Payden&Rygel

# POINT of VIEW

WINTER 2017

*Our Perspective on Issues Affecting Global Financial Markets*

# Peak Hipster:
## Gentrification and The Next Phase In Housing

Downtown streets teem with fixed-gear bicycles. The pungent smell of pomade overwhelms any fumes arising from a vegan restaurant's grill. Food trucks idle and phone-toting social-media-masters queue in front of dog parks and yoga/barre studios. Whether in Brooklyn or Silver Lake, Allston or the Mission, Wicker Park or Capitol Hill, the gentrification of neighborhoods near the city center is a familiar sight to twenty-first century Americans.

But how can we explain the Hipster—a stylish subset of Millennials—boom? Many believe that young people today simply desire a different kind of lifestyle, that the recent declines in homeownership betray a shift in preference, that Millennials are unique in their city-living ways. We disagree. Much of what we observe as gentrification is just the result of *changes in the age distribution of the American population*. Combined with the suburban flight of prior generations, these demographics account for a large fraction of the recent boom in urban living. With this foundation laid, we contemplate alternative futures for the $23 trillion U.S. household real-estate market.

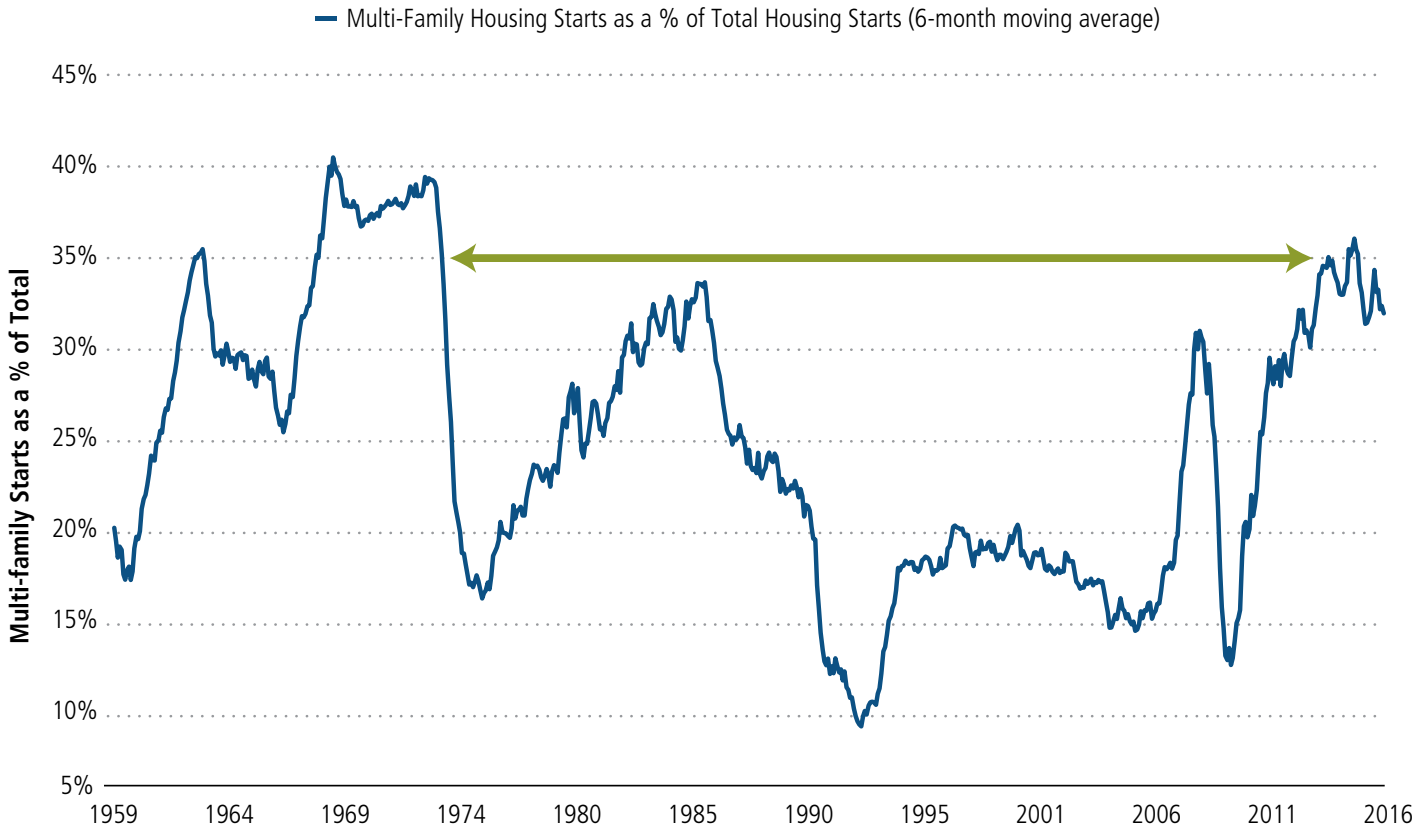
### BABY BOOMERS AND THE SUBURBAN LOVE AFFAIR

To understand the dynamics of gentrification we must first establish an important precondition to its occurrence: suburbanization. Suburbanization characterized the development of the United States in the latter half of the twentieth century.

The chief protagonists in this story were members of the baby boomer generation. The cohort of Americans born between 1946 and 1964 was the largest generation the country had ever seen, as new births accounted for 2.5% of the entire U.S. population in 1955. Compare that to 2015, a year in which new births accounted for only 1.2% of the U.S. population.

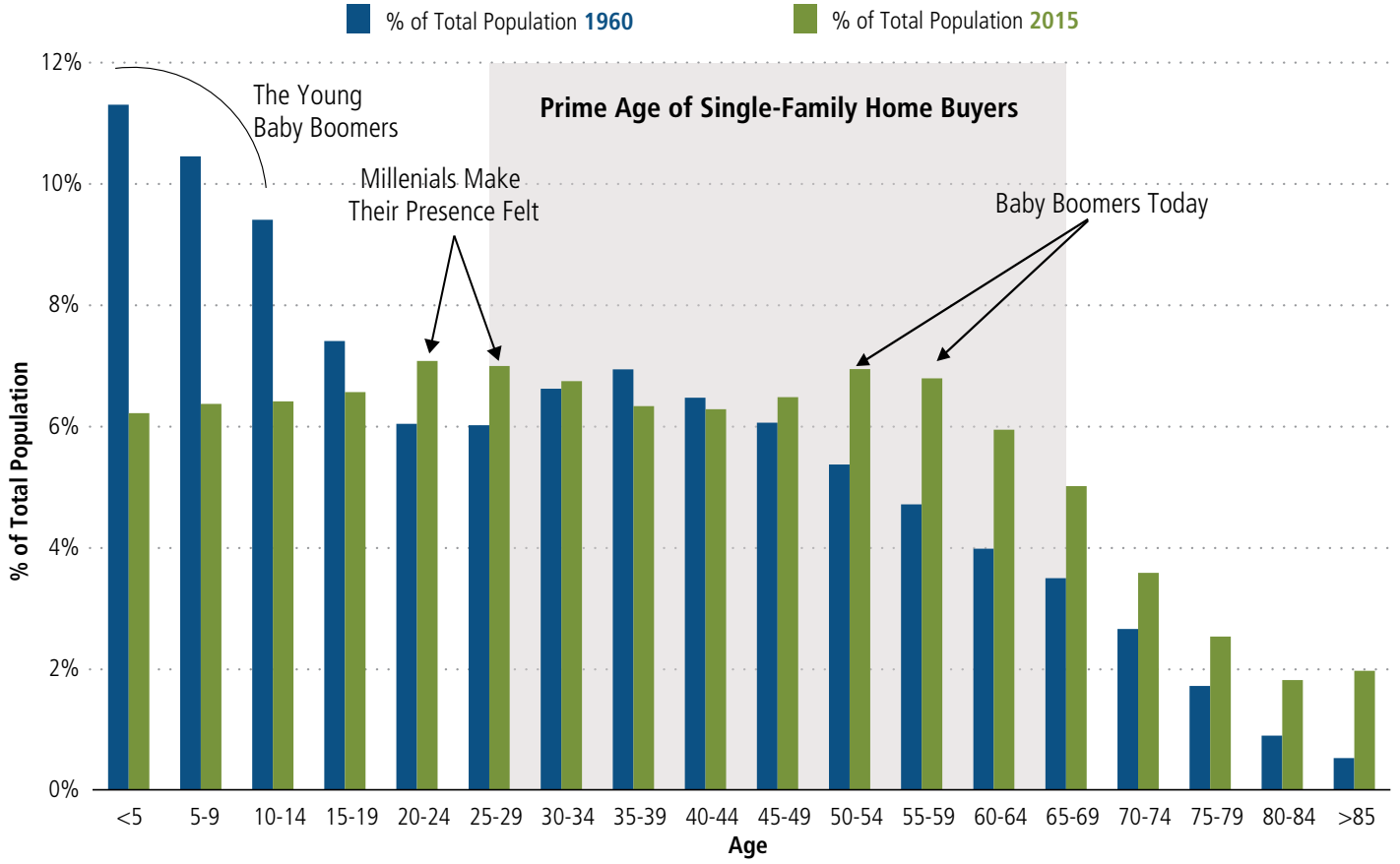
As baby boomers grew through adolescence and young adulthood, they, like the Millennials of today, flocked to urban areas and apartment housing. For those impressed by the recent boom in apartment

*fig. 1* MULTI-FAMILY HOUSING STARTS HAVEN'T BEEN THIS CONSISTENTLY ELEVATED AS A SHARE OF TOTAL STARTS SINCE THE LATE '60s




Source: U.S Census Bureau

*fig. 2* AGING GRACE: THE STRUCTURE OF THE U.S. POPULATION LOOKS VERY DIFFERENT TODAY THAN IT DID IN 1960




Source: Filip Blazheski (2016). "Multifamily vs. Single-family Housing Trends." BBVA Research Real Estate Analysis.

building in cities around the United States, it is worth reflecting on the fact that from 1969 to 1974, multifamily housing (read: apartment) construction accounted for more than 40% of new building (*see Figure 1*). Social commentators of yore opined on gentrification in language indistinguishable from commentary today: Professor Brian Berry described the baby boomers' urban push as a process that created "islands of renewal in seas of decay."[1]

> «MUCH OF WHAT WE OBSERVE AS GENTRIFICATION IS JUST THE RESULT OF CHANGES IN THE AGE DISTRIBUTION OF THE AMERICAN POPULATION.»

But the apartment boom didn't last forever (we'll get to that later). Eventually baby boomers started families and needed more living space. Surprise! Suburban areas exploded to accommodate the hordes in search of a single-family house and a "safe" neighborhood. Indeed the measured area of suburban (or exurban) land in the United States grew nearly sevenfold from 1950 to 2000 in counties next to the largest U.S. cities.[2] From whence the expansion? Single family home building was 20% higher in the 1970s than in the 1960s.

## CITY COME, CITY GO

The boomer migration might have been terrific news for the homebuilding crowd, but for those left in the city center, wealth evaporated quickly. In 1960, those Americans whose socio-economic status was above the 55th percentile were most likely living within five miles of the city center. By 1990 (the year in which the most Millennials were born), Americans whose socio-economic status was above the 50th percentile were located an average of 11 miles outside of the city center.[3]

What's more, "in the decades following WWII, the central regions of most U.S. metropolitan areas were in decline. Between 1960 and 2000, the aggregate central city population share in the 100 largest metropolitan areas fell from 49% to 24% while the employment share declined from 61% to 34%."[4]

It wasn't just the great mass of young American boomer families moving to the suburbs that drained city centers across the United States of their wealth. The rise of automated and off-shored manufacturing

resulted in the loss of many jobs and a decline in disposable income. Consider that while manufacturing employment as a share of total employment has been falling steadily for six decades, in just the two decades of the '70s and '80s manufacturing fell from 26% to 16% of all U.S. jobs.

«EVENTUALLY, THE DEMOGRAPHIC BOOM THAT RELOCATED WEALTH AWAY FROM CITY CENTERS TO THE SUBURBS BORE OTHER FRUIT IN FORM OF THE LARGEST GENERATION IN THE HISTORY OF THE UNITED STATES: THE MILLENNIALS. »

## GENTRIFY ME

Eventually, the demographic boom that relocated wealth away from city centers to the suburbs bore other fruit in form of the largest generation in the history of the United States: the Millennials. Drawing on work from demographer Dowell Myers, we will argue here that the 83 million person cohort of Americans born from 1980 to 1999, combined with their particular historical circumstances, were the driving force behind the latest urban renewal.

The influx of wealth to city centers—gentrification—is not likely the result of generational preference. As we have suggested elsewhere (*see our Fall 2016 Point of View article on Housing Myths*), the Millennial generation will more than likely replicate the migration patterns of preceding generations: urban apartment dwelling in their youth, followed by single-family living as adults.

If it wasn't preference that brought Millennials to cities, then what was it? Large "swings in population structure" are the driving force behind much of the recently observed gentrification. The aging of the giant Millennial generation explains a large portion of what many imagine to be preference shifts as an artifact of demographics.

As Myers observes, throughout the second half of the 20th century "turning points for apartment construction closely followed swings in the population of young adults."[5] Since 1990 was the peak year of births (4.2 million babies were born during the year), 2015 represented the year in which the largest group of Americans were 25 (*see Figure 2*).

The many and varied 25-year-olds required living arrangements, and, "given the housing and urban locational propensities of [all young adults]," we shouldn't be surprised that many of these childless-singles ended up living close to their places of work in apartments or that the most recent data show a slight pickup in the homeownership rate of older (e.g., 30 to 35 years old) Millennials.[6] As surely as the pig works through the python, we expect Millennials' homeownership to accelerate as they age.

## PEAK HIPSTER, LONG LIVE THE BOOMERS

Because the Millennial cohort has now aged through its prime urban-living/renting age, it is likely that "the Millennial wave has crested in urban areas."[7] But what comes next? Can we infer that single-family home, suburban living is destined to boom in the coming decades? Not so fast. As Millennials increasingly pick up and leave city centers, how should we think about the consequences for the single-family housing market? We offer two visions of the future, both of which presume strong Millennial demand but differ in their assumptions about single-family housing supply.

Our first possible future for single-family housing envisions a shortage of single-family homes for sale, leading to rising prices for Millennial homebuyers. This argument proceeds from a few data points. First, the baby boomers look poised to set new high-water-marks for life expectancy. For those early baby boomers alive today, say those just turning 70, the average life expectancy tables collected by the Center for Disease Control suggest that this group has an additional 16 years of life ahead. The younger baby boomers, those turning 53, are expected to live another 28 years. Ordinarily this would be good news. But for Millennials interested in purchasing in the suburbs or upgrading in the suburbs within the next 10 years, the baby boomers staying in their (large) houses will keep supply off the market.

Indeed some of the initial signs that retiring baby boomers might not change their lifestyle as quickly as expected have already appeared. Despite the fact that "between 2006 and 2012, the proportion of

«BETWEEN 2006 AND 2012 THE PROPORTION OF LEADING-EDGE BOOMER HOUSEHOLDS CONSISTING OF A MARRIED COUPLE WITH AT LEAST ONE CHILD UNDER AGE 18 DECLINED FROM 10 PERCENT TO JUST 3 PERCENT. »

leading-edge Boomer households consisting of a married couple with at least one child under age 18 declined from 10 percent to just 3 percent," many baby boomers continue to occupy their single-family home.[8]

**«32 MILLION SINGLE-FAMILY DETACHED HOMES INHABITED BY BABY BOOMERS ACCOUNT FOR MORE THAN ONE QUARTER OF THE NATION'S ENTIRE OCCUPIED HOUSING INVENTORY...AND HAVE AN ESTIMATED AGGREGATE MARKET VALUE OF ALMOST $8 TRILLION, OR 42 PERCENT OF THE VALUE OF THE ENTIRE OWNER-OCCUPIED STOCK. »**

## BOOMERS UNLEASH SUPPLY GLUT ON MILLENNIALS

Our second vision for the future of the single-family housing market argues that because of the demographic forces we've described, single-family home prices won't budge much over the coming decade. Why? The many home-owning baby boomers will eventually leave their single-family homes. Whether by choice or necessity, the large supply of single-family homes in the U.S. will eventually open up. The question, naturally, is when. The oldest baby boomers were born in 1946. This age cohort hit their official "normal retirement age" in 2012. As the baby boomers increasingly retire, one would expect the aggregate number of home sellers to increase faster than the number of new home buyers. In particular states like Florida and Arizona, there are reasons to believe many retirees might actually take some of their home-sale proceeds and use them to purchase a new single-family home, but across the U.S., such a dynamic is an anomaly.

The implications of demographic changes for single-family housing demand are profound. Simple extrapolation would suggest that "the demographic increase in homeowners is expected to be about 900,000 per year in 2015," but will decline to only "475,000 per year in 2040, near the low point [of growth in new home owners] recorded in 1965 before the baby boomers' entry into the housing market."[9]

For some context on the magnitude of the potential shift, it is estimated that the "32 million single-family detached homes inhabited by Baby Boomers account for more than one quarter of the nation's entire occupied housing inventory…and have an estimated aggregate market value of almost $8 trillion, or 42 percent of the value of the entire owner-occupied stock."[10]

## HIGH-TAILING IT OUT OF HIPSTER-DOM

The hipster havens of the last decade may soon become relics. As the Millennials age and head to the suburbs, gentrification, if it continues, will likely happen outside of city centers - just like it did for previous generations. The power of demographics is subtle but strong. To ignore it in favor of pronouncing generational changes in housing preference is analogous to treating the symptoms of an illness rather than its cause.

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5 Dowell Myers (2016): Peak Millennials: Three Reinforcing Cycles That Amplify the Rise and Fall of Urban Concentration by Millennials, Housing Policy Debate, DOI: 10.1080/10511482.2016.1165722

6 Simmons, Patrick. "Baby Boomer Downsizing Revisited: Boomers Are Not Leaving Their Single-Family Homes for Apartments." Fannie Mae Housing Insights (5, 2), August 19, 2015.

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9 Ibid.

10 Ibid.

# "Can I Pay You With SDRs?": Back to the Future in the Global Financial System

Last year a host of stories about the Chinese renminbi (RMB)'s inclusion in the International Monetary Fund's "Special Drawing Rights (SDR) basket" rattled markets.[1] With the IMF's imprimatur stamped on the Chinese currency, some investors argued that the next step for the world's biggest economy would be to become a "world reserve currency" and a major rival to the U.S. dollar and the euro on the global stage. As such, investors worried a new, rival world reserve currency portended higher interest rates in the West, as large holders of foreign exchange reserves in need of "safe assets" found a new destination for their holdings (i.e., not the U.S. Treasury market!).

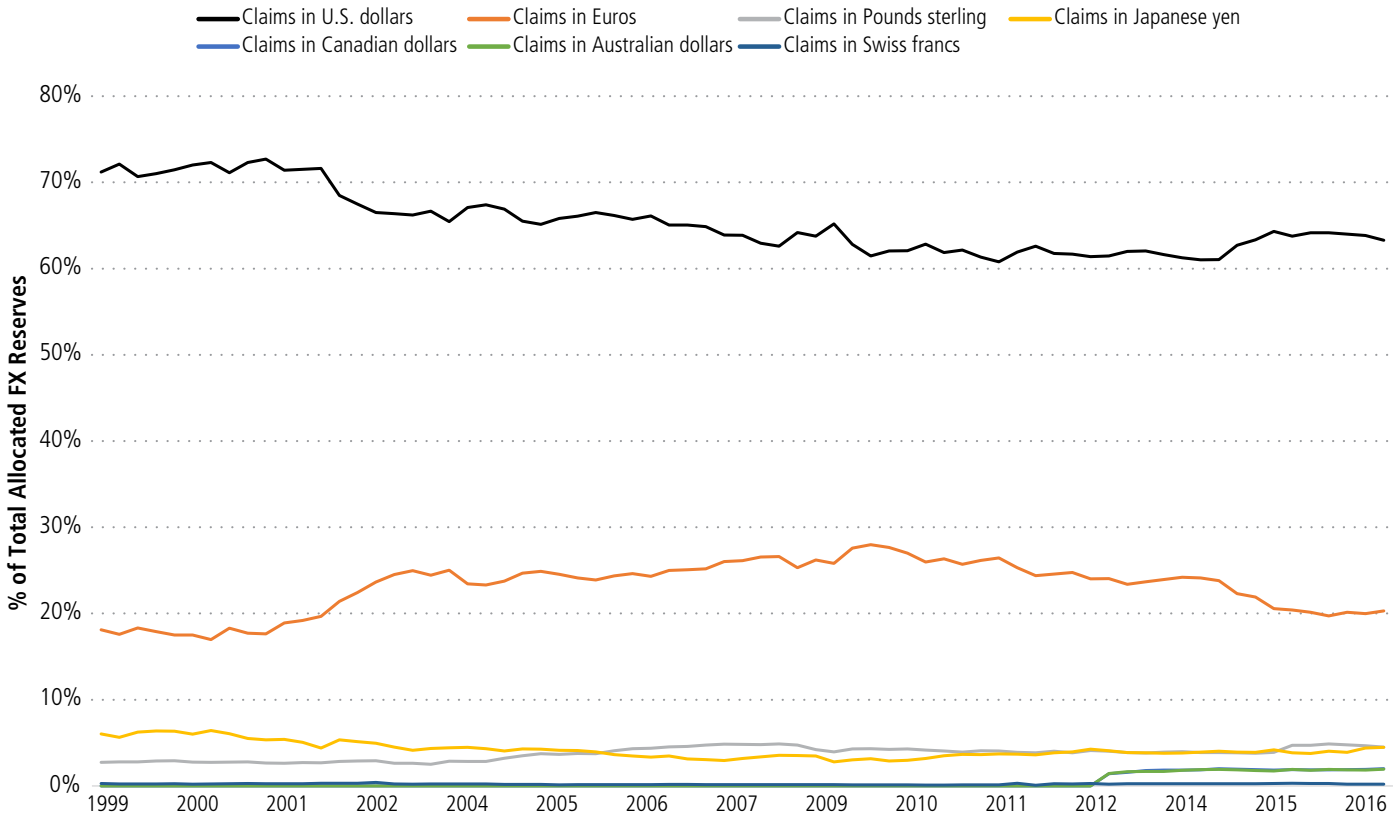
We think "Can I pay you with SDRs?" is probably the most important question you should ask on this topic. That's because the answer—an emphatic "No!"—anticipates the conclusion of our thinking on the importance of the RMB in the SDR framework: China's inclusion is a symbolic gesture reflecting the country's importance in the global economy, not a significant step in the direction of becoming a world reserve asset on par with the U.S. dollar.

The SDR hoopla is not entirely misguided though. Thinking about what an SDR is, and why it came to be, may help investors better understand the global financial system today, and more importantly, where the system may be headed in the near future. There actually is an important change afoot in the global financial system—it's just not the SDR. To see why this is so requires a trip down financial market memory lane.

## HE WHO HOLDS THE GOLD MAKES THE RULES

The U.S. was in a unique position during World War II: it possessed most of the world's gold. Despite the fact that eminent economist John Maynard Keynes led the British delegation to an international finance conference at Bretton Woods, New Hampshire, in 1944, the proud island nation was in no position to negotiate, saddled as it was with huge war debts and the pound sterling already out of favor as a reserve asset.

*fig. 1* ALL ABOUT THE BENJAMINS: NEARLY TWO-THIRDS OF GLOBAL RESERVE ASSETS ARE HELD IN U.S. DOLLARS




Source: International Monetary Fund

## DID YOU KNOW?

### A (BRIEF) HISTORY OF THE INTERNATIONAL MONETARY SYSTEM

Three short weeks in July 1944 changed the world. In particular, three weeks at the Mount Washington Hotel in Bretton Woods, New Hampshire, at the "International Monetary and Financial Conference." It was here that world financial leaders met to decide on a new, post-war, monetary framework.[7]

The conference convened in New Hampshire at least in part due to the urging of its most famous attendee: John Maynard Keynes, representing Great Britain. Keynes had two requests. The first, in a letter to the U.S. Treasury Secretary, Henry Dexter White: "For God's sake do not take us to Washington in July, which would surely be an unfriendly act."[8]

Avoiding Washington D.C.'s swamp-like summer climate was important to Keynes, but more important was his desire to address a problem plaguing the global financial system: the absence of a common reserve asset to anchor global commerce. Gold had served as the anchor of the financial system for centuries until the onset of the Great Depression, but international financial anarchy persisted throughout the war years as one country after the another abandoned gold for free floating (i.e., weaker) government-issued fiat currencies. The conference at Bretton Woods provided an opportunity to fix finance and stop the international currency chaos.

As a solution, Keynes proposed his second request: the ICU, or international clearing union. In Keynes' own words, "an International Clearing Union, based on international bank money, called (let us say) bancor, fixed (but not unalterably) in terms of gold and accepted as the equivalent of gold by the British Commonwealth and the United States and all members of the Union for the purpose of settling international balances."

In practice, central banks would use the common asset, bancor, to settle payments between one another.

But the global currency never came to be.

Instead of adopting Keynes's scheme for a new international reserve asset called *bancor (see Did You Know Box? above)*, policymakers followed U.S. Treasury Secretary Harry Dexter White's plan and erected a global settlement system that depended on the U.S. to hold gold reserves pegged to the U.S. dollar at $35/ounce of gold.

Even early on under the new regime, a problem arose: the supply of gold grew slowly while the world economy's liquidity needs grew swiftly, thereby requiring more U.S. dollars to circulate globally. Staring at stacks of U.S. dollars, global central bankers worried that, with so many dollars outstanding relative to a scarce supply of gold, the dollar just wasn't worth $35 per ounce any longer. Should a "run on the dollar" occur (everyone showing up at once to cash-in their dollars for gold), not enough gold would be available. Fears grew throughout the 1950s and 1960s.

Enter the SDR on January 1, 1970. SDR stands for "special drawing right," and its name provides a clue as to its use: it affords the IMF member country holder a claim on another currency. International monetary architects indicated that the goal of the SDR program was to be the "principal reserve asset in the international monetary system."[2]

Lofty ideals aside, the SDR was originally intended to act as a dollar and gold *substitute*—a way to diversify reserve holdings. That is, instead of holding U.S. dollars or gold, a country could hold SDRs. Voila! Reserve diversification without a run on the dollar or the need to hold the scarce, "barbarous relic," gold.[3]

Importantly, the SDR itself was not a new currency, or a liability of the IMF, or a "basket of currencies," but a claim ticket of sorts for actual currencies in the IMF's "pool"—paid-in capital from IMF contributors. The SDR holder could acquire dollars (what they *really* needed!) should they need them in exchange for SDRs.

The original weighting of the SDR was based on the gold content of a U.S. dollar, which at the time was still $35/ounce. The number of currencies and the weighting of those currencies in the "basket" evolved over time based on a complex formula using economic size, share of world trade, and other factors.

**«THE MOST NOTABLE STRUCTURAL DEVELOPMENT IN GLOBAL FINANCE IN THE LAST EIGHT YEARS: A CENTRAL BANK "SWAP" NETWORK.»**

## DID YOU KNOW?

RENMINBI: "THE PEOPLE'S MONEY"

The British pound Sterling is the name of the British currency, but if you walk into a store in London you will be quoted in pounds. Similarly, the renminbi is the name of the Chinese currency established in 1948, but if you walk into a store in Shanghai you will be quoted in "yuan."

## THE U.S. DOLLAR STILL REIGNS SUPREME

While the SDR scheme sounds neat on paper, back in the real world, one still needed dollars (or euros) to make payments for goods and services in most places on earth. SDRs weren't useful for anything on a day-to-day basis. Further, the SDRs did not become useful for their intended purpose: as a reserve diversifier. To this day, the stock of SDRs remains tiny, at just $285 billion as of March 2016—less than 3% of the $10.9 trillion in total reserves held by all countries. This suggests that the ongoing reign of the dollar has less to do with bureaucratic edicts and much more to do with the greenback being freely usable in global capital markets.

Indeed, countries still prefer U.S. dollars (64%) and euros (21%) as a share of that $11 trillion of reserves. The U.S. dollar tally of global reserves remains slightly less than it was 15 years ago (72%), but still makes up the majority of holdings (*see Figure 1 on page 5*). Meanwhile, the IMF estimates that only 1.1% of official reserves were held in renminbi (up from 0.7% in 2013). While that tally is good enough to rank seventh on the world list, the U.S. dollar (63%), the Euro (20%), the British pound sterling (4%), Japanese yen (3%), Australian dollar (2%) and Canadian dollar (2%) still out-rank the renminbi. The Chinese currency just barely has the Swiss, Swedish and Kiwi currencies beat, thus justifying its SDR inclusion.

## SIZE, YES, BUT, TRUST? NO

Hold on a moment, you might say, the SDR imprimatur is just the start—not the end—of the discussion. Based on purchasing power parity (PPP) adjusted exchange rates, the Chinese economy is already larger than the U.S. economy and accounts for 17% of global GDP compared to 15% for the U.S. And China's share of total global merchandise trade is 12%, on par with the U.S. Surely the RMB's rise is underway with the rubber stamp provided by SDR status!

We contend otherwise. It's not size that matters for reserve currency status. Nor does the U.S. dollar reign supreme because it checked off the boxes on some international bureaucrat's clipboard. In the words of Eswar Prasad, in his account of the fledgling Chinese currency, *Gaining Currency: The Rise of the Renminbi*, "China has become big and influential before it has become rich and, more importantly, before it has well-developed financial markets or broadly trusted public institutions."[4] Greenbacks rule because the market prefers them to just about any other form of moola—by a mile.

"After all," Prasad continues, "if size was the main criterion, it is unlikely that a small country such as Switzerland, which has a GDP less than one-fifteenth that of China, would have one of the main reserve currencies in the world." We can add our British and Aussie friends to this list of small yet mighty.

In short, we arrive at the heart of the problem: there needs to be more RMB-denominated instruments to buy that are deemed "safe and liquid." Until such time, it seems unlikely global investors will put their reserve asset faith in the RMB—no matter how many distinctions the IMF bestows (*see Figure 2 below*).

## RESERVES ARE *NOT* FREE

None of the above should be read as an endorsement of the current global monetary framework, however. For one thing, holding "reserves" comes with overlooked costs. To name but one, "holding reserves" means "holding government bonds." Given the meager yields offered, reserve portfolios produce paltry payouts. Large holdings may provide central banks comfort, but with trillions of dollars allocated to relatively unproductive ends, reserve holders are robbed of more valuable uses for the savings.

Seen in this way, it appears that not much has changed in the international monetary system in decades—there is still a yearning for an

*fig. 2*

**INTERNATIONAL BONDS AND NOTES BY CURRENCY**

| | June 2015 (USD billions) | Share (% of total) |
|---|---|---|
| USD | 8,816 | 42.7 |
| Euro | 8,092 | 39.2 |
| British Pound Sterling | 1,988 | 9.6 |
| Japanese yen | 402 | 1.9 |
| Swiss franc | 295 | 1.4 |
| Chinese RMB | 98 | 0.5 |
| Brazilian real | 37 | 0.2 |
| South African rand | 29 | 0.1 |
| Russian ruble | 21 | 0.1 |
| Indian rupee | 7 | 0.0 |

alternative to the U.S. dollar that could provide grease to the global financial system, and reserve holders remain too dollar-centric.

## DID YOU KNOW?

### THE FIRST FIAT PAPER CURRENCY

The RMB came into being in 1948 but China's currency history goes way back—long before currency developments in the West. In fact, China likely invented fiat paper currency (i.e., money not backed by a commodity like gold or silver). When Marco Polo visited what is now Beijing in the 13th century, he wrote:

> *In this city of Kanbalu is the mint of the grand khan, who may truly be said to possess the secret of the alchemists, as he has the art of producing money . . . The coinage of this paper money is authenticated with as much form and ceremony as if it were actually of pure gold or silver.*

## SWAPS TO REPLACE RESERVES?

That brings us to the most notable structural development in global finance in the last eight years: a central bank "swap" network. Inspired by the stresses in the global financial system that erupted in 2007-2008 when a huge surge in demand for U.S. dollars prompted violent moves in both exchange rates and interest rates, the six major global central banks (the U.S. Federal Reserve, the Bank of England, the European Central Bank, the Bank of Japan, the Bank of Canada and the Swiss National Bank) entered into arrangements to swap currencies with one another should currency market stress recur. With trust among central banks well-established, a swap network may turn out to be *more* important than an FX reserves hoard. Instead of maintaining a low yielding portfolio of bonds, a swap network allows a central bank to use a liability it can create at-will (its own currency!) to exchange with other central banks for liquidity in their currency.

What does this mean in practice? Should Canadian banks run into a shortage of U.S. dollars, the Bank of Canada could offer the Federal Reserve loonies in exchange for greenbacks on an unlimited basis. Such swap arrangements gives central banks far more influence in currency markets than ever before. In times of stress, central banks can acquire all the dollars they need through a network of central banks, rather than by maintaining a portfolio of bonds or going hat in hand to the IMF.

Importantly, the swap concept has gone global (i.e., beyond the U.S. dollar). The People's Bank of China (PBoC) now has swap arrangements with 36 global central banks, including the Bank of England and the European Central Bank. The total amount available for drawdown exceeds a half a *trillion* dollars. More importantly the swap arrangements are for local currency swaps (say, euros for yuan), circumventing the U.S. dollar.[5] Should another monetary crisis flare up in the years ahead, it will be the global central bank swap network to keep an eye on rather than the FX reserves or SDRs.

## "GOVERNMENTS PROPOSE, MARKETS DISPOSE"

"Governments propose, markets dispose," was a phrase uttered by Charles Kindleberger to summarize the best laid plans of policymakers being dashed by the private markets.[6] Sure, international organizations and government entities are important, but there are real limits to what they can achieve. With sincere apologies to our friends at the IMF, an international bureaucracy is not going to knight a new world reserve currency, nor is the SDR going to help supplant the U.S. dollar from its dominant status.

If you're selling your U.S. bond portfolio or shorting the U.S. dollar currency based on stories about SDRs, you need to update your thinking about the global financial system. The global financial system, for better or worse, remains dollar-centric and the real important development in the last few years is neither the rise of the RMB nor the antiquated SDR framework reweighting, but the currency swaps network between major central banks.

SOURCES


1 See, for example, "China's Yuan Joins Elite Club of IMF Reserve Currencies." *Reuters*. 3 October 2016.

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3 Keynes popularized the reference to gold as the "barbarous relic" in his 1923 book, *A Tract on Monetary Reform*.

4 Ibid, location 1822

5 Ibid, location 2247

6 Charles Kindleberger. "*International Money: A Collection of Essays*." Routledge, November 5, 2013.

7 "*The Bretton Woods Transcripts*." Edited by Kurt Schuler and Andrew Rosenberg. Center for Financial Stability. New York, 2012.

8 Ibid, location 358.

# MAY THE REVENUE BE WITH YOU

THE ORIGINAL *STAR WARS* APPEARED ON ONLY 32 SCREENS WHEN IT WAS RELEASED MAY 25, 1977. *STAR WARS: SPECIAL EDITION* WAS SHOWN ON 2,100 SCREENS WHEN IT WAS RE-RELEASED ON JAN. 31, 1997.

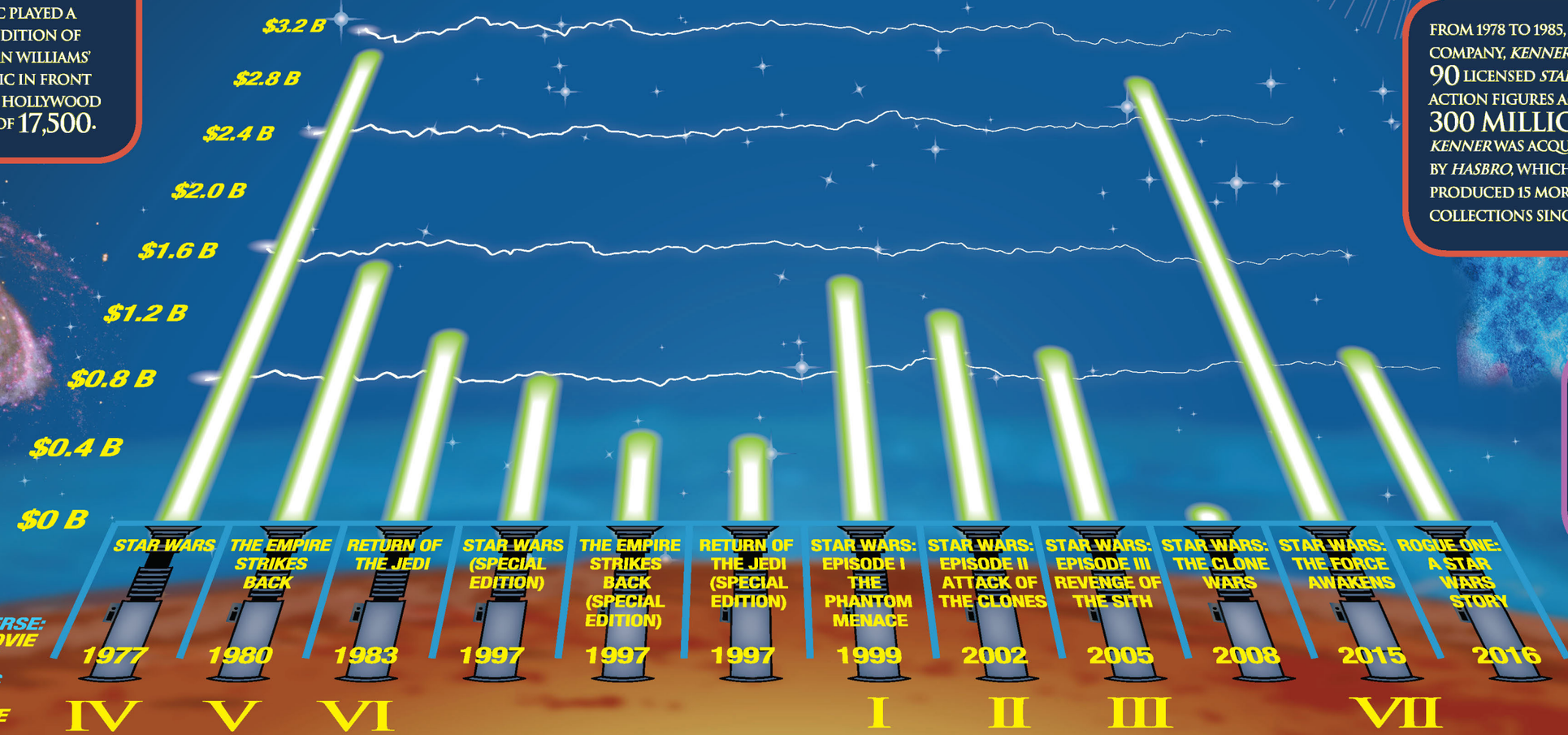
THE *STAR WARS* SCORE WAS NOT ONLY A HIT WITH MOVIE-GOERS BUT ALSO WON THE HEARTS OF CLASSICAL MUSIC AFICIONADOS. IN NOVEMBER 1977, THE LOS ANGELES PHILHARMONIC PLAYED A 30-MINUTE RENDITION OF COMPOSER JOHN WILLIAMS' *STAR WARS* MUSIC IN FRONT OF A SOLD-OUT HOLLYWOOD BOWL CROWD OF 17,500.

***Many shook their heads in disbelief when Disney agreed to purchase Lucasfilm, the creator and owner of the Star Wars franchise, for $4 billion in 2012. Today, Disney might shake their heads at the naysayers. Four years and two mega-blockbusters later, the world's most successful movie studio appears to have struck gold. And they should not be surprised. A tour of the history of Star Wars global box-office releases shows that the intergalactic story-line has nearly always produced intergalactic revenues, especially when adjusted for inflation. The original Star Wars movie was released in 1977 and remains the most lucrative movie opening in Star Wars history.***

## STAR WARS FRANCHISE REVENUES


FROM 1978 TO 1985, THE TOY COMPANY, *KENNER*, PRODUCED 90 LICENSED *STAR WARS* ACTION FIGURES AND SOLD 300 MILLION. *KENNER* WAS ACQUIRED BY *HASBRO*, WHICH HAS PRODUCED 15 MORE COLLECTIONS SINCE 1995.

## WORLDWIDE BOX OFFICE GROSS (BILLIONS OF 2015 U.S. DOLLARS)




Source: Aswath Damodaran, Box Office Mojo, National Association of Theatre Owners

THERE HAVE BEEN OVER 130 *STAR WARS* VIDEO GAMES PRODUCED AND OVER 358 TITLES OF *STAR WARS* BOOKS BY 76 AUTHORS.

# Knowledge and Learning in the 21st Century:

## An Optimist's perspective

Outrageous tuition costs. Mountainous student debt. Without help, higher education seems increasingly unattainable for many. The future looks dim—and along with it the future of the U.S. and global economy. A less educated workforce is a less productive one. Productivity—producing more with less—is at the root of prosperity and growth.

Or is the future so dim? We contend that whether you are a farmer in Kenya, a dancer in Delhi or a software programmer in Berlin, learning something—anything—is cheaper, easier, faster, more accessible and more customized than ever before. What's more, once created, knowledge is more durable and shareable. Collaboration on a massive scale is also more feasible than ever before in history.

The knowledge and information renaissance underway will bear fruit for decades to come. The lesson: while knowledge and learning are necessary to propel economic progress, such progress can still occur even given the high-priced constraint of traditional educational institutions.

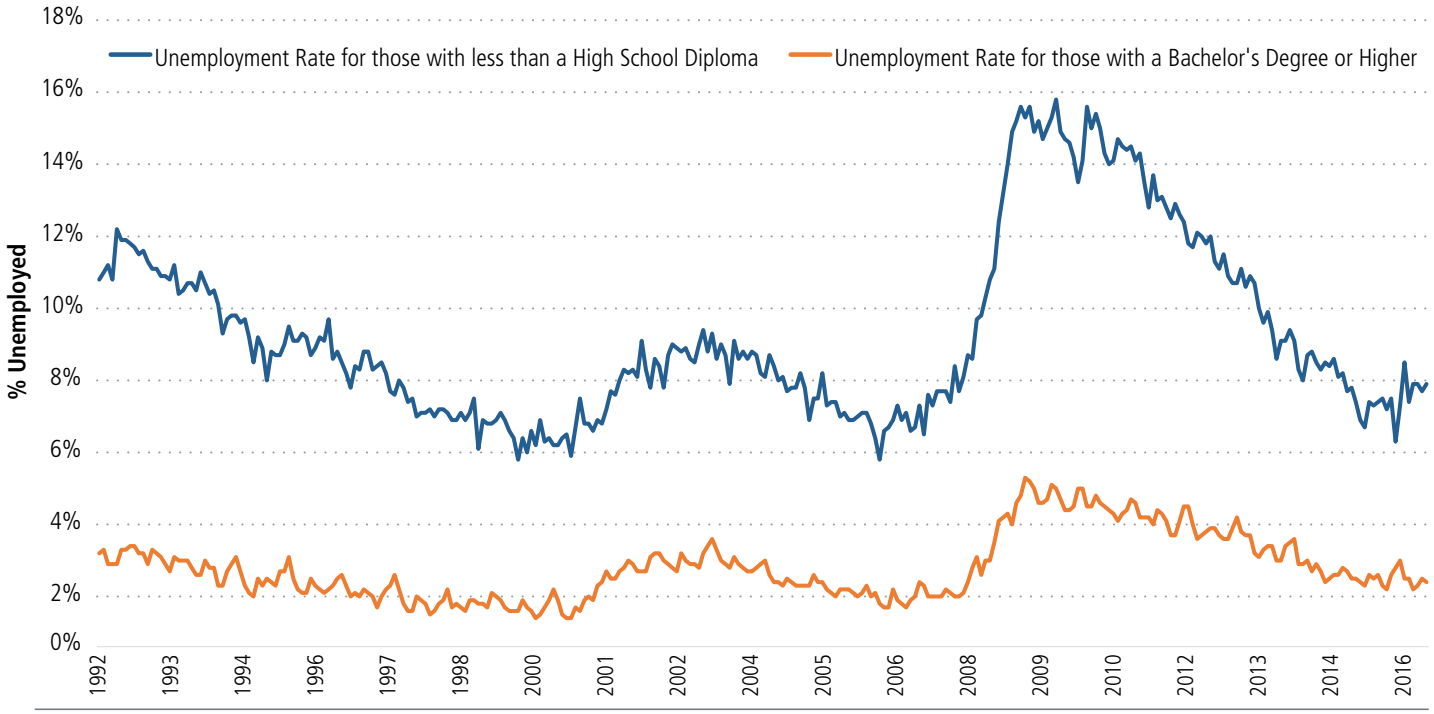
### INFLATED COSTS

In the words of Barack Obama, "The fact is, college has never been more necessary, but it's also never been more expensive."[1] In 1972, a public, four-year university tuition cost just $428 per year. Add in room and board and you racked up a $1,405 tab. [2]

In 2016, the same public, four-year degree costs a student $20,092 per year, with room and board included. A private four-year institution carries an even more exorbitant price tag, fetching $45,370 with room & board included—per year. Often the cost is divided up into the portion of paid by students and the portion financed by student aid or loans. We ignore such a distinction because, as economists, we know that regardless of how the bill is paid, real resources, either a lender with savings considering possible investment opportunities or a parent with hard-earned cash, must be devoted to the cause.

And it only looks set to get worse. Vanguard estimates that in 20 years the annual cost of a private college will exceed $120,000 per annum,

*fig. 1* GET SCHOOLED: THE GAP BETWEEN THE EDUCATIONAL "HAVES" AND "HAVE NOTS"




Source: Bureau of Labor Statistics

or roughly half a million dollars for a four-year degree.[3] Are you saving enough?

As former President Barack Obama aptly stressed, never has a degree been so important. Among those workers with a bachelor's degree, the unemployment rate was just 2.4% as of February 2017. But for workers with only a high school education, the unemployment rate was twice as high, at 5.0%. Worse still, for those who have not completed high school, the unemployment rate is not only higher but rising, registering 7.9% in February 2017 compared to 7.3% one year ago *(See Figure 1)*.

The gap between the college-educated "haves" and the non-high school educated "have nots" is wide. In short, not only is the sticker price of education excruciatingly high, but the costs of not achieving a college degree are staggering. So what could possibly be the optimist's reply to such startling education facts? The internet, of course…but first some history.

**«OPEN SOURCE HAS TAKEN OVER THE WORLD.»**

## FROM ALEXANDRIA TO FLORENCE: ORGANIZING THE WORLD'S INFORMATION

For most of history, the production of knowledge and learning was fragile and sporadic. Even if a brilliant individual or group of individuals toiled away on new ideas, they did so in obscurity and ultimate futility. Ideas often died with their inventor.

Isolated projects to collect, curate, link and share the world's information were carried out but often fell short. The great library at Alexandria, built around 300 BCE boasted half a million scrolls on the shelves, roughly half of all books in existence at the time. The library went up in flames, whether by design or by accident, during the reign of Julius Caesar in 48 BCE.

Later the dream of education and enlightenment found few better friends than Lorenzo de Medici in Florence in the late 1400s. Lorenzo dispatched agents around the world to collect books and documents, make copies and share the volumes with scholars. As a result, Florence became a clearinghouse for ideas, both old and new, as well as the intellectual home of Galileo Galilei and Michelangelo.

As Joel Mokyr details in Culture of Growth: The Origins of the Modern Economy, "Nations and their economies grow in large part because they increase their collective knowledge toward productive ends."[4] Most societies in history produced some limited technology but typically such achievements represent[ed] "one off" feats that "settled down, and the growth [they] generated fizzled out."[5] The brief, sporadic growth of shared knowledge goes a long way to explain the lack of economic progress exhibited prior to 1800.

Rather than growth, stagnation and lack of progress were far more common in history. As Mokyr summarized:

> Stagnation occurs because the status quo can suppress further challenges to entrenched knowledge and blocks non-marginal advances using a range of means, from the threat to persecute heretics and the burning of their books, to subtle but effective mechanisms, such as meritocracies in which the key to personal success was the uncritical expertise in the existing body of knowledge inherited from the past.[6]

## UPENDING TRADITION

Where do we go from here? Today the world is different. Not only do institutions for the production and transmission of knowledge abound (albeit expensively), we have the internet, which infects and invigorates virtually every aspect of our lives. The message is that established, traditional institutions may not hold the keys to the future of knowledge and learning. We will provide examples in three areas where knowledge and education are flourishing: sharing, linking and collaborating.

## SHARING IS CARING

Instead of established media titans like ABC, CBS, NBC and the BBC, or even early internet pioneers like Yahoo and AOL, it was really you and I who revolutionized the web. What makes Twitter and YouTube wonderful is not the staff inside the building with "Twitter" emblazoned on it, but the users of the technology. User-generated content drives the web, with more than 60 trillion web pages residing on the internet.

UC Berkeley economists estimate that five years ago humanity stored "several hundred exabytes of information," roughly equivalent to 80 "Library of Alexandrias," for every person on the planet. Today, that figure has exploded to 320 "Library of Alexandrias" for each human being.

Included in that information bounty are sixty-five thousand user-created videos that appear on YouTube every day, which is roughly 400 new video hours every minute.[7] We, your faithful writers, tested the internet's chops on teaching. Applying snow chains to a vehicle before a trip into the mountains for a long weekend? A recipe for cooking a rib-eye steak in the oven? How to get in shape using just a pull-up bar? How to tie a bow-tie for special occasions (such as "Fed Day"[8] or your wedding)?

Sure, YouTube is not a traditional classroom, but on YouTube you can learn almost anything.

## LINKING: WIKI WACKY

But the web is more that just a treasure-trove of user-generated educational content, it's a global web of knowledge. Internet pioneer Ted Nelson was convinced that "every document in the world should be a footnote to some other document, and computers could make links between them visible and permanent."[9]

The links or connections matter most because, as technologist and co-founder of Wired magazine Kevin Kelly argues, it's not enough to have a collection of facts. "Science is on a long-term campaign to bring all knowledge in the world into one vast, interconnected, footnoted, peer-reviewed web of facts. Independent facts, even those that make sense in their own world, are of little value to science."[10]

Today the dream of a web of connected information has been realized in Wikipedia. Launched in 2001, at last count in 2017 it sported more than 40 million articles in 293 languages.[11] It has even been cited in some cases by the U.S. Supreme Court.

Prior to its discontinued print publication, the Encyclopedia Britannica set cost $1,400 in 2015, a hefty price tag for the average household. Worse, for that price, you received a stale, soon-to-be-out-of-date collection of facts curated by editors. With Wikipedia, you get a living, breathing, changing, constantly-updated, rarely-wrong-but-quickly-corrected, durable encyclopedia of interconnected facts. Almost as many hyperlinks to additional references adorn each Wikipedia page as words. As a result, more information is available than ever before to the wondering mind and at bargain basement internet pricing: free.

## COLLABORATING: THE RISE OF OPEN SOURCE

Sharing and linking lead to our third example of the knowledge and information revolution underway: collaborating.

Bill Gates once labeled free software pioneers—that is, those people who created and gave away for free their software—as "new, modern-day sort of communists." But the reality is today many of the software programs you depend upon originated in the free software movement, or what is more commonly called today "open source." Open source means the original software is freely distributed and can be used and/or modified by anyone.

One example of successful open source software is the operating system debuted by software programmer Linus Torvald in 1991 called Linux (riffing off of the widely-used but centrally-controlled operating system called Unix at AT&T). Today, Linux powers 67% of all web servers. You can also find Linux in your smart TV, Nest thermostat, Amazon's Kindle, drones, PlayStation 4, Google Home, Amazon Echo, Apple Watch, Apple TV, and even your Tesla, Ford, Honda or Toyota auto. Android, which is Google's mobile operating system based on Linux, accounts for 84% of the smartphone market as of 2016. Open source has taken over the world.

More fascinating than the ubiquity of open source software in our daily lives is the way it's produced. What "open source" means is that thousands of workers collaborate daily on projects all over the world. According to Black Duck Open Hub, more than 650,000 people contributed to a half a million projects worldwide last year. To put open source employment in perspective, that's twice the number of people employed at Amazon and 50% more employees than all of McDonald's stores combined.

This army of open sourcers isn't directed by top-down edicts of a CEO; instead, progress occurs bottom-up via online knowledge and learning. One popular bazaar for open source projects is GitHub. Created in 2008, the online hub connects nearly 2 million software programmers on thousands of projects. Anyone can "commit" to a project by submitting code (ideas) or "fork" an existing piece of software (meaning copy the existing file) and update/add/augment it as they see fit. Anonymous programmers anywhere in the world can contribute to projects—where contributions matter more than college degrees—and established companies themselves are tapping into Github as a way to produce new code.

## STICK A FORK IN ME

In a discussion on the difference between the books that adorned the library at Alexandria and books that still dot the shelves of the modern equivalent, Kevin Kelly remarked, "One quirk of networked books is that they are never done, or rather that they become streams of words rather than monuments."

So, too, with open source projects. At some point in the past it was necessary for an elite to collect information, preserve it, and share it with a precious few. Today, though, with the ever-growing array of information available, information has been liberated. Instead of the contents at Alexandria or in Florence being available only to the narrow elites, our current book of knowledge is available to any and all, for free. Every person on the planet will soon have access. Learning means self-directed inquiry. It can take place anytime, anyplace, whether in your living room or at the local coffee shop.

Knowledge is ever-changing and learning never ends—certainly not at university graduation. So earning a high-priced degree may still be required as a rite of passage to corporate America, but knowledge has never been more durable and widely available, nor learning easier.

Perhaps more importantly, viewing knowledge and learning this way shows that knowledge is more like an organism, growing and changing, rather than a fixed body of information to be doled out by our elders in bite-sized pieces over four years.

For the 21st century (and beyond), to focus on the traditional educational institutions as the key to learning and growth is to look in the wrong place. Instead, look to sharing, linking, and collaborating as the new foundations of knowledge and learning.

Such foundations provide bright futures for economic progress, says the optimist.

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