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Shale: Hope or Hype?

Which U.S. state boasts the lowest unemployment rate and the fastest acceleration in property value since 2007?

Unless you monitor regional economic data the answer may surprise you: North Dakota. With an unemployment rate of just 3.2% and home value appreciation of 26% since 2007, the Peace Garden State has enjoyed unprecedented economic water and sunlight during an otherwise slow U.S. recovery.¹

What twist of history accounts for this curiosity? The tight oil and shale gas “revolution” fomenting in North

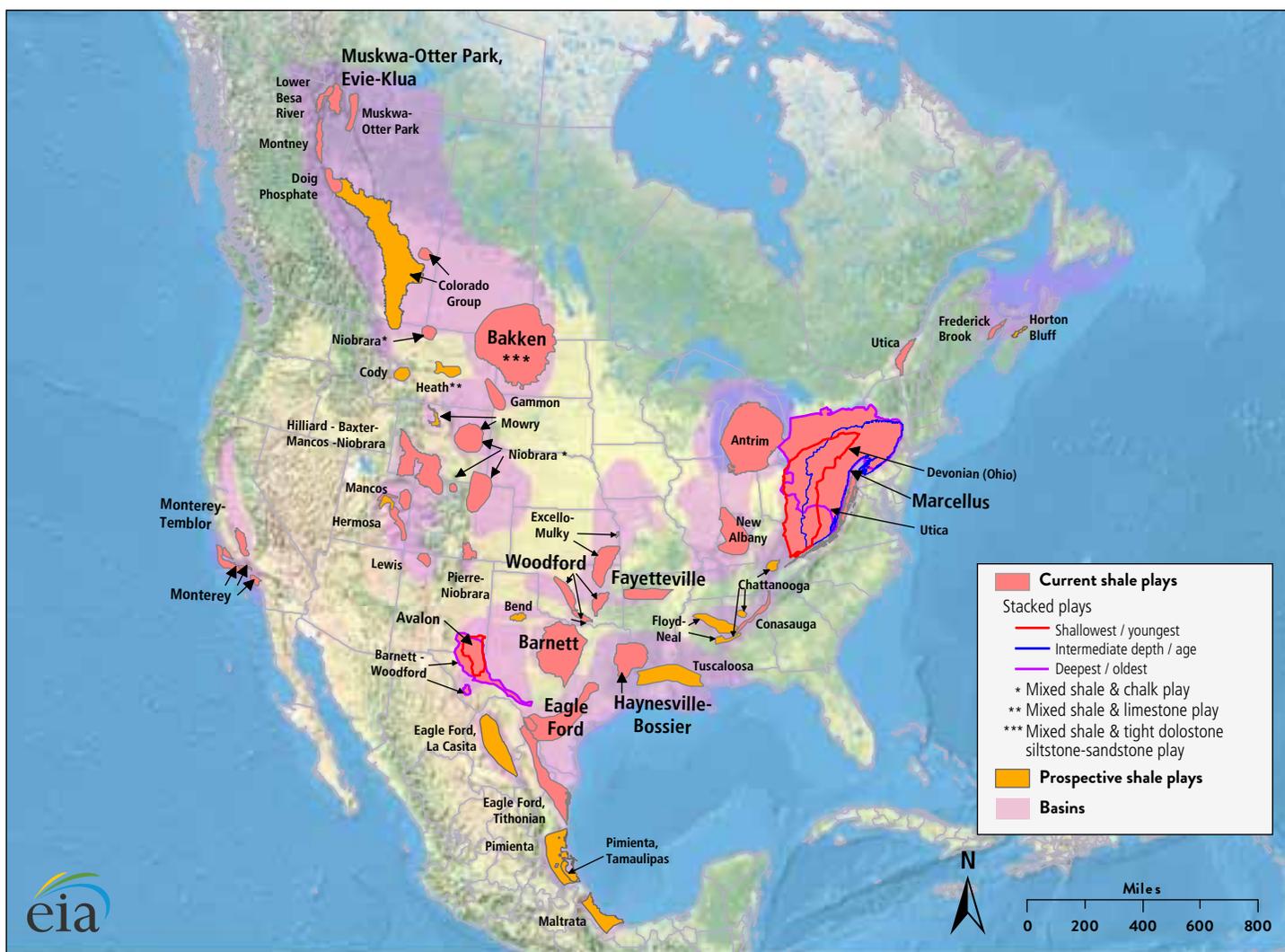
Dakota’s Bakken Shale formation. Until recently, the importance of shale was limited to introductory geology class. Now investors and geologists must know what makes this sedimentary rock so important (*see Did You Know*).

Is North Dakota just an economic anomaly or is it a remarkable foreshadowing of a revolution in U.S. energy production and a resurgence of economic growth? We review the evidence and suggest that even if tight oil and shale gas development in the United States does not revolutionize every aspect of our economy, it will bring a wealth of new opportunities for investors, workers and producers.

THE HISTORY

While recent developments in North Dakota are impressive, they beg many questions. How did

fig. 1 AREAS TARGETED IN NORTH AMERICAN FOR TIGHT OIL AND SHALE GAS POTENTIAL



Source: U.S. Energy Information Administration

these unconventional shale and tight oil resource areas (plays) become attractive for exploration? Why were natural resource producers not focused on these areas previously?

Part and parcel of the shale gas and oil revolution are economically viable methods for retrieving previously inaccessible or uneconomic reserves (**See Figure 1**). Because oil recovery is expensive—especially when it involves hard to get resources—the end price of oil goes a long way in determining whether or not a company pursues a given oil reserve.

As technology has improved, and as the price of oil has remained elevated for the past half decade, “horizontal drilling in conjunction with hydraulic fracturing has greatly expanded the ability of producers to profitably recover natural gas and oil from...shale [rock].”²

Defined by the American Petroleum Institute, hydraulic fracturing “is used to create spaces in the rock pores deep underground to release oil and natural gas so it can be brought to the surface...‘fracturing fluids’ or ‘pumping fluids’ consisting primarily of water and sand are injected under high pressure into the producing formation (*sic*), creating fissures that allow resources to move freely from rock pores where it is trapped.”³

Despite the contemporary controversy surrounding horizontal drilling and hydraulic fracturing (“fracking”), they are not new technologies. According to official records, the first horizontal well was drilled in 1929. Not only is horizontal drilling old news, hydraulic fracturing techniques have existed since the 1940s (**See Figure 2**). As with horizontal drilling, the question was less one of technological possibility but more of economic reality. Until recently, fracking was too expensive to be a cost effective means of resource recovery.

Without effective accompanying technology, commercial horizontal drilling did not occur until the 1980s.⁴ Since then, horizontal drilling activity accelerated quickly: in 1990 only 100 horizontal wells had been drilled. As of 2013 that number had increased to over 1,100 in the U.S. (**See Figure 3**).

MARKET STRUCTURE MATTERS

It was not *just* technological development that facilitated the recovery of unconventional oil and shale gas

DID YOU KNOW?

Quick Definitions²

Commentators bandy about a variety of different terms when discussing US energy prospects. Below we list the most relevant to our argument.

SHALE—Most common sedimentary rock, composed of silt to clay sized grains

TIGHT OIL—oil recovered by hydraulic fracturing of shale formations (e.g., Bakken Formation and Eagle Ford Formation)

SHALE GAS—Natural gas trapped inside shale rock formations, typically requiring hydraulic fracturing and or horizontal drilling techniques to recover

OIL SHALE—sedimentary rock that contains solid hydrocarbons called kerogen, a precursor to petroleum (e.g., Green River Formation)

SHALE OIL—the oil that can be obtained by cooking kerogen

OIL RESOURCE—Refers to the amount of oil in place in a given location, no matter if it is recoverable or not

OIL RESERVE—quantity of economically recoverable oil with present technology

reserves. Combined with technology, the especially accommodative market infrastructure undergirding oil and gas production in the United States dramatically increased the possibility of a “revolution.” Two features in particular distinguish the U.S. gas and oil industry: private ownership of mineral rights and the presence of many small, privately owned exploration companies.

In the United States, owners of private land have claims both above and below ground on their property. Private ownership of mineral rights in the United States (and Canada) stands “in contrast to countries such as Australia and most countries of the European Union and Latin America where [mineral rights] are exclusively state-owned.”⁵ Instead of applying to the government, oil and gas development companies in the U.S. wishing to drill on a particular plot of land need only undertake a private transaction with the landholder to lease or buy mineral rights.

The U.S. arrangement speeds connections between willing buyers and sellers. That is, if a company thinks a profitable opportunity exists, direct buying and leasing from the private property holder permits swift action. For example, in North Dakota, 82% of mineral rights are

privately-owned, 12% are owned by the Federal government and only 6% are owned by the state. According to the testimony of Lynn Helms, the director of North Dakota's Department of Mineral Resources, "It is this private ownership...[which] made development of the Bakken [shale] resources possible."⁶ (See Figure 4 on next page)

Though the private ownership of mineral rights paved the road for the shale and oil boom, without a glut of small, independently owned exploration companies, the discovery of the potential of these hard-to-access resources would not have come so quickly. Unlike the large oil conglomerates, which cannot justify unprofitable exploration, the smaller oil and gas companies have less accountability to a wide-variety of shareholders. Indeed, Exxon Mobil recently abandoned shale exploration in Poland after drilling two dry wells.⁷

ENERGY INDEPENDENCE AND THE U.S. ECONOMY'S MIRACLE CURE?

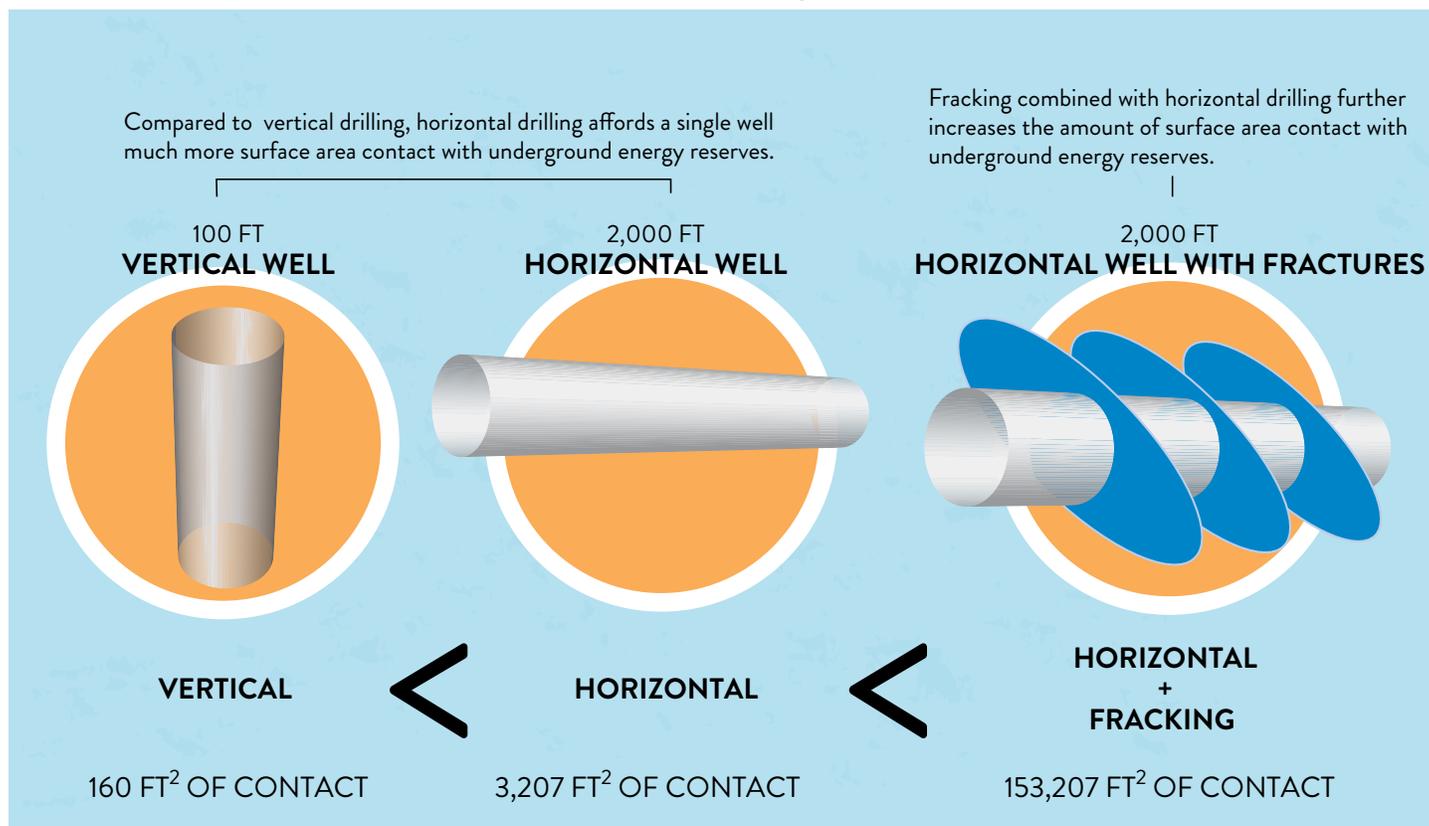
Oil and shale development in the U.S. has received much publicity. However, the exact economic consequences of a changing energy landscape are less certain and likely

less "revolutionary" than the hype suggests. Analysts at Citigroup have estimated that an increase in domestic production and a reduction of imports "could increase real U.S. gross domestic product (GDP) by 2% to 3.3%, or by \$370 billion to \$624 billion, by 2020."⁸

For the labor market, the benefits of the tight oil and shale gas "revolution" remain even less clear. Estimates for 2020 forecast 600,000 net new jobs created in the oil and gas extraction sector. Workers moving into the most productive sectors is healthy for the U.S. economy overall, but for low-skilled workers, the long-term job losses in manufacturing and construction will partially offset the "new" jobs created by the oil and gas industry. Since the start of the recession, constructing and manufacturing lost nearly four million workers: mining, on the other hand, gained 106,000 jobs over the same period.

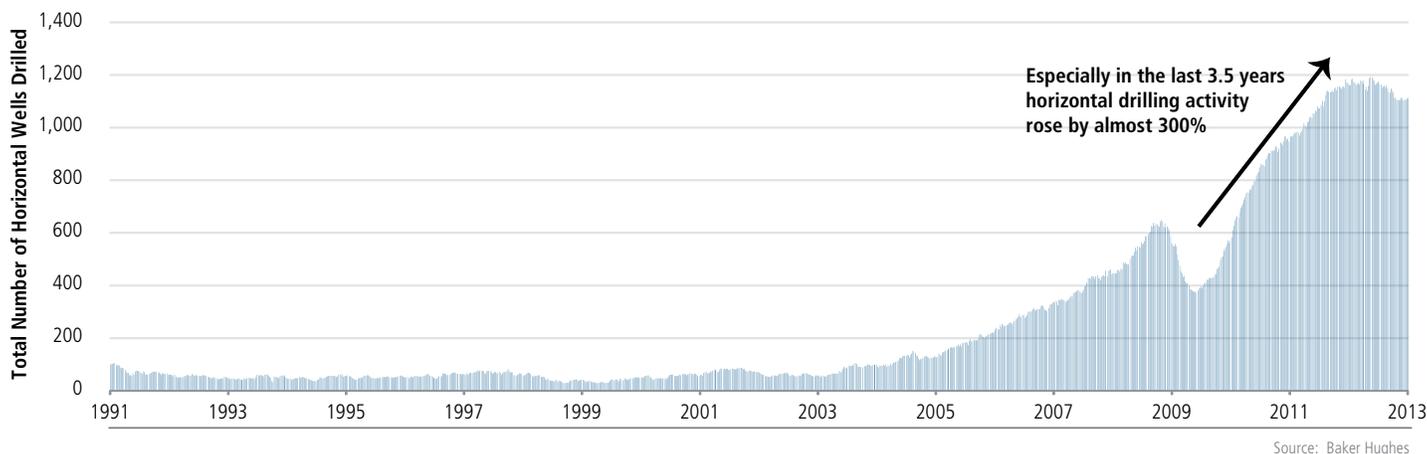
Even though the mining sector evinced strong resilience throughout the recent downturn, jobs in oil and gas exploration account for only a small fraction of total mining employment (roughly 20%). As a result, the employment gains attendant upon the tight oil and shale revolution will likely appear elsewhere. Increases

fig. 2 THREE DRILLING TECHNIQUES EXPLAINED



Source: Fleckenstein, William. "Shale Drilling and Completions"

fig. 3 WELL, WELL: HORIZONTAL DRILLING IN THE U.S. INCREASED SHARPLY IN THE PAST 5 YEARS



in petroleum engineering, energy specific software programming, and financial services related to financing new ventures: all these, in aggregate, will outweigh the gains seen in oil and gas extraction labor.

No matter the employment or growth benefits of the tight oil and shale gas “revolution,” the U.S. will not be fully “energy independent.” Even if U.S. producers could supply enough for U.S. consumers, the price of oil is determined on a global market. For example, just as Washington state apple producers sell their apples to the highest global bidder, so too do oil producers sell their product to whomever will pay the most.

Domestic demand and supply dynamics alone would not determine the price of oil as global competition would quickly arbitrage away any difference. In fact, supply independence is only a fully pressing concern during sudden shocks to global supply—as in times of war. Otherwise, regardless of our domestic capacity to produce, we will continue to import oil.

While net oil imports have fallen by roughly 25% since peaking in 2005, oil imports still account for 45% of the total share of demand—so while we may see a slight reduction in the trade deficit due to increased domestic oil production, a wholesale evaporation of cross-border oil trade seems unlikely.

Further, natural resource recovery depends on the price that end-of-the-line petroleum products fetch. Final purchases must validate the marginal cost of production. The price of oil drives the profitability of recovering difficult or expensive oil and gas resources. Present estimates suggest that, “despite their complex features,

most of U.S. shale and tight oil are profitable at a price of oil (WTI) ranging from \$50 to \$65 per barrel, thus making them sufficiently resilient to a significant [though brief] downturn of oil prices.”⁹

We have already seen the effects of low prices on the willingness to pursue resources in the natural gas sector. Since 2008, natural gas prices have remained stubbornly low due to a glut of supply and dampened demand, hovering around \$3.75 per million btu (British thermal unit). For producers, “at \$3 flat gas, it’s a 21% rate of return; at a \$4 flat price, it’s 56%; at \$5, it’s over 100%... it’s about opportunity cost. And you can make a lot more money with \$90 oil than with today’s \$3.75 gas.”¹⁰

OPPORTUNITY FOR INVESTORS?

Regardless of the magnitude of the economic impact, in the U.S., investors may reap the benefits of the shale boom as energy production evolves. Energy master-limited partnerships (MLPs) are one of our favorite avenues for investment in this macro economic trend (see our previous article on MLPs). MLPs are publicly-traded partnerships that own supply-side infrastructure such as pipelines and storage facilities for petrochemicals like crude oil and natural gas. Rather than owning a company, MLP “unitholders” purchase claims to a portion of the operating income. As of 2012, the total market cap for all publicly listed MLPs exceeded \$250 billion.

Master limited partnerships evidence the near seamless dovetailing in the U.S. gas and oil industry between interested investors and capable producers. Ventures such as these (MLPs came about in the 1980s) are a singularly American feat. Only in the U.S. are the rights to

DID YOU KNOW?

Unpredictable Innovation

Few, if any, could have predicted the evolution of the industry. The advent and subsequent development of extraction technologies has made previously unavailable resources accessible. Fittingly, Anne-Sophie Carbeau from the International Energy Agency remarked, “a few years ago the United States was ready to import gas. In 2009 it had become the world’s biggest gas producer. This is phenomenal, unbelievable.”

Compared to conventional natural resource recovery, the oil and gas trapped in shale is more difficult to access because of the low-permeability of shale rock. Resource extraction from shale requires unconventional methods which allow the oil and gas to flow out of the rock in that it is held. The Bakken Shale formation in North Dakota is a fine example of a well-endowed but unconventional “play” (industry jargon for a geologically attractive area for natural resource extraction).

infrastructure unbundled from the resources using the infrastructure.

This means that one company can own and lease the use of its infrastructure (say, a section of an oil pipeline) to smaller drillers who want to pipe their oil to a refinery owned by yet another company. Elsewhere (e.g. Russia), law stipulates that only those owners of the infrastructure may employ it for their product. Such high costs of owning and operating infrastructure discourage, and in some cases prohibit competition from enterprises.

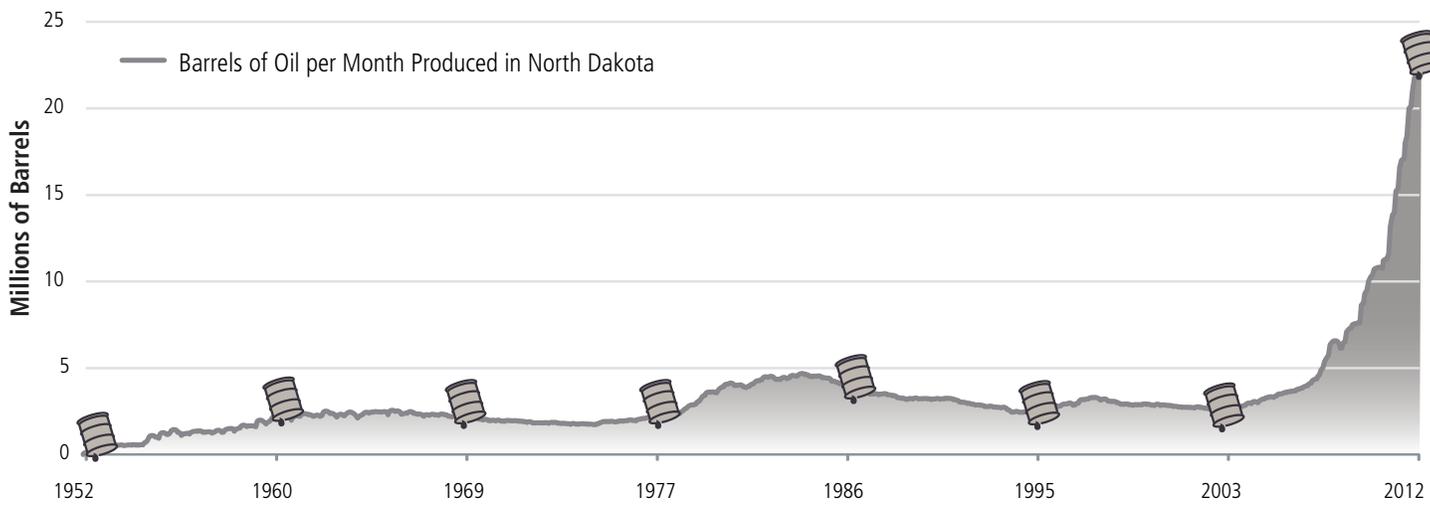
THE HURDLES: ENVIRONMENTAL OBJECTIONS AND POLITICAL CONCERNS

Simply because new techniques and technologies exist for utilizing once inaccessible or uneconomic resources does not mean that the evolution of the industry will occur immediately, easily, or profitably. Among a host of unsolved problems perhaps the two most significant outstanding unknowns are the social resistance (environmental/political) and the price of oil. As discussed above, dramatic declines in the price of oil discourage expensive exploration and development. If oil prices fell below \$50-\$65 per barrel for extended periods of time, the profitability of tight oil and shale development could fall.

As for the social resistance, controversy abounds. Already environmental activists have questioned oil companies on public health issues and geologic destabilization. These claims have not been taken lightly. In his 2012 State of the Union address, President Obama pledged to rein in U.S. “frackers” by requiring them to disclose the chemical content of their fracking solutions.¹¹

Complicating the already murky public discussion, scientific studies also lack broad agreement. A 2011 National Academy of Sciences found fracking to be potentially harmful to those near active sites, while a recent MIT study found that the cases of groundwater contamination due to fracking were limited enough as to be nearly negligible.^{12,13}

fig. 4 NORTH DAKOTA OIL PRODUCTION GOES VERTICAL



Source: North Dakota Oil and Gas Division

THE ULTIMATE RESOURCE

U.S. tight oil and shale gas development has only just begun its latest phase of evolution. Will it bring a much heralded robust recovery? Will American oil producers become the new OPEC?

The late economist Julian Simon noted that “the main fuel to speed the world’s progress is our stock of knowledge, and the brake is our lack of imagination.”¹⁴ The “ultimate resource” is the human mind. So while the world may have non-renewable resources in the form of fossil fuels, our capacity for innovation and invention will persist.

“**MASTER LIMITED PARTNERSHIPS EVIDENCE THE NEAR SEAMLESS DOVETAILING IN THE U.S. GAS AND OIL INDUSTRY BETWEEN INTERESTED INVESTORS AND CAPABLE PRODUCERS.**”

Forecasting is a challenge, especially in economics and finance where case studies and controlled experiments are dreams not standard operating procedure. However, the recent activity in oil and gas exploration and development in the United States demonstrates at least that when pressed by necessity, the “ultimate human resource” and a congenial market structure make for exciting and unknown outcomes. Pessimists take heed—new ideas for economic growth often appear from unexpected avenues.

Few would have guessed the results of a recent “controlled economics experiment” in North Dakota: the lowest unemployment rate and the fastest house price increase in the United States after the worst economic recession since the Great Depression.

SOURCES

- 1 Lincoln Institute of Land Policy, Bureau of Labor Statistics
- 2 U.S. Energy Information Administration. “Review of Emerging Resources: U.S. Shale Gas and Shale Oil Plays.” (July 2011).
- 3 American Petroleum Institute (2010)
- 4 Energy Information Agency (1993)
- 5 University College London
- 6 Platts.com
- 7 Harvard Belfer Center (2012)
- 8 Harvard pg. 63
- 9 Harvard, pg. 45
- 10 Financial Times. “U.S. set to require disclosure from ‘Frackers.’” (2012).
- 11 *Ibid.*
- 12 Osborn, et, al. “Methane Contamination of Drinking Water Accompanying Gas-well drilling and Hydraulic Fracturing.” Proceedings of the National Academy of Sciences, Vol. 108, No. 20 (2011).
- 13 MIT. The Future of Natural Gas. Cambridge, MA: MIT Energy Initiative, 2011, pg. 40.
- 14 Julian Simon, “The Ultimate Resource II: Preface,” Princeton University Press, 1998.

"Civilization advances by extending the number of important operations which we can perform without thinking of them."
 – Alfred North Whitehead

Automation lies at the heart of human progress. In fact, automation *is* progress. Eliminating the role of deliberate human actions and decisions in one area frees up time and resources for humans to work on other projects. Next up, your car.

Those who doubt the possibility of this future path take note: the revolution will be incremental. Little improvements that we use push us daily in this direction. Where would you be without your GPS navigation with turn-by-turn instructions? Your auto ignition start while outside the vehicle? Your automatic parallel parking feature? The driverless future is closer than it appears.

DRIVERLESS VEHICLES: The Future is Closer than it Appears

WHEN IT COMES TO THE FUTURE, ONE WORD SAYS IT ALL: YOU NEVER KNOW. — YODI BEBARR

FUTURE NEXT EXIT

34,676
DEATHS INVOLVING AN AUTOMOBILE IN 2011



CAR ACCIDENTS ARE THE NUMBER 1 KILLER OF 15 to 29 YEAR-OLDS



62%

OF ALL TRAFFIC FATALITIES OCCUR IN JUST 10 COUNTRIES

INDIA, CHINA, US, RUSSIA, IRAN, MEXICO, INDONESIA, SOUTH AFRICA, EGYPT

PARKING LOT
 In congested urban areas **ABOUT 40%** of total gasoline usage is by drivers seeking parking spots and **30%** of land is used to make parking lots (that's 3 parking spaces for every car)

PRESENT POP. 8 BILLION

PRODUCTIVITY LOST

The average American commuter now spends **250** hours a year behind the wheel of a vehicle; whether the value of that time is measured in lost productivity, lost time pursuing other interests, or lost serenity, the cost is high

WASTED RESOURCES

Despite years of encouraging environmental consciousness, in 2010 **86%** of all U.S. workers 16 years of age and older commuted to work in a car, truck, or van, and **89%** of those drove alone—only **11%** traveled in a carpool

Human beings were not engineered to operate vehicles at high speeds

World	Deaths in Millions	% of Deaths
Road traffic accidents	1.21	2.1%
Diabetes mellitus	1.26	2.2%
Tuberculosis	1.34	2.4%
Trachea, bronchus, lung cancers	1.39	2.4%
HIV/AIDS	1.78	3.1%
Diarrhoeal diseases	2.46	4.3%
Chronic obstructive pulmonary disease	3.28	5.8%
Lower respiratory infections	3.46	6.1%
Stroke and cerebrovascular disease	6.15	10.8%
Ischaemic Heart Disease	7.25	12.8%



Even a **10%** reduction in infrastructure investment would result in savings of **\$7.5 Billion** per year, or **\$75 billion** per decade

LESS INFRASTRUCTURE

In the driverless future, collaborative consumption (widespread car sharing made possible by GPS technology) could dramatically reduce demand for new vehicles. A **20%** reduction in demand in the U.S. would mean 2 million fewer future purchases—to about 13 million units

FEWER RESOURCES NEEDED

1.6 million heavy truck drivers
1.3 million delivery drivers
647,000 bus drivers
250,000 taxi drivers

Would be replaced by autonomous delivery vehicles at a fraction of the cost

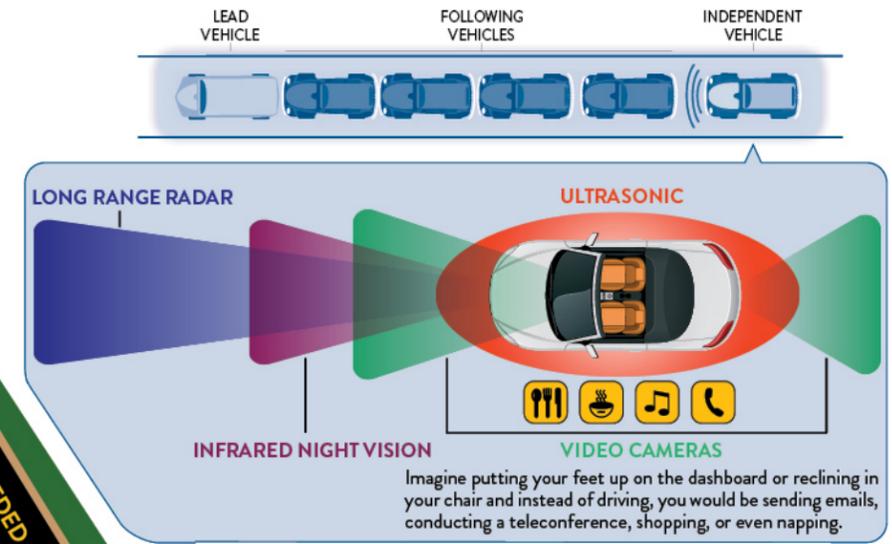
This crashless future would eliminate the injuries and property damage associated with vehicle crashes and save more than **30,000 lives a year**

Hospitals would lose more than two million crash victims sent annually to U.S. emergency rooms and the resulting **240,000 annual hospitalizations**. Few, however, would lament these declines

FEWER DEATHS AND LESS DESTRUCTION

ROAD TRAVEL WILL BE LIKE A TOUR DE FRANCE PELOTON

Driverless vehicles would "communicate" with each other to find vehicles headed to the same destinations. "Platooning" alone would reduce the effective drag coefficient on following vehicles, and could reduce highway fuel use by up to 20 percent (just as "drafting" behind the lead allows cyclists to reduce their exertion). By "platooning," just as professional cyclists do in a peloton, vehicles could increase highway lane capacity by as much as 500%.



GOOGLE HAS ALREADY LOGGED MORE THAN

200,000 MILES

IN A FLEET OF SELF-DRIVING CARS RETROFITTED WITH SENSORS



SOURCES: World Health Organization (2011) and KPMG Center for Automotive Research, "Self Driving Cars: The Next Revolution", (2012).

Gutenberg Online: The *End* of Education as We Know It

In less than two decades, the internet has fundamentally altered most of what we do and how we act each day. Mail, music, movies, books, television, even hailing taxis have all migrated from the old world to the new, changing the most routine of our daily tasks. Where information abounds, the internet has helped package and distribute content to the end user in an incredibly efficient manner.

Not all analog antiques have slipped off stage, though. As one of the oldest means of transmitting information, higher education has, until recently, remained relatively undisturbed. With its long history and well established traditions, higher education will be the next to change. Excessive costs and mediocre results have even the staunchest skeptics of online education ceding ground.

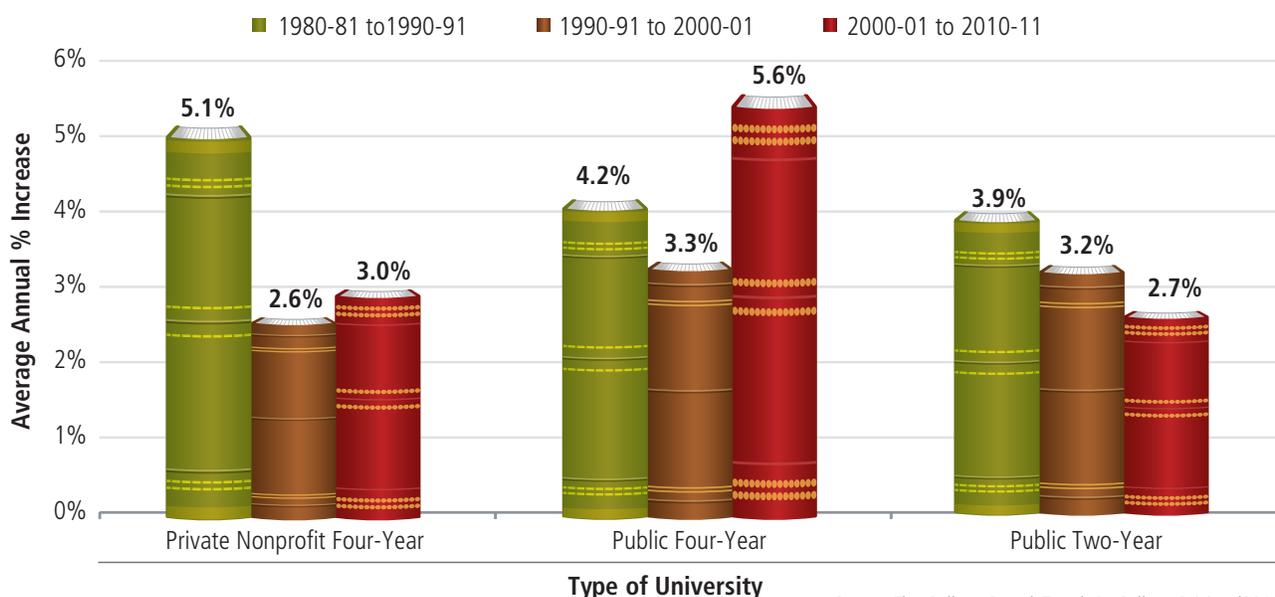
Too harsh a critique? Consider that not only has the cost of education outstripped the general rise in the cost of living (as measured by the consumer price index), it also rose faster than house prices during the largest bubble in a generation. Since 1980, tuition at four year private

colleges and universities averaged a 3.6% annual increase, adjusted for inflation. Public universities were no better, averaging annual tuition increases of 4.4% (See Figure 5).

This would be acceptable if the results were spectacular. But are they? Not necessarily—at least not based on some recent metrics. The average student walks away from a four-year institution with \$20,000 in debt. Worse, the unemployment rate for recent college graduates clocks in at 50.3%—nearly four years into the economic recovery.¹ The combination of high debt burdens and difficult job prospects has prompted worries about a “student-loan bubble.” With \$953 billion worth of outstanding student loan debt in the US (a total greater than all outstanding credit card debt!), future students and student families wonder, “Is this a good long-run investment?”

Or, more importantly, is there another way? The stage is set. As a new medium alters the way we teach, learn, and certify students, for the 4,500 colleges and universities in the United States, creative destruction is on the doorstep.

fig. 5 TUITION ON THE RISE ACROSS ALL INSTITUTIONS



Source: The College Board, Trends in College Pricing (2010)

While some detest the idea that something as important as the process of education should be online, others are quite ready for the next “Gutenberg moment” (See *Did You Know*).

THE GUTENBERG PRESS AND THE “FOURTEENTH-CENTURY CLASSROOM”

Despite the costs, classroom learning remains decidedly stuck in the pre-Gutenberg era. Professors at Oxford today would be comfortable as professors at Oxford in the fourteenth century.

But online education technology is changing all of this. A sure advantage of online education mirrors the current disadvantage faced by colleges and universities: cheap cost of production. Though the kinds of “classrooms” available online will evolve and change, two primary models currently dominate: massive online open courses (MOOCs) and traditional blackboard learning online (such as Kahn Academy, an online learning site with narrated lessons and a digital blackboard). The latter started as a tutoring program for younger family members and has turned into one of the most popular and widely used learning platforms online.

Most new online learning platforms employ massive online open courses—again MOOCs. MOOCs operate like gigantic lecture halls, allowing up to (in the case of one Stanford hosted MOOC) 100,000 students to enroll in any one given course. Software grades the assignments, students “gather” (typically online) to discuss and review each other’s work, and the professor need never leave the comfort and convenience of her own regular classroom—just install audio/video.

FROM DIPLOMA TO CERTIFICATION: THE BARRIERS

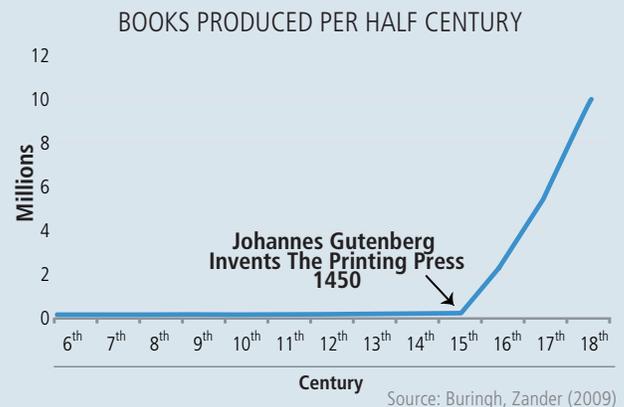
However, all of this assumes online courses can provide a comparable education that holds the same value to potential students as a degree from a traditional accredited university. And this is by no means a foregone conclusion. Despite the recent boom of online options, few, if any, have identified a means of certification that holds the same weight as the certifications provided by existing brick-and-mortar institutions—yet.

That the quality and real content contained in a degree differs depending on the student and the institution which awarded the degree does not mean that traditional certification has not worked. Instead of

DID YOU KNOW?

The Gutenberg Moment

Why do economists care about the Gutenberg printing press in 1450? The press unleashed a spread of ideas and knowledge unseen in human history. It also brought about part of (or at least coincided with) the epic rise in standard of living over the past few centuries beginning in Western Europe and spreading worldwide. In simple terms, the proliferation of books is the proliferation of “a crucial part of the information infrastructure” and the hardware on which “are stored all ideas.”²



having to administer their own certification processes, employers depend on accreditation and past experience to determine the quality and applicability of a degree.

Certification will be an important problem for online education institutions to solve. Not that this problem has escaped the notice of these new educators: Udacity, for example has developed a credentialing program for the graduates of some of its programs. For a fee, students can pay to take a course and study for an examination. If they pass the test, Udacity awards a certificate of proficiency.

Additionally, Udacity offers for its “graduates” a “free job-matching program in which résumés are sent to partner companies, including Google, Bank of America, Twitter, Facebook and TrialPay, based on their job openings and the student’s analytic metrics (grade, participation level).”³

Though these programs seem particularly fitting for quantitative study (where software programs can effectively provide feedback about student performance), humanities education online proves more difficult. After all, there is no single right answer to an essay question: elements of style, composition, and the like are subjective.

There are, however, other models where the new online education ventures become something like a supplement to older forms of education. Especially with regards to “remedial courses and gateway introductory courses in subjects like economics or statistics,” the MOOC model allows pre-existing educational institutions to work with new online outfits to lower costs.⁴

foregoing these other more ineffable qualities of traditional education.

Internet-based retailers initially faced the same criticism. Skeptics charged that online vendors were unlikely to replace brick-and-mortar variety where customers could see, touch, feel and experience the products while conversing with a trained, knowledgeable salesperson.

As it turns out, Amazon.com does not yet fully replicate the physical experience of shopping. Revenues alone though suggest that customers do not mind. In addition to lower costs, internet shopping produced an entirely new ecosystem of product reviews and recommendations that far outpace anything available at the local mall or big box store (with both institutions beating a hasty retreat in recent years).

Further, as tuition increases at colleges and universities have been dramatic, so too have these institutions increased spending per student. Higher tuition not only has to do with supply and demand for the certification, but also the higher costs associated with providing a certain educational experience. From 2000 to 2010, across all sectors of higher education, no operational expense required more budget space than spending on student services (*See Figure 6*). Will this continue?

YOU ARE ONE OF THE LUCKY ONES

While we can speculate on what the future of education will be, the advent of online education suggests an alternative (or at least a complementary option) for schools and students facing increasing financial pressures. More-

IN LESS THAN TWO DECADES, THE INTERNET HAS FUNDAMENTALLY ALTERED MOST OF WHAT WE DO AND HOW WE ACT EACH DAY.

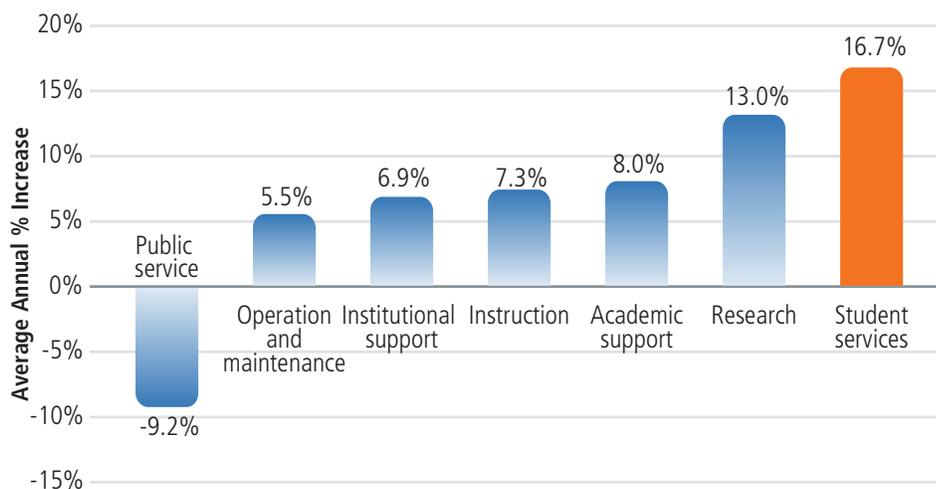
In a most striking example, in the fall of 2012, Antioch University “agreed to offer its students credit for successfully completing” two courses provided by a new online venture, Coursera. Such a practice made “Antioch...the first college to pay a licensing fee” to a new, venture capital funded online education provider.⁵

Even if it is too early to declare these pioneering partnerships a success, they appear to be the first step toward achieving the credible certification usually reserved for brick and mortar educational institutions. If approaches such as these prove tenable, the lower cost model of online higher education would present more robust competition to existing models.

THE FUTURE IS ONLINE. YES, THAT MEANS YOU, RESIDENTIAL COLLEGES

Another barrier to entry for online educators is their inherent inability to offer a comparable college experience. The medium prohibits it. The social and experiential education offered by colleges where students are away from their homes, most likely for the first time, cannot be replicated. But for those students who are more interested in solely developing a skill set or body of knowledge, the relative price of the online education may be worth

fig. 6 OVER THE PAST DECADE, HIGHER ED. SPENT MORE ON STUDENTS THAN ON RESEARCH



Source: Delta Cost Project

over, the increased competition generated by online options will force traditional universities to adopt more effective models, both for teaching and for certification. Online education as we know it now may not be the exact answer for the future; but the fresh and innovative energy it has injected into the education sector has already positively affected students looking for other options and schools who have no choice but to find other options.

Despite potential upheaval, online education holds great promise for the future of economic growth. Beyond the confines of higher education, if you hold this printed object in your hands (or peruse the pixels on your screen), you are one of the lucky ones. In the developing world, access to education is still limited. Online ventures are hard at work to change that. As Tom Friedman recently remarked: “the big breakthroughs come when what is suddenly possible meet with what is desperately necessary.”⁶ The “Gutenberg moment” has arrived.

SOURCES

- 1 Harrington, Paul. (2012) “The Employment and Mal-Employment Situation for Recent College Graduates: An Update.” The number is an average of the 20-24 and 25-29 age brackets.
- 2 Eltjo Buringh and Jan Luiten van Zanden, “Charting the ‘Rise of the West’: in Manuscripts and Printed Books in Europe, A Long-Term Perspective from the Sixth through the Eighteenth Centuries,” *The Journal of Economic History*, Vol. 69, No. 2 (June 2009).
- 3 Lewin, Tamar, “Students Rush to Web Classes, but Profits May Be Much Later,” *The New York Times*. 6 January 2013.
- 4 Pappano, Laura, “The Year of the MOOC,” *The New York Times*. 2 November 2012.
- 5 *Ibid.*
- 6 Thomas Friedman, “Come the Revolution,” *NYTimes.com*, 15 May 2012.

South Korea: *Lessons For Global Development*

The rapid economic growth of so-called “emerging markets” is *the* most important feature of the world economic landscape since the dawn of the 21st century. This story alone explains the ascension of billions of people from abject poverty to relative prosperity and accounts for most of the growth in the total size of the global economy from \$42 trillion in 2000 to \$75 trillion today.¹

Despite a doubling in world population since 1955, the absolute number of poverty-stricken humans on earth is lower today than in the 1950s. In percentage terms, humans in poverty tumbled from nearly 40% of the world population to less than 18% by 2010. So dramatic has been the transformation that, in some cases, it is no longer responsible or fair for investors to label certain countries “emerging” or “developing”—they have more than emerged.

South Korea is the example par excellence. Though Korean products surround us—Samsung, Kia, and Hyundai—few people *think* about South Korea.² Still fewer think of South Korea as a developed economy. Yet, as we discuss below, Korea’s economic rise is remarkable and holds lessons for China and other economies supposedly still “emerging.”

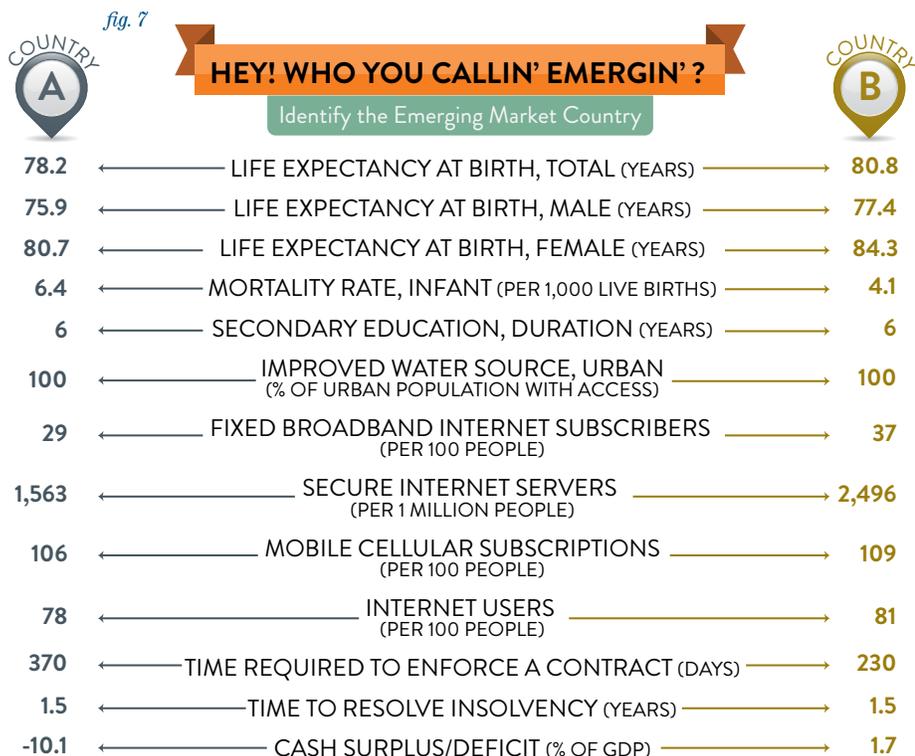
KOREA: “THE IMPOSSIBLE COUNTRY”

According to Kim Dong-jin, the long-time advisor to President Park Chung-hee, South Korea was “the poorest, most impossible country on the planet.” In fact, in 1960, after the Korean War, South Korea had a per capita gross domestic product (GDP) in 2005 inflation-adjusted US dollars of less than \$100, making it one of the poorest countries on Earth. A third of the population wandered homeless and the government relied on steady doses of foreign aid (mostly from the United States) to make ends meet.

Today, by contrast, the average South Korean lives 26 years longer and the per capita GDP is over \$27,000, making it one of the wealthiest countries on Earth.

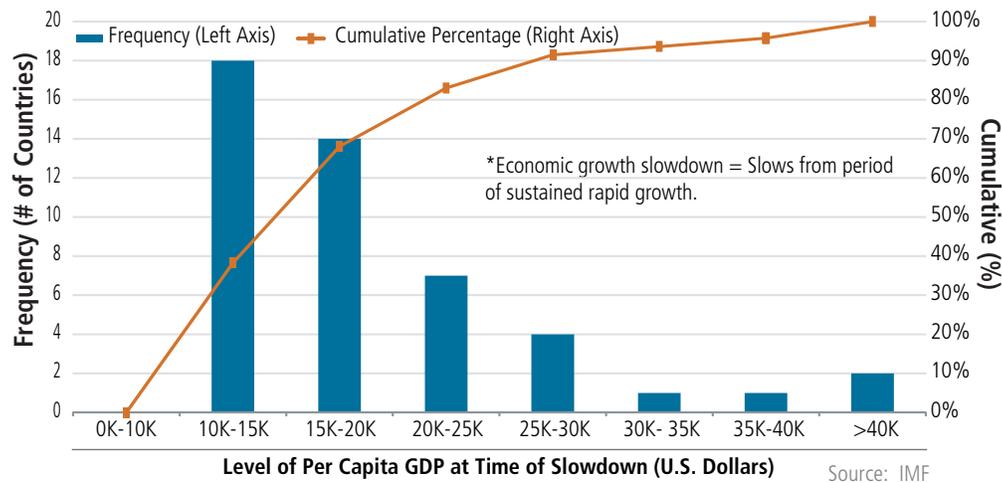
A MIRACLE OR A “PRIORITY ON PRODUCTION”?

Korea’s rise is nothing short of a miracle. *Or is it?* According to economists, three factors drive long-run economic growth. The first factor is population. More people means a greater quantity of goods and services that can be produced. Second, the stock of capital (equipment and facilities that people use to produce “stuff”) holds important consequences for growth. More equipment and technology increase productivity. Third, and finally, the



Source: World Bank World Development Indicators
 Answer: Country A is the U.S. with per capita GDP of \$42,486. Country B is South Korea with per capita of GDP of \$27,541.

fig. 8 MOST EMERGING COUNTRIES SLOW* UPON REACHING \$10,000-\$20,000 PER CAPITA GDP



techniques of production, such as higher-yielding crops, faster computers, and more efficient management, facilitate and encourage long-term increases in output.

These three factors are well and good in theory—but they needlessly complicate the story. Instead, the heart of economic success lies with producing stuff for the world. With a relatively small domestic market, for South Korea, exports were the key. In short, economic growth in Korea is “virtually synonymous with” export growth.³

The upward march began in the 1950s with exports of everything: tungsten, iron ore, raw silk, seaweed, fish and rice. In the 1960s, Korea increased exports of all kinds of consumer products—from footwear to children’s toys. In the 1970s, attention shifted from consumer goods exports to capital-intensive activities, like shipbuilding.

As a share of GDP, South Korea’s exports rose from near zero after the Korean War to 30% by the late 1980s. Then Korea’s exports surged again to nearly 45% of GDP prior to the most recent crisis in 2007. Exports went from \$100 million in 1964 to \$10 billion in 1977 to \$548 billion in 2012. As a consequence, from the 1960s to the mid-1990s, annual economic growth averaged 9%.

The typical retelling of this success story focuses on the *chaebol* led growth: the Korean conglomerates with access to cheap funding powered export-led growth.⁴ One need only peruse the Kospi-100 stock index, comprised of the largest Korean firms (similar to the Dow Jones Industrial Average) to find the much-vaunted *chaebol* firms. For example, Samsung,

the biggest conglomerate, accounts for 20% of South Korean exports. But this angle is overemphasized: cheap funding alone is not sufficient to power an economy to world class status. While fewer than 10 firms outside the original *chaebol* club claim annual revenues in excess of \$1 trillion won (\$900 million), the firms that do, do so by out competing on the innovation front (mostly technology and internet-related companies). Producing for global consumers with high valued added exports remains the recipe for success.

HEY, WHO YOU CALLIN’ EMERGIN’?

South Korea has triumphed. Today it ranks as the 12th largest economy on earth, nipping at the heels of Spain and Mexico for entrance into the global top ten economic powers. On a per capita GDP basis, South Korea is now in 11th place, just behind Japan—yes, Japan—at number ten.

As a result, we think South Korea deserves to be in a different club (see **Figure 7**). In fact, we challenge readers to take a moment and view **Figure 7**: on the basis of the criteria listed, which would seem to be the developed market and which would be the so-called “emerging market” country?

When judging the relative “emergence” of an economy, the most commonly-used metric is per capita GDP. On this basis the US beats South Korea \$43,000 to \$27,000 in inflation-adjusted 2005 dollars. But, on a wide variety of other metrics, from years of education, to life expectancy, to literacy—and even the ease in establishing

(or liquidating!) a business, South Korea fares better than the United States. The country also outpaces much of the developed world in infrastructure and internet connectivity.

Yet the myth persists. Barclays, which publishes fixed-income indices used by investors worldwide, reiterated in November 2012 that South Korea remains in the “Emerging Market (EM) Bond Index because [it includes] countries that bond investors generally classify as EM.”⁵

LESSONS FOR GLOBAL DEVELOPMENT

From 2001 to 2007 Korea’s growth rate slumped to an annual average of just 4.7%. Analysts lamented policy “mistakes” and cheap labor producers (e.g., China) for competition. However a little perspective should provide investors more appropriate guideposts for thinking about the future of the world economy.

Lesson #1: A growth slowdown is *not* remarkable based on modern economic history. If history is any guide, for rapidly-developing countries, a slowdown seems inevitable. In fact, once a country’s purchasing power parity (PPP)-adjusted per capita GDP hits \$14,000 (or, to treat the data with benign skepticism somewhere between \$10,000 and \$20,000), GDP growth slows. After breaching the per capita GDP threshold for the first time, no advanced economy returned to above a 4% annual growth rate for any extended period of time (see *Figure 8*).⁶

Is this the fate awaiting China? Most likely. China’s PPP-adjusted per capita GDP is approximately \$9,000, suggesting its potential growth rate should slow from double-digits to the 7-7.5% range.

Why do rapid-growth economies slow? Just as with the lesson of South Korea, imitation is easier than innovation. Fast growing economies absorb, use and implement ideas and technologies already tested in the developed world—but at some point this absorption reaches saturation.

Lesson #2: The epic rural to urban worker migration boosts labor productivity while keeping a lid on wages—a boon to manufacturing and production sectors that export goods. But, this reaches a limit. In almost every fast-growing economy (South Korea included), there is a limit to the shift from agricultural workforce to

manufacturing. In 1960, the population of Seoul was 2.4 million. Seoul today: 10 million in the city and 24 million in the broader metropolitan area—nearly 50% of the country’s population. This rapid rise in urbanization, from 20% in the 1950s to over 80% in cities today is faster and more impressive than China’s current miracle. Further, urbanization seems to slow once it reaches 75% of a country’s total population. According to United Nations data, China will reach the 75% threshold in 2040, so there may be some room to run in China’s long-term economic expansion.

Lesson #3: Most countries see manufacturing start to decline just before manufacturing jobs reach 30% of the total labor force. South Korea had reached 30% of its labor force in manufacturing by 1990, with the manufacturing share on the decline ever since, replaced by a rise in the services sector. A decline in manufacturing as a share of GDP and employment accompany economic maturity not economic decline. Investors should be wary of explanations that a country is “losing its competitive edge.”

“THE RAPID ECONOMIC GROWTH OF SO-CALLED “EMERGING MARKETS” IS THE MOST IMPORTANT FEATURE OF THE WORLD ECONOMIC LANDSCAPE SINCE THE DAWN OF THE 21ST CENTURY.”

Lesson #4: Despite the impact of the *chaebol* on economic development, the large firms are true global competitors, not insulated domestic producers. Samsung, Hyundai, LG all produce for the world, where the best products win. Entrepreneurship and innovation hold the key to the future: can Korea compete on the global stage? Can China? According to the US Patent and Trademark Office (PTO), in 2011, Korea ranks #6 on the global patent filings, trailing only the United States, Japan, Germany, Taiwan, the United Kingdom and France.⁷ Developed-world aspirants should take note and investors should watch these metrics.

THERE ARE NO MIRACLES

Economic growth is no “*miracle*”—we can explain and understand its causes. The South Korean experience tells investors that no country should be ruled out of possible development in the years ahead—even from a lowly starting point of \$100 per capita GDP, a vast army of homeless citizens and dismal prospects.

However, once rapid development occurs, investors should recognize the emphasis on continued high rates of annual growth as unrealistic. Pessimism with regard to Korean growth is misplaced. Averaging nearly 5% annualized before the financial crisis outbreak in 2007, South Korean growth registered at nearly double the pace of developed world growth—still a stellar achievement. Further, a skilled and well-educated workforce, a collection of world class and world-leading businesses hold promise for the future.

What’s more, a growth slowdown is inevitable for some areas of the high-flying growth regions in the developing world—but this does not mean the most remarkable story of economic transformation is over.

It means investors must continually reassess what “emerging” means.

SOURCES

- 1 Barry Eichengreen, Donghyun Park, Kwanho Shin, “Growth Slowdowns Redux: New Evidence on The Middle Income Trap,” NBER Working Paper 18673, January 2013.
- 2 Daniel Tudor, “Korea: The Impossible Country”
- 3 Barry Eichengreen, Dwight H. Perkin, Kwanho Shin, “From Miracle to Maturity the Growth of the Korean Economy,” Cambridge: Harvard University Press, 2012.
- 4 Lee, Hong Yung. “South Korea in 1992: A Turning Point in Democratization.”
“Asian Survey (1993): 32-42.
- 5 “Barclays Announces Changes to Its Benchmark Fixed Income Indices,”
5 November 2012.
- 6 Barry Einchengreen, Dwight H. Perkins and Kwanho Shin, “From Miracle to Maturity: The Growth of the Korean Economy,” Cambridge: Harvard University Press, 2012.
- 7 U.S. Patent Office.

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