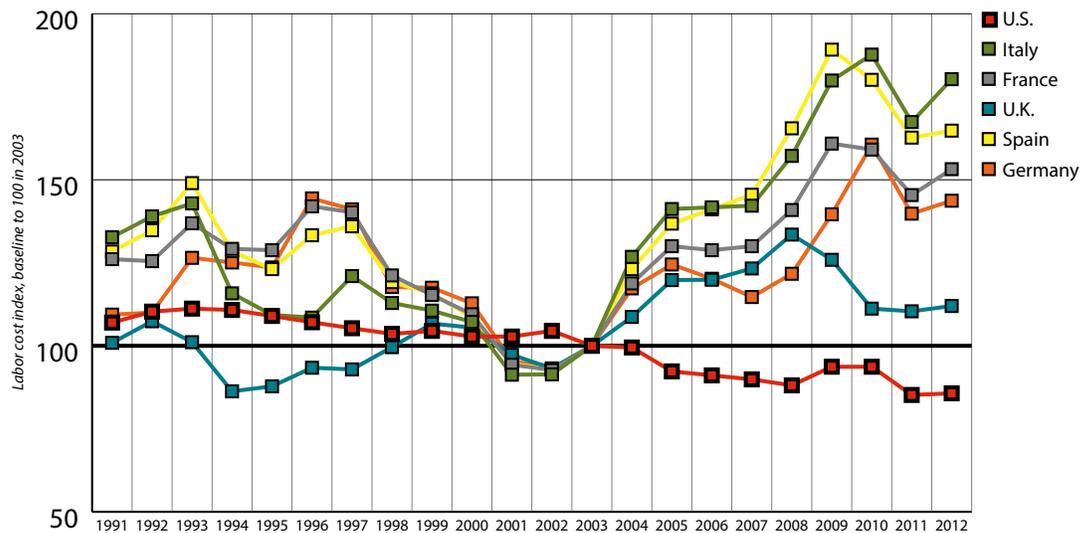
Even as the world’s fastest-growing major economy slows down, aggregate growth rates in the largest economic bloc of developed nations, the Eurozone, are likely to remain low. There are two principal challenges facing the Eurozone. First, a number of the countries on the periphery still face major unaddressed sovereign debt issues and have implemented austerity policies that have proved largely unsuccessful. Second, many countries have failed to undertake the structural reforms necessary to help their economies grow at a sustained pace. At the same time, there have been some positive indicators in recent months, as countries like Spain and the U.K. have started to grow at more significant rates, while Germany continues its solid growth.

Since late 2009, when a newly elected Greek government revealed the magnitude of the country’s debt issues, the Eurozone has been buffeted by a series of sovereign debt crises.<sup>25</sup> In addition to Greece, which is relatively small, countries like Italy have seen their abilities to manage their debt called into question, forcing them to enact significant austerity programs.<sup>26</sup> Mario Monti, Italy’s prime minister from 2011 to 2013, pushed his government to substantially cut back public spending, resulting in a difficult recession and dramatically higher unemployment, which eventually forced him from office.<sup>27</sup> Many European countries are also beset by labor regulations that have driven up labor costs and by tax regimes widely perceived

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as hostile to business. France’s 3,200-page labor code, for example, is often regarded as one of the most restrictive in the world, and gives employees such extensive rights to contest job reductions that many employers are reluctant to hire additional workers in the first place.<sup>28</sup> On the tax front, the country has levied income taxes as high as 75% in recent years.<sup>29</sup> French economic growth remains below 0.5%,<sup>30</sup> while its unemployment rate remains at 10%.<sup>31</sup>

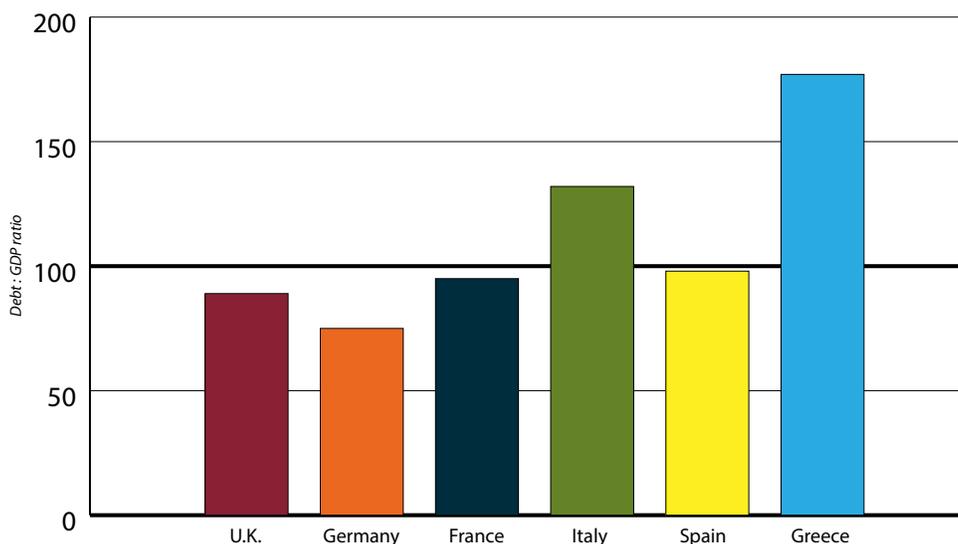
*Labor Costs, Eurozone vs. U.S.*



Source: International Labor Organization (ILO)

There are, however, some bright spots in Europe, even in some of the countries that have been troubled to date. Italian Prime Minister Matteo Renzi has pivoted his country away from austerity in favor of economic reforms, including significant reforms to Italy’s labor laws, as part of a strategy to engender higher economic growth and reduce the country’s 13% unemployment rate.<sup>32</sup> The country is projected to return to growth—albeit modest growth—this year, a trend that could be strengthened if Renzi is able to push the reforms through the Italian parliament.<sup>33</sup> Similarly, the French government has started to take incremental steps toward reforming the country’s economy. The country’s economy minister, Emmanuel Macron, has pushed to improve the French business climate by liberalizing transportation and protected professions, divesting government stakes in French companies, and allowing for increased business on Sundays.<sup>34</sup> There are even some plans to start opening up the country’s labor markets,<sup>35</sup> though further steps are clearly required, and many analysts are skeptical that reforms will take hold.<sup>36</sup>

### *Debt-to-GDP ratio, Europe*



Source: Trading Economics

Spain and the United Kingdom, for their part, have recovered impressively. In Spain, exports, foreign investment, and the availability of credit have increased substantially on the back of structural reforms to the economy, while the country's austerity program under Prime Minister Mariano Rajoy—which reduced spending on a range of social services, while reining in pensions and civil service salaries—has increased investor confidence in the country, allowing it to borrow nearly at American rates.<sup>37</sup> The result is that some growth projections for Spain now exceed 2% even as unemployment remains a significant concern at 25%.<sup>38</sup> In the U.K., several years of similar fiscal retrenchment have given way to increased consumer spending and business investment, with growth expected to reach 2.7% in 2015, and 2.5% in 2016.<sup>39</sup> While exports and productivity improvements remain areas of moderate concern, the positive growth picture has reduced unemployment to just 5.5%.<sup>40</sup>

### *Japan: Waiting for the Last Arrow*

Japan's economy, which has suffered through two "lost decades" of virtually no economic growth, has seen somewhat of a resurgence since the landslide victory of Prime Minister Shinzo Abe in December 2012.<sup>41</sup> Abe promised three "arrows" to put the Japanese economy back on track: dramatically looser monetary policy, a commitment to significantly increased spending on public works, and reforms to Japan's business climate and labor

laws, among other areas of focus for reform. The new administration has broadly delivered on the first two arrows, loosening monetary policy and undertaking a significant public works spending and fiscal stimulus campaign. Together, these initiatives have created excitement in the Japanese corporate sector—and helped drive a rapid appreciation in the stock market.<sup>42</sup>

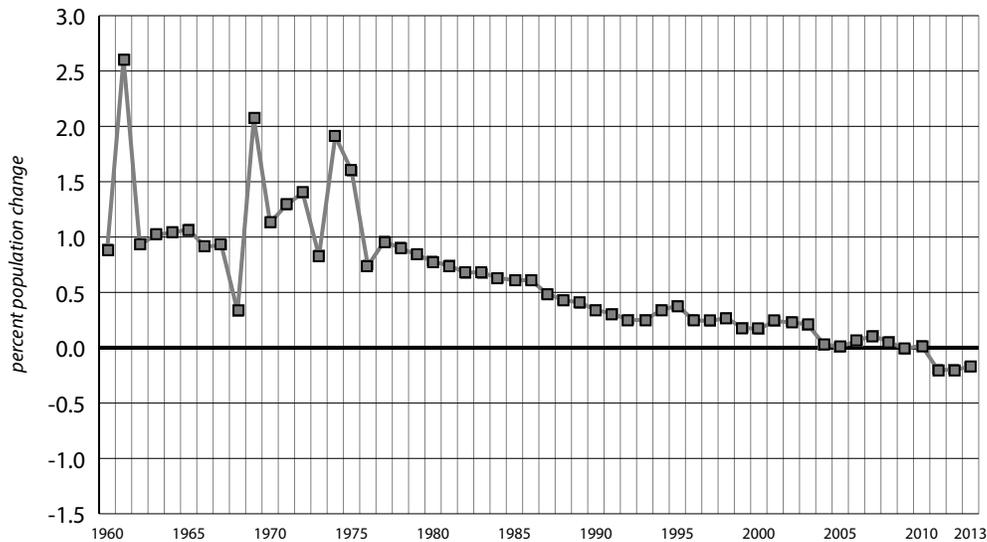
*In truth, this arrow is better described as dozens of darts, rather than a single all-encompassing reform package the government could control on its own.*

But the final arrow of Abenomics—reforms to the Japanese business sector—remains incomplete. In truth, this arrow is better described as dozens of darts, rather than a single all-encompassing reform package the government could control on its own. The reforms comprise a wide range of changes to Japanese business and labor practices, implemented through a variety of legislative and policy initiatives. In some areas, the government has proceeded quite aggressively: it has urged Japanese companies to adopt nimbler management practices and strengthen corporate governance, while pushing companies to increase the number of women in the workplace (to offset the demographic downturn) and improve their positions in the corporate world (to increase their contributions and retention).<sup>43</sup> Still, significant labor market rigidities remain: the combination of ironclad job protections negotiated by powerful trade unions and the strong relationship between workers and corporate management means that laying off employees is still de facto prohibited, and many companies maintain bloated payrolls that cannot be supported by the underlying business operations.<sup>44</sup> In addition to dragging down the profitability of Japanese companies and making the country less competitive, such employment practices have the added effect of creating a two-tier labor market: new hires are often low-paid “irregular” workers with few job protections, a fact masked by the country’s low official unemployment rate of 3.5%.<sup>45</sup>

Japan’s biggest long-term challenge is a significant and precipitous decline in its working age population, a demographic shift that some analysts have described as a “death spiral.”<sup>46</sup> An extremely low birth rate (1.4 children per woman) and the world’s longest life expectancy (83 years) have combined to make Japan both the fastest-aging and most elderly society in the world, and the first major country in history to see its population shrink dramatically from natural causes.<sup>47</sup> The working age population started falling in 1996, and it began falling precipitously in 2012, when the oldest of the Baby Boomers started to exit the workforce.<sup>48</sup> The country has already seen an unprecedented three consecutive

years of population decline, and its working age population slipped below 80 million for the first time in over three decades.<sup>49</sup>

### *Population Growth Rate, Japan*



Source: World Bank

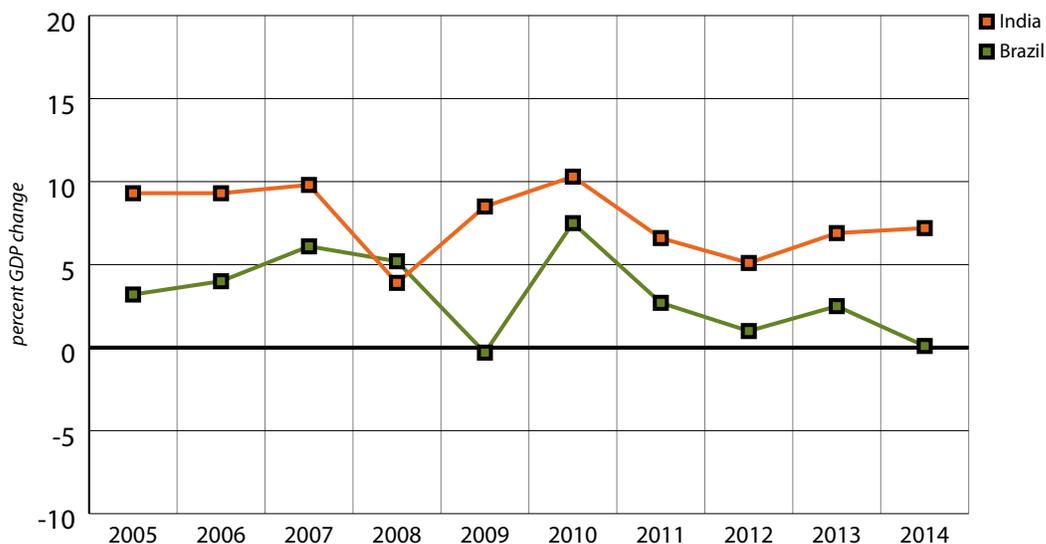
So far, the country is growing again—reaching 3.9% annualized growth in the first quarter of 2015 on the back of strong business investment—but the political and social challenge of enacting the “third arrow” and the country’s massive demographic challenge make it an open question whether Japan can maintain such strong growth rates.<sup>50</sup>

### *Future Prospects: India and Brazil*

Given the slowdown in China and continued challenges in Europe and Japan, the most likely engines of economic growth are the other major developing countries: India and Brazil. (Russia, often included alongside those two and China as a “BRIC” nation, is facing severe distress due to low oil prices and economic sanctions imposed by the United States and its European allies. Consequently, the country is experiencing stagflation, with GDP projected to fall by 5% in 2015 and inflation accelerating to over 16%.<sup>51</sup>) While India and Brazil represent significant hopes for future growth, neither country has yet undertaken the considerable reforms needed to improve their business climates, though there is increasing hope—and early signs—that India’s current government may prove reform-minded enough to do so.

After nearly a decade of coalition rule by India’s left-of-center Congress Party, voters elected conservative leader Narendra Modi as prime minister in May 2014. Modi had previously served as the chief minister of Gujarat, an industrialized western state that notched impressive rates of economic growth under his leadership. In his first year in office, Modi reenergized India’s economic reform program by pursuing efforts to dismantle the country’s notorious “License Raj,” increasing infrastructure spending, reforming public sector enterprises, and improving the country’s fiscal position, including through the elimination of fuel subsidies.<sup>52</sup> Nevertheless, India’s business climate issues remain challenging. The country ranks 142<sup>nd</sup> out of 189 countries in the World Bank’s Ease of Doing Business index,<sup>53</sup> and 85<sup>th</sup> out of 175 on Transparency International’s 2014 Corruptions Perceptions Index.<sup>54</sup> Major elements of the country’s reform agenda remain incomplete; indeed, restrictions on foreign investment remain substantial, and laws perceived as hostile to business—such as those governing land acquisition and taxes on multinational companies—remain obstacles to investment. Economic growth has accelerated, but at 7.4% it remains too low to drive global growth,<sup>55</sup> and too low, in fact, to absorb the new workers coming of age in India, which would require 10% growth.<sup>56</sup> Nonetheless, there is considerable, seemingly justified, hope for vigorous Indian economic expansion in the years ahead.

*GDP Growth Rate, India and Brazil*



Source: World Bank

The situation in Brazil is significantly more challenging. Brazil has had stagnant growth—under 3%<sup>57</sup>—for more than three years, and the country now seems poised to enter a

recession, with GDP expected to decline by 2% in 2015. While unemployment remains low at 5.3% (an increase from 4.6%), the high and rising inflation rate (7.4%) mean the country might be entering a period of sustained stagflation.<sup>58</sup> In fact, some economists have warned that Brazil could face the first two-year downturn since the 1930s.<sup>59</sup>

There are many causes of Brazil's slowdown, from external factors, such as slower growth of its principal trading partner, China, and declining oil prices, to internal factors, such as President Dilma Rousseff's macroeconomic policies.<sup>60</sup> The government's policies, such as alternately raising and lowering certain taxes, have created a high degree of uncertainty, sapping consumer and business confidence.<sup>61</sup> Numerous economists have argued that Brazil has relied too much on stimulating consumption at the expense of investment.<sup>62</sup>

The country's tight monetary policy—rates have been raised to 12.75% in an effort to reduce inflation—has further slowed economic growth,<sup>63</sup> as has the country's labyrinthine bureaucracy: Brazil ranks 120<sup>th</sup> out of 189 on the Ease of Doing Business index, with particularly poor ratings in areas such as starting a business (167) and obtaining construction permits (174).<sup>64</sup>

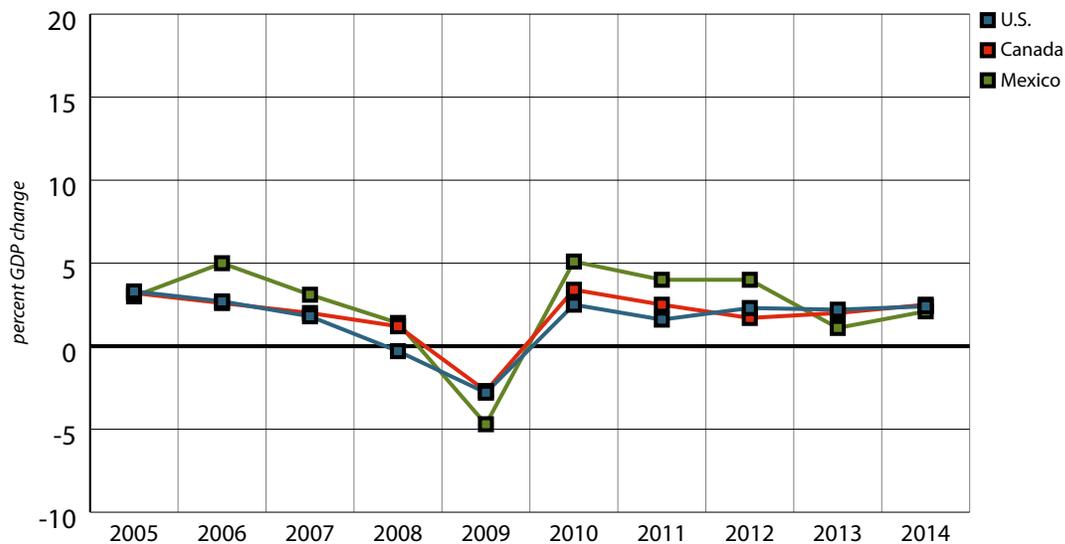
All of these woes have been exacerbated by widespread accusations of corruption at the country's state-owned oil company, Petrobras, which has led to a scandal and replacement of the firm's management.<sup>65</sup> Because of uncertainties over how much the company will have to write down the value of some assets because of its corruption scandal, Petrobras's auditor has refused to sign its quarterly earnings release, which precludes it from tapping the global bond market.<sup>66</sup> The Petrobras scandal is a triple blow to the Brazilian economy, as it has damaged the nation's largest company (and badly hurt related sectors like construction), raised questions about Brazilian corporate governance, and created a major political scandal for the Rousseff administration.<sup>67</sup> Brazil thus remains a country with unfulfilled growth prospects.

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# NORTH AMERICA: FUNDAMENTALLY SOUND

In the midst of declining or uncertain growth from foreign developed and emerging markets, the North American economy continues to look sound. Both the United States and Canada have emerged from the recession in comparatively good shape, and both have experienced strong growth and relatively low unemployment, though the precipitous drop in oil prices is taking a toll on Canada. Mexico, for its part, has achieved a considerable measure of economic stability, and is undertaking a serious reform agenda to put the country on the path to substantial economic growth, even as it is hurt in the near term by a drop in oil prices.

*GDP Growth Rate, U.S., Canada, Mexico*



Source: World Bank

## *United States: A Solid Recovery*

Since the recession, the United States has experienced a consistent, if slow, recovery that now appears to be accelerating. Economic growth has rebounded, rising from effectively 0% in 2009 to over 4.5% in 2013.<sup>68</sup> While growth settled at 3.7% in 2014, this level remains strong for a developed economy, and the incremental increase in GDP accounted for \$700 billion in growth.<sup>69</sup> Though unemployment (or, more accurately at this point,

underemployment) remains an issue, the overall trend has been very positive: the economy has registered 61 consecutive months of jobs growth,<sup>70</sup> and the unemployment rate has fallen from 10% in 2010 to under 5.5% in 2015.<sup>71</sup>

The performance of the American economy in the aftermath of the recession is attributable to a wide range of factors, including the country's economic policies, business climate, innovativeness and entrepreneurialism, deep and agile capital markets, and small firms that can create and capitalize on technological advances—all factors that contributed considerably to the ongoing energy, IT, manufacturing, and life sciences revolutions.

From a policy perspective, the Federal Reserve's strong and unorthodox accommodative monetary policy has played a major role in boosting growth, asset prices, and employment. From 2009 to 2014, Federal Reserve Chairman Ben Bernanke increased the size of the bank's balance sheet from \$834 billion<sup>72</sup> to \$4.1 trillion,<sup>73</sup> an extraordinary increase. This unprecedented use of the Fed's authority, particularly with interest rates hovering just above 0%, created a strong tailwind for the U.S. economy. And while fiscal standoffs between Congress and the president did produce some austerity-like policies—particularly the “sequester” in January 2013—such cutbacks in public expenditure and hikes in taxes have been small in comparison to the sort of austerity seen in Europe.

*This unprecedented use of the Fed's authority, particularly with interest rates hovering just above 0%, created a strong tailwind for the U.S. economy.*

Moreover, the business climate in the U.S. remains comparatively strong. Labor markets remain largely liberalized, with low rates of unionization and the ability to add or reduce workers at will.<sup>74</sup> This labor market flexibility extends to wages as well, allowing employers to adjust wages to reflect worker productivity. While these practices have contributed, to some degree, to low wage growth and income inequality, issues of increasing concern in the U.S., they have also undoubtedly enabled the U.S. to achieve a lower rate of unemployment than most of its industrialized peers.<sup>75</sup> Similarly, the flexibility of American law—such as a bankruptcy code that focuses on reorganization—has led to fewer liquidations than in Europe, creating an environment where businesses are preserved as going concerns and employment is protected.<sup>76</sup>

*The American economy remains one of the most innovative and entrepreneurial in the world.*

A number of U.S. structural factors are also a deep source of competitive advantage. The American economy remains one of the most innovative and entrepreneurial in the world, the result of factors ranging from strong collaboration between research universities and businesses to the tolerance for risk-taking in launching new ventures.<sup>77</sup> U.S. capital markets are, by virtually any measure, the deepest, most liquid, and most agile in the world.<sup>78</sup> American universities remain a powerful magnet for the best students and researchers, with international rankings indicating that the country is home to either 15 or 16 of the world's top 20 universities.<sup>79</sup> The presence of large numbers of small businesses and ever-more exciting startups—especially compared to countries where a handful of conglomerates control the bulk of the economy—means that firms are more capable of capitalizing on technological advances and better poised to move quickly to address unmet needs in the marketplace.<sup>80</sup>

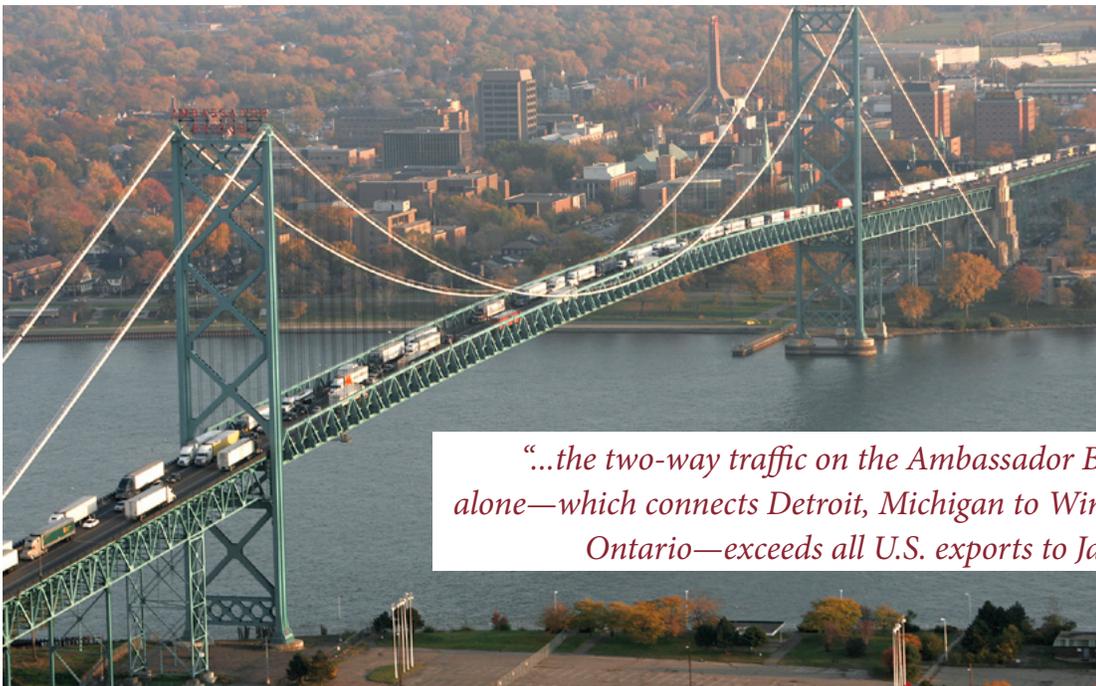
*Canada: Stability Through the Recession*

The Canadian economy has also performed well in recent years, especially through the financial crisis, though the reduction in oil prices does pose a significant challenge. The country has seen economic growth in the 2% to 3% range<sup>81</sup> over the past few years, and experienced relatively moderate unemployment at 6.8%.<sup>82</sup>

For the past few decades, the western provinces, namely Alberta, have seen strong economic growth as a result of a boom in fossil fuel production, which has created hundreds of thousands of jobs and billions of dollars of exports.<sup>83</sup> However, this reliance on fossil fuels—which accounts for 10% of Canada's GDP, though as much as 25% to 30% of the economy in some provinces—has increased Canada's exposure to global commodities prices.<sup>84</sup> The Canadian oil and gas sector, which has high production costs and insufficient infrastructure in certain areas, has been one of the hardest hit by the recent decline in global oil prices. The decline has shaved 0.5% off of Canada's economic growth, and the country is now poised to grow at 1.9% in 2015.<sup>85</sup> The effect of the fall in oil prices is not uniformly negative, however, as the combination of the boost to consumers, a stronger American economy, and a weaker exchange rate (which will strengthen other exports) means that the non-oil producing industrialized provinces, like Ontario, could see their economic fortunes improve even as their western peers slide into recession.<sup>86</sup>

The country's financial and banking systems remain vibrant after being largely immune to the global financial crisis. Underwriting standards remained strong in the run-up to the recession (in part due to strict regulation), and the banks managed risk effectively.<sup>87</sup> For seven years in a row, the World Economic Forum has judged the Canadian financial system the strongest and most stable in the world.<sup>88</sup> While some signs of an asset bubble exist and some banks have been downgraded by credit rating agencies, the banking sector overall continues to post strong earnings and regulators have started to rein in potentially risky practices.<sup>89</sup>

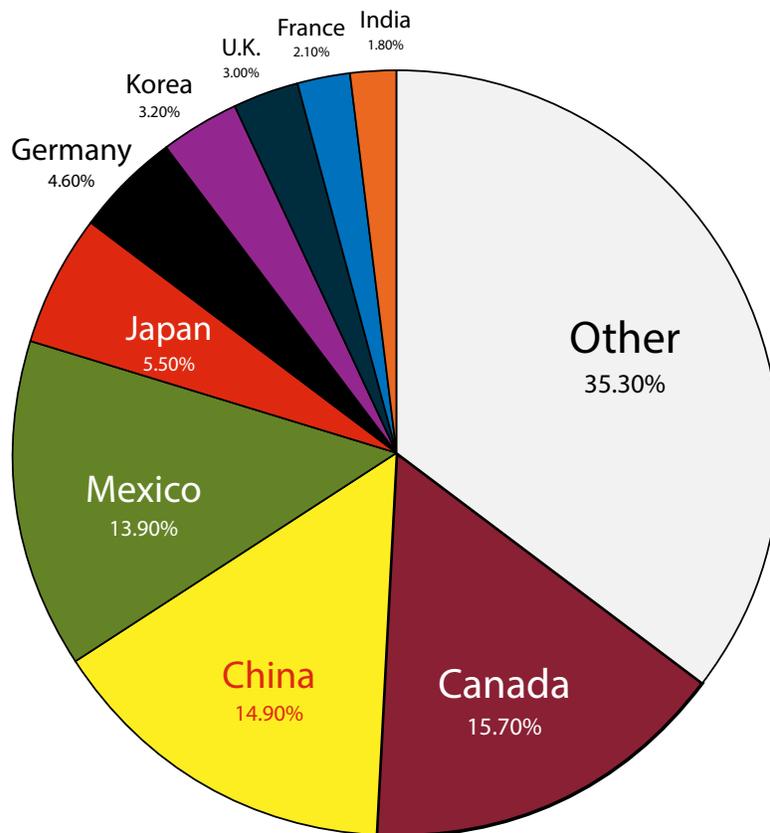
Beyond fossil fuels, the country enjoys significant industrial strengths, especially in mining, transportation, advanced manufacturing, and electronics. The country is home to considerable extraction activities, ranging from gold to potash. It possesses a dense railway network, and its two principal railways, Canadian National and Canadian Pacific, are two of North America's 11 Class 1 railroads, with thousands of miles of integrated tracks in both Canada and the U.S.<sup>90</sup> The country is home to major manufacturers and designers of everything from planes (Bombardier) to cellular phones (Blackberry), and its industries are supported by high-quality research universities such as the University of Waterloo.<sup>91</sup>



*“...the two-way traffic on the Ambassador Bridge alone—which connects Detroit, Michigan to Windsor, Ontario—exceeds all U.S. exports to Japan.”*

Canada and the United States also share an exceptionally large trading relationship: the two countries' bilateral trade is easily the largest in the world, and the two-way traffic on the Ambassador Bridge alone—which connects Detroit, Michigan to Windsor, Ontario—exceeds all U.S. exports to Japan.<sup>92</sup> While Canada is a massive country geographically, about 90% of Canadians live within 100 miles of the United States, and the integration of the two economies has grown considerably over the two decades of the North American Free Trade Agreement.<sup>93</sup>

## *Largest Trading Partners of The United States*



Source: U.S. Census Bureau

## *Mexico: Stability and New Reforms*

Mexico has seen considerable improvements in its economic fortunes over the past two decades as well. Since the 1995 peso crisis, the country has enjoyed far greater macroeconomic stability, both under its centrist, institutional party, the PRI, and its right-of-center, market-oriented party, the PAN. To be sure, the country's significant oil and gas sector (accounting for 5% of GDP)<sup>94</sup> has been hit by the recent decline in oil prices, which has slowed overall Mexican GDP growth to just 1%.<sup>95</sup> In response, the Mexican government has taken strong, decisive steps to rein in public spending,<sup>96</sup> enacting spending cuts amounting to 1.5% of GDP over two years.<sup>97</sup>

Under the leadership of Mexico's two previous presidents, the PAN's Vicente Fox and Felipe Calderon, the country made solid economic progress. While annual growth never reached 6% in the 2000s, the country notched only one year of recession (in the immediate aftermath of the global financial crisis), while holding both borrowing and inflation in check.<sup>98</sup> The country's growth rate, around 4% to 5% in the aftermath of the recession, slowed to about 1% last year,<sup>99</sup> yet the country's unemployment rate remained below 5%.<sup>100</sup> Beyond the stability, though, Calderon left the country with significant challenges, notably a lack of foreign investment in its (declining) oil sector, numerous uncompetitive sectors of the economy, and long-run challenges to the provision of social services, such as the low quality of education. Calderon also began a war with the country's criminal cartels, which led to the capture or killing of numerous drug kingpins, but also cost the country 60,000 lives over five years.<sup>101</sup>

Since the election of President Enrique Peña Nieto in 2012, the country has achieved historic progress in pushing reforms through the Mexican Congress. The reforms, the product of a three-way pact uniting the PRI, the PAN, and the country's left-of-center party, the PRD, have been substantial and wide-ranging. In total, the pact spans 16 constitutional reforms, more than Peña Nieto's three predecessors accomplished in their combined 18 years in office, with each reform intended to spur greater Mexican productivity.<sup>102</sup>

The most significant reform is the new constitutional amendment that opens the long-closed oil industry to

*The most significant reform is the new constitutional amendment that opens the long-closed oil industry to foreign investment and expertise.*

foreign investment and expertise, raising the possibility of significant participation by American and other international oil companies. This reform could greatly improve Mexico's extraction capabilities, particularly from challenging oil fields in the Gulf of Mexico. Similarly, Mexico's Congress has opened up several major industries to competition, most notably the mobile telecommunications industry, long dominated by América Móvil, a company controlled by Carlos Slim.<sup>103</sup> (This law is already paying dividends, as competition from AT&T has reduced phone rates and improved services for many consumers.<sup>104</sup>) Finally, Peña Nieto has pushed to increase accountability in education, jailing Elba Esther Gordillo, the head of the powerful teachers union, on corruption charges, and pushing for reforms to teacher evaluations.<sup>105</sup> While the reforms will take years to be implemented and demonstrate their value, Mexico has already passed most of the necessary implementing legislation and made early progress in capitalizing on some of the reforms (though some opposition to education reform, in particular, has developed). Most significantly, perhaps, in the oil sector, Peña Nieto's government passed the enabling legislation to allow foreign investment in August 2014, nine months after the original vote to amend Mexico's constitution to allow foreign investment. And new investments are already being announced—including one by BlackRock to invest in two natural gas pipelines—even as bids for various opportunities are being considered.<sup>106</sup>

His legislative victories aside, Peña Nieto has nonetheless suffered from falling approval ratings, which may threaten his ability to implement some of his reform agenda. His personal popularity has been damaged by “pay to play” allegations regarding a house he had built by a company that had won a major government contract,<sup>107</sup> an allegation leveled at his capable finance minister as well.<sup>108</sup> More troublingly, confidence in his administration has been shaken by significant breakdowns in the country's rule of law; indeed, while there have been some statistical improvements in certain measures of violence, several high profile events—like the murder of several dozen Mexican college students in one incident alone—has demonstrated the challenge in sustaining the security needed to

*Some experts are even concerned that the rate of job growth is not high enough to absorb the workers entering the economy each month.*

allow the entire country to benefit from the “Mexican Miracle,” the dramatic growth in the manufacturing arena.<sup>109</sup> Finally, while Peña Nieto has focused on economic reforms, the government's inability to facilitate a rapid economic turnaround that can be felt by the average Mexican (through more and better jobs) has further eroded confidence in the program.<sup>110</sup> Some experts are even concerned that the rate of job growth is not high enough to absorb the workers entering the economy each month.<sup>111</sup>

Encouragingly, since the passage of NAFTA in 1994, the Mexican economy has become increasingly intertwined with the United States. The country has become home to numerous *maquiladoras*, or small- to medium-sized manufacturing businesses that serve the U.S. market, often as subcontractors for American multinational corporations. Mexican and American manufacturing is so intertwined that 40% of the value added in Mexican exports to the U.S. is actually of American origin.<sup>112</sup> Overall, Mexico's manufactured exports have increased 1,000% since NAFTA's enactment, with roughly 80% of total exported goods being shipped north of the border.<sup>113</sup> As a result, Mexico has become the U.S.'s third-largest trading partner, trailing only Canada and China.<sup>114</sup> While this extraordinary level of integration with the U.S. can be seen across a range of industries, the clearest example is auto production: Mexico is now the fourth-largest exporter (and seventh-largest producer) of cars in the world, and major international carmakers, such as Toyota and Audi, are building new plants in Mexico, principally for export to the American market (which accounts for 66% of Mexican car exports).<sup>115</sup> In fact, last year Mexico surpassed Japan to become the second-largest exporter of cars to the U.S., and it is set to surpass Canada to be the largest this year.<sup>116</sup> Mexico, in short, demonstrates enormous promise thanks to the reforms being enacted, even as lingering challenges threaten perceptions of Mexico as a country on the threshold of enormous opportunities and economic development.

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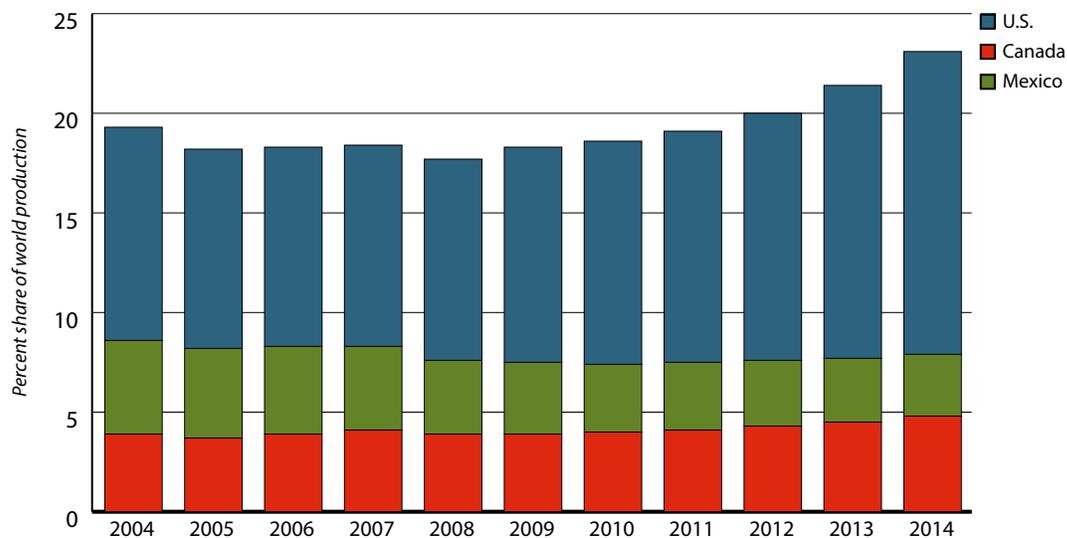
# NORTH AMERICAN ECONOMIC GROWTH: FOUR INTERLOCKING REVOLUTIONS

The North American economies are in the enviable position of exhibiting solid economic growth, particularly compared to economies in the rest of the world. While there are many sources of this strength, their leadership in four large and growing sectors—energy production, advanced and digital manufacturing, the life sciences, and information technology—is responsible for much of their economic prowess.

## *Energy production*

Since 2013, the U.S. has been the world's largest producer of natural gas and oil liquids,<sup>117</sup> and its third-largest producer of crude oil.<sup>118</sup> U.S. reserves are also extraordinarily large: its natural gas reserves, for example, could supply the country at current rates of consumption for the next 87 years.<sup>119</sup> While there are some concerns about the extraction process that has triggered the energy revolution, safe methods of production are increasingly proven and, thus, domestic production will likely continue to power the American economy for decades to come.

*Share of Total Oil Liquids Production, Canada, Mexico, U.S.*



Source: U.S. Energy Information Administration

For its part, Canada is the fifth-largest producer of oil in the world, and home to the world's third-largest reserves, over 95% of which are contained in Alberta's oil sands.<sup>120</sup> At the same time, however, production in Canada's oil sands is expensive, and the increase in oil prices since 1999—with a short exception in the immediate aftermath of the financial crisis—made extraction from Canada's oil sands economically feasible. If global oil prices remain low for a sustained period, oil sands production could be under increased pressure.<sup>121</sup>

For its part, Mexico is the ninth-largest producer of oil in the world, and home to the world's eighteenth-largest reserves. Unlike American and Canadian oil production, however, Mexican production peaked in 2004 and has declined since then.<sup>122</sup> The majority of Mexican oil comes from one oil field in the Gulf of Mexico, the Cantarell Field, whose production is in decline. Additional reserves have been discovered, but their recovery is significantly more complicated, and annual production has continued to decline.<sup>123</sup> One of President Peña Nieto's primary reasons for opening Pemex, the country's state-owned oil company, to foreign investment was to bring in foreign capital and expertise to attempt to increase production in fields where extraction has proved to be more challenging.<sup>124</sup> The Mexican government's goal is to raise crude-oil production to 3 million barrels a day by 2018, from its current level of 2.5 million barrels a day.<sup>125</sup> In 2004, by contrast, Pemex's output stood at about 3.4 million barrels a day.<sup>126</sup>

The trade in energy among the three countries is very large: 99% of Canadian oil exports are to the U.S., and Canada is far and away the U.S.'s largest oil supplier. In fact, Canada alone accounts for nearly 44% of U.S. oil imports, now about four times as much as the next-largest supplier, Saudi Arabia.<sup>127</sup> Likewise, while federal law largely bans American exports of unrefined crude, Canada has an exemption.<sup>128</sup> The size and scope of this relationship would grow with the approval of the Keystone XL pipeline, which would carry Canadian crude needed by refineries in the United States. And while non-fossil fuel energy integration is smaller, it is still significant: about 1% of total U.S. electricity comes from Canadian hydropower,<sup>129</sup> a figure likely to grow due to demand for clean energy sources in the Northeastern United States.<sup>130</sup>

*99% of Canadian oil exports are to the U.S., and Canada is far and away the U.S.'s largest oil supplier.*

Mexico is the United States' third-largest supplier of oil, accounting for about 10% of all U.S. imports.<sup>131</sup> Nonetheless, one of the principal arguments for lifting the ban on

American crude oil exports is to increase shipments to Mexico; in fact, Pemex has asked the U.S. Commerce Department to allow 100,000 barrels per day to be exported to Mexico, which Mexico can now receive under its new energy legislation.<sup>132</sup> (Many Mexican refineries need the light crude from the United States, while the U.S. needs more of the heavy crude from other countries.) Similarly, American investment in the Mexican oil industry will undoubtedly grow as Pemex opens up oil fields to international investment. Greater exports of American and Canadian natural gas—which is about half as expensive as the gas in Mexico—can bolster the Mexican petrochemical sector. And an even larger opportunity exists in reducing the price of electricity: firms in Mexico pay 80% more for electricity than American firms do; if natural gas generation can be built and fed with cheap American and Canadian gas, the benefit to Mexico’s manufacturing sector would be substantial.<sup>133</sup>

## *Advanced and digital manufacturing*

Since the end of the recession, the U.S. and Canada have seen a resurgence in manufacturing activity, led by increases in advanced and digital manufacturing—greater use of robotics and automation, and growth in the use of 3D printing. This has led to and been helped by “re-shoring” pursued by many multinational companies. Though manufacturing output has increased, however, employment has only risen marginally, as machines have steadily been replacing people in the performance of various manufacturing tasks.

*...advanced robotics has allowed U.S. factories to match and beat cheaper labor costs abroad.*

In addition to falling energy costs, which have been a key enabler of resurgent manufacturing in both Canada and the U.S., there are four other key drivers of this trend. First, and most notably, advanced robotics has allowed U.S. factories to match and beat cheaper labor costs abroad, while achieving these savings with the lower defect rates that come from increased automation.

Second, major advances in technologies like 3D printing allow for greater customization of components and products. Third, with much greater access to and use of customized design and engineering software, the diversity and quality of engineering has dramatically improved. Combined with 3D printing, this increases the value of co-locating design and manufacturing, as such proximity allows for rapid experimentation and iteration in product design, enabling greater quality and customization. Finally, advances in material sciences—developed largely in American universities and corporate labs—allow for

materials that are both lighter and stronger, making them both more energy efficient and more durable. In industries from autos to planes, the use of composite materials has propelled major leaps forward in quality and efficiency.

Mexico's economy has benefited from the evolution of North American manufacturing as well, especially as labor costs in and transportations costs from China have risen steadily, and as weak intellectual property protections in China make North American firms increasingly wary of doing cutting-edge business there.<sup>134</sup> Nonetheless, while Mexico's *maquiladoras* benefit from being integrated into American supply chains, the country will need to make continued investments in education and training to develop the skilled workforce needed to move up the value chain and into advanced manufacturing.<sup>135</sup> The reform legislation approved in recent years should lead to increased investment and long-term economic growth, especially if improvements to the Mexican education system take hold.

## *Life sciences*

In the U.S. and Canada, progress in genetics and other life science research has allowed for new and exciting breakthroughs in the life sciences, ranging in application from health care to agriculture.

In health care, American biotechnology and pharmaceutical companies have continued to make major investments in research, investments that will continue for at least the next half-decade. These investments have yielded a large suite of “wonder drugs” that have widespread therapeutic applications.<sup>136</sup> Similarly, genomics research has the potential to revolutionize health care by creating “personalized medicine,” in which individuals can receive targeted therapies customized to their own genetic makeup.<sup>137</sup> And new applications derived from stem-cell research could yield treatments for a host of injuries and diseases. In all of these areas, corporations are partnering with research universities, facilitated by significant federal funding for biomedical research, and an American “technology transfer” system designed to facilitate the transfer of research into commercially viable products.<sup>138</sup>

*...life sciences research in agriculture has yielded a host of breakthroughs that have the potential to revolutionize food production, both in North America and across the world.*

Likewise, life sciences research in agriculture has yielded a host of breakthroughs that have the potential to revolutionize food production, both in North America and across the world. Research, jointly conducted by American companies and universities, has produced several major advances in agriculture. The creation of drought-resistant and disease-resistant seeds is one such advance, as it has the potential to dramatically reduce the risk of crop spoilage, thus increasing food security and decreasing food costs.<sup>139</sup> Similarly, seeds that are herbicide- and insect-resistant can allow for food to be grown using more environmentally sustainable farming methods, such as no-till farming, and without the use of harsh, often prohibitively expensive, insecticides.<sup>140</sup> Finally, seeds can now be engineered to increase the nutritional value of crops; for example, Golden Rice contains higher amounts of beta-carotene.<sup>141</sup> The embrace of genetically modified foods in the U.S.—in contrast to Europe—will allow American agriculture to remain an outsized force in the global marketplace; in fact, as demand for agriculture products, such as meat in China, continues to grow, experts have said that the U.S. is “completely set up” to supply this demand due to its leadership position in genetically modified crops.<sup>142</sup>



*“The embrace of genetically modified foods in the U.S.—in contrast to Europe—will allow American agriculture to remain an outsized force in the global marketplace.”*

International Rice Research Institute BY-NC-SA 2.0

## *Information technology*

As with many U.S. firms in the other sectors, American information technology companies continue to be the most innovative in the world by virtually any measure. American IT companies—alongside a handful from Korea and Japan—earn the most patents,<sup>143</sup> command the majority of the world’s venture capital (followed by Canada),<sup>144</sup> and enjoy extraordinarily high corporate valuations: Apple is the world’s most valuable corporation, and Google and Microsoft are in the top five.<sup>145</sup>

Beyond traditional technology like Web search, e-mail, and social media, American companies are leading the push into applying technology to traditional businesses. Big data, cloud computing, and “software as a service” are three such areas, where the combination of analytics, storage capacity, and processing power can aid companies in improving their businesses. Seven of the ten leading companies in big data are American, including the three top companies: IBM, Dell, and Hewlett-Packard.<sup>146</sup>

Similarly, applications of technology to heavy industry (manufacturing or infrastructure) and health care (such as medical devices) comprise another area of strength for the U.S. economy. Companies such as General Electric, which have major operations in industrial manufacturing (e.g., drilling equipment and power turbines) and health care (MRI equipment), have hired thousands of data scientists and software programmers in order to offer clients the service of running data analytics on instrumented versions of their products.<sup>147</sup>

The “Industrial Internet” and “Health Care Internet” represent the intersection of several trends: they exhibit not just American leadership in IT and big data, they are also predicated on prowess in advanced manufacturing. And in many cases, these manufactured goods are directly related to the other two sectors, as many of the industrial products are used in energy exploration and production, and many of the health care advances are used in the life sciences.

## THE ROLE OF AMERICAN POLICY

*...the policy proposals should appeal broadly to members of both political parties.*

To capitalize fully on emerging North American economic growth and integration, Congress and the president can—and should—pursue a number of important policy initiatives. Many of these steps are generally beneficial to the U.S. macroeconomic climate, while others are more specifically targeted to either encourage integration or enhance one of the trends discussed above. While agreeing on legislation and policies will be challenging, the policy proposals should appeal broadly to members of both political parties.

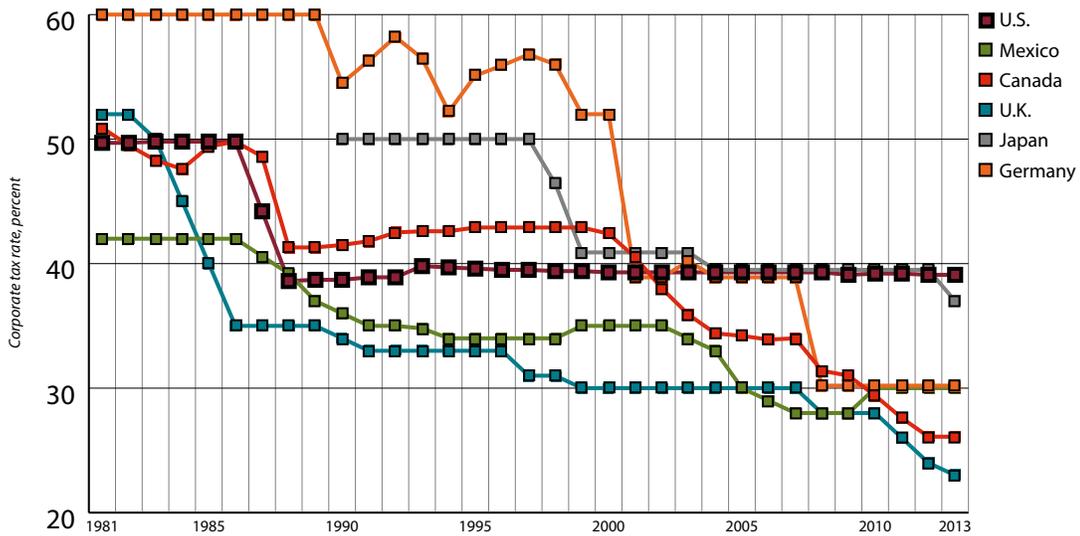
### *Improve the Long-Term U.S. Fiscal Outlook*

The nation's debt-to-GDP ratio currently stands at approximately 74%, declining at present but projected to begin increasing again in the next few years.<sup>148</sup> Under the current path, the Congressional Budget Office estimates that the debt-to-GDP ratio will reach 79% by 2024,<sup>149</sup> though this may understate the true level, since the CBO must include in its projections many items that reduce the deficit but will not be enacted, such as significant cuts in Medicare rates to medical providers (which were recently repealed) and a tax on expensive “Cadillac” health insurance programs (which could easily be repealed). Congress and the president should, instead, commit to reducing the long-term debt to GDP ratio to 72% by 2024, and to then stabilizing it at that level. Doing this would require both reductions in spending—largely from reforms to entitlement programs—and increased revenues, ideally through comprehensive tax reform.

Reforming entitlements will necessitate tackling the two largest drivers of U.S. spending: Social Security and Medicare. Social Security is in better shape (despite challenges in its Disability Insurance program) and is easier to fix from a technical perspective. In order to shore up Social Security, Congress can revisit the successful Social Security reforms of the 1980s, the result of a commission chaired by Fed Chairman Alan Greenspan. The reforms increased both the Social Security payroll tax and the retirement age to bring the program into long-term balance.<sup>150</sup> Another such set of reforms, focusing on both revenue (the payroll tax and its cap) and benefits (the retirement age and cost of living adjustments) can put the program on sound financial footing once again.<sup>151</sup> By contrast, reforms

to Medicare will prove more challenging, as ensuring the program’s solvency necessitates reducing the growth in health care spending. This means that the U.S. must find ways to reduce health care costs through better care coordination, moving away from fee-for-service payment models and reducing the practice of excessive “defensive medicine.” The recent slowdown in U.S. health care cost growth is potential evidence that reforms are taking hold in the system, though it remains to be seen whether costs start rising again once the economy recovers fully from the recession.<sup>152</sup>

*Corporate Tax Rates, U.S. vs. Selected Countries*



Source: International Labor Organization (ILO)

While the U.S. must continue to prudently manage its non-entitlement spending—both defense and discretionary—it must do so in a way that is strategic and not harmful to either U.S. national security or the nation’s long-term economic prospects. As a result, Congress and the president should replace the sequester, which cut defense and discretionary spending in a particularly blunt fashion, with more targeted, surgical cuts to carefully chosen programs, while shoring up defense programs that will enable the U.S. to perform its critical missions and prepare for future threats. Congress should also invest more in defense and non-defense scientific research. The modest, partial rollback of the sequester in 2013 was a step in the right direction, although it was not accompanied by thoughtful offsets.

Together with reining in spending, Congress should pursue comprehensive reform to the U.S. tax code, with a particular emphasis on the corporate tax code. Current American corporate tax rates are among the highest in the world, even as most industrialized countries have significantly lowered their corporate tax rates over the past 30 years.<sup>153</sup> Yet U.S. tax law is so riddled with loopholes, often as a result of corporate lobbying, that the corporate share of federal revenue has declined over the past few decades.<sup>154</sup>

Congress should reduce the complexity of the corporate tax code by stripping out deductions and loopholes and using the savings to lower the overall rate. The Simpson-Bowles Commission, which called for significant reforms to the corporate tax code, reported that eliminating corporate tax expenditures would allow the rate to be reduced to 26%, a cut of over one quarter from the current 35% rate, while keeping revenue flat.<sup>155</sup> This would improve the competitiveness of the U.S. economy by cutting taxes for many corporations and reducing the administrative cost of tax compliance. Reducing the corporate tax rate might also induce American corporations, which are holding over \$2.1 trillion in cash abroad, to repatriate their earnings, which could then be invested in research, infrastructure, or manufacturing, or simply returned to shareholders.<sup>156</sup>

## *Develop and Attract the Best Human Capital*

*...economic growth  
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labor force.*

Congress should also take three steps to ensure that the U.S. is developing and attracting—and retaining—the best human capital in the world. As numerous economists have amply demonstrated, economic growth is a direct result of a qualified and talented labor force.<sup>157</sup> American economic strength in the 20<sup>th</sup> century came in large measure from the leading position the U.S. enjoyed in the education of its citizens and its ability to attract the best and brightest from abroad.<sup>158</sup> To ensure that the U.S. continues to develop and attract the best human capital, the president and Congress should reform American education, increase funding for scientific research, and pursue comprehensive immigration reform.

To reform public education, policymakers should adopt and invest in proven solutions. At the state level, policymakers should adopt rigorous educational standards, particularly for math, science, and reading. Reforms that encourage greater competition and choice, such

as authorizing more high-quality charter and other specialized schools, can create room for experimentation, the results of which can be adopted and scaled inside the broader public school system. In terms of higher education, ensuring that all Americans have access to some form of post-secondary education (including in the trades where the American labor force comes up short), and that a larger share of the U.S. population completes an undergraduate degree, is critically important.

In 1995, the U.S. stood first in the OECD with 33% of its graduates holding an undergraduate degree, compared to 20% on average among OECD nations.<sup>159</sup> Since that time, the U.S. has slipped to fourth, and many of the other OECD countries have caught up: as of 2012, 39% of Americans have a college degree, compared to a 38% average among OECD countries.<sup>160</sup> Similarly, apart from college, there is no viable pathway for many Americans, as the country's system of vocational education is antiquated and not aligned to the needs of the modern economy. By adopting the practices of countries such as Germany, which has robust programs for non-college technical degrees from which companies draw heavily, the U.S. can ensure that a larger share of its graduates are able to find quality employment, particularly in areas related to advanced manufacturing, energy, and IT.

In addition to strengthening its ability to educate its own people, the U.S. needs to ensure that it continues to attract the best and brightest from around the world. Many individuals already come from abroad to American universities for undergraduate and graduate training in scientific, technology, and engineering fields. In 2011, 56% of the students receiving a Ph.D. from an American university in a technical field were of foreign origin.<sup>161</sup> Yet despite their training—paid for by American taxpayers in many cases—and despite their desire to remain in the U.S. and start businesses here, their inability to obtain the proper immigration paperwork compels them to return to their home country or emigrate to another developed country where they can receive entry. To rectify this, Congress should pass comprehensive immigration reform that dramatically expands the quantity of H1B visas, particularly for foreign technical graduates of American universities; implements a point system, like in Canada, where those with advanced degrees and the ability to contribute to the economy are given a higher score and a faster path to entry; and streamlines the path to permanent residency and citizenship by providing paths to residency without employer sponsorship. (Comprehensive immigration reform should also provide a legal

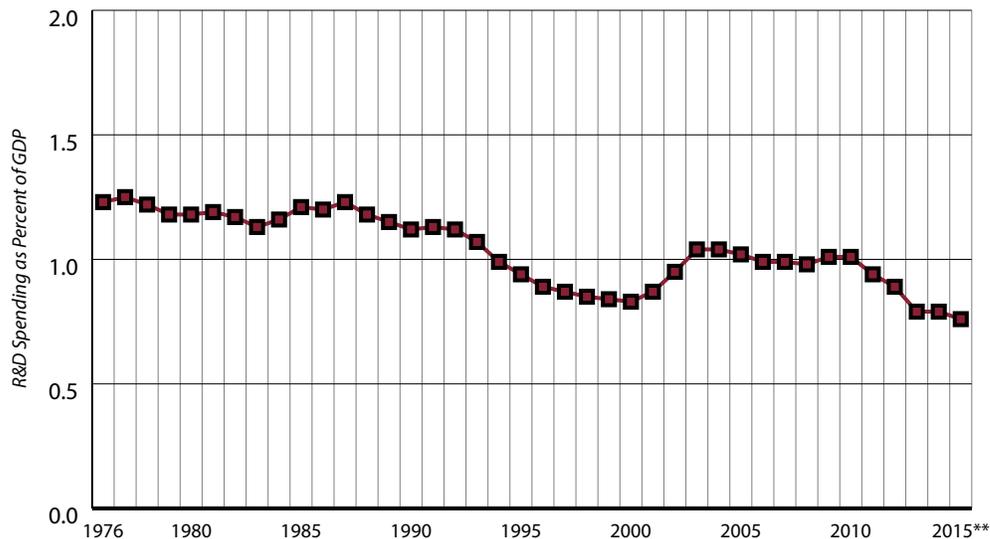
*Congress should pass comprehensive immigration reform that dramatically expands the quantity of H1B visas, particularly for foreign technical graduates of American universities.*

path for entry for unskilled workers, who are important to numerous sectors of the U.S. economy, from agriculture to manufacturing to hospitality.)

## *Make Research and Innovation a Priority*

The federal government should also undertake a series of policies to ensure that the U.S. remains at the forefront of science and technology research and development. Funding across both basic and applied research has fallen slowly over the past several decades, with particularly sharp drops taking place in the aftermath of the recession. From the 1980s through the mid-2000s, federal spending on research and development stood at around 1% of GDP. However, since 2009, when such spending stood at 1.01% of GDP, funding has fallen and is now projected to be below 0.80% of GDP—a substantial reduction in just a few years.<sup>162</sup> This decline has taken place across the range of federal agencies devoted to funding scientific research. The National Institutes of Health, the premiere funder of biomedical research, has seen its share of GDP fall from nearly 0.25% to 0.15% since 2003,<sup>163</sup> and similar declines have befallen the National Science Foundation, the National Institute of Standards and Technology, and the Department of Energy’s Office of Science.<sup>164</sup>

*Total Federal R&D Spending as a Percent of GDP*



Source: American Academy for the Advancement of Science

Congress should also make the research and development tax credit permanent as part of comprehensive tax reform, as this would give companies certainty that their investments will remain tax protected. Left unaddressed, the lack of certainty in this area could eventually cause companies to pull back on applied research, which would be a worrying trend in a country where corporate spending accounts for the majority of funds for research and development.<sup>165</sup> In fact, one of the key factors in driving corporate share from about 50% to 65% of the total research and development spending since 1980 has been the presence of the tax credit.<sup>166</sup>

Further reforms to the U.S. patent system are also needed in order to give companies certainty that their investments in research will receive sufficient protection to be commercialized. The 2011 law that moved the U.S. from a “first to invent” to a “first to file” system was a major step forward. But further reforms are needed, especially as it relates to patent holding firms (so-called patent trolls) that engage in aggressive litigation against technology companies, often on the basis of patents that should not have been granted in the first place. Removing this threat through stricter standards for patent litigation is an important next step as Congress updates the nation’s patent laws, one that would benefit a wide range of American technology companies, from IT to pharmaceuticals.

Finally, Congress should take strong action to counteract the threat of cyberterrorism by passing new cybersecurity legislation. Such legislation should make it easier for companies to share information with the Department of Homeland Security, and create standards for how DHS can share this data with other federal agencies. Ensuring a strong response to cybercrime is essential to safeguarding American leadership in the IT sector, and will be increasingly important as more and more information is stored digitally and an ever-increasing share of the economy becomes Web-enabled.

## *Strengthen the North American Energy Market*

Congress should also take several steps to encourage the continued development of domestic energy production in the U.S. and to further the integration of the North American energy market. At the same time, the U.S. should balance energy production with environmental concerns by ensuring that all production is consistent with stringent, best-in-class environmental standards.

First, the president should approve the Keystone XL pipeline to carry oil extracted from Canadian tar sands to refineries and production facilities in the U.S. (which need that type of “heavy” crude). While there are some environmental risks, they are offset by the fact that the oil will be extracted regardless of its final export market, and the fact that pipelines are generally a safer method of transportation than rail or truck. Further, it is in the American interest to see that the exports flow south of the border rather than elsewhere, and approving the pipeline would protect jobs in the U.S. energy industry, while helping to maintain low energy costs for American consumers and industry.

Congress should also encourage the development of a robust transmission infrastructure to transport electricity nationwide, and, in conjunction with the Canadian and Mexican governments, across borders. One of the largest impediments to the development of renewable energy in the U.S. is that locations where such electricity can be generated, such as the Great Plains, are far from major population centers on the coasts. This can be alleviated by a high voltage transmission system that moves electricity over long distances with low levels of power loss. Similarly, such transmission lines can help deepen North American energy integration. Much of New England, including the Greater Boston region, could be powered by efficient and clean hydropower from Quebec, particularly as the remaining coal plants in the region are shuttered for environmental reasons.<sup>167</sup> This could be true in much of the Northeast and Upper Midwest as well.

*Congress should pass legislation providing the EPA with the authority to issue and enforce high-quality, uniform standards on fracking nationwide.*

Finally, while policymakers should encourage greater energy production in North America, such production should be subject to stringent environmental standards. This is particularly true with regard to the principal technique that has yielded the revolution in U.S. energy production: hydraulic fracturing (or “fracking”). Many concerns have been raised about geological instability and water pollution resulting from fracking. As a result, many states have considered bans on fracking, and some—such as New York and Vermont—have already implemented them.<sup>168</sup> Rather than allowing a patchwork of state regulation, Congress should pass legislation providing the EPA with the authority to issue and enforce high-quality, uniform standards on fracking nationwide.

## *Invest in 21<sup>st</sup> century physical infrastructure*

Congress also has to find a way to refurbish and expand the country's physical and digital infrastructure, both of which are essential for continued economic growth. The 2013 American Society of Civil Engineers gave the U.S. a D+ for the quality of its infrastructure,<sup>169</sup> which is actually a modest improvement from the D in 2009.<sup>170</sup> However, the improvement came largely due to investments at the state level.<sup>171</sup>

The most pressing challenge facing infrastructure financing is the declining revenue in the U.S. Highway Trust Fund, funded by an 18.4-cent federal motor fuels tax, which has not been raised since 1993.<sup>172</sup> As a result of decreased driving, more fuel-efficient vehicles, and the fall in oil prices, the revenue stream entering the trust fund is falling, and it is failing to keep up with the need for more funding for transportation infrastructure.<sup>173</sup> While Congress has transferred money from the general fund for the past several years,<sup>174</sup> a permanent solution to financing the trust fund is needed—both to maintain the current level of funding and to increase the size of the total pie to address deferred maintenance and the need for strategic expansion. Congress should, in fact, consider a substantial increase in the motor fuels tax (especially with gasoline prices so relatively low) and also consider indexing the tax to inflation so that the trust fund maintains its purchasing power over time. Congress should also encourage states to make expanded use of user fees, such as tolls for roads, higher rates on railways, and passenger facility charges for airports.

At the same time, the federal government should take steps to ensure that the existing funds are spent wisely and efficiently. Congress and the relevant infrastructure departments—such as the Departments of Transportation and Interior—should adopt rigorous methods of project selection to ensure that only those that pass tough cost-benefit analyses are selected. The creation of a “National Infrastructure Bank,” which takes a more investment-oriented approach to project selection, would be beneficial, as other countries have found that such programs help them be far more judicious and careful in project selection, while also providing state and local governments with resources to implement quality projects.<sup>175</sup> In the same vein, Congress can change the conventional way of undertaking construction to reduce the cost of building infrastructure. This would encourage states to share risk and reward with the private sector, such as through public-private partnerships, which would help projects come in on time and on budget.<sup>176</sup> Allowing exemptions to federal prevailing wage laws would also help each incremental infrastructure dollar go further.

Finally, in addition to conventional physical infrastructure, another area of needed investment is in digital infrastructure, albeit one that still facilitates a market solution, including high-speed broadband. Most fiber networks are privately owned, and many solutions to promote affordable broadband connections throughout the U.S. rely on this private system combined with changes to federal regulation and the introduction of limited tax credits. Because the U.S. is slipping in rankings of both Internet speed and affordability,<sup>177</sup> developing a clear and achievable strategy for improving the nation's digital infrastructure should be of high importance.

## CONCLUSION

The U.S. and its neighbors find themselves in a fortunate position: while most of the rest of the world is slowing down, they together form a large bloc of comparative prosperity. By further integrating their markets, the three nations can build on their strengths and take full advantage of the ongoing revolutions in energy, advanced manufacturing, the life sciences, and information technology.

American policymakers can and should enable the U.S. to capitalize fully on the important current opportunities by improving the country's long-term fiscal outlook; developing and retaining high quality human capital; encouraging domestic energy production and further integrating the North American energy market; and refurbishing and expanding the quality of the country's infrastructure. These initiatives would turn so-called policy headwinds into policy tailwinds and enable the United States and its North American neighbors to make the most of the considerable opportunities at hand.

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