
Payden & Rygel

POINT of VIEW

FALL 2017

Our Perspective on Issues Affecting Global Financial Markets

Pg **1** **MALLRATS: THE PAST, PRESENT, AND FUTURE OF THE SHOPPING MALL**

In the mid-1990s, a distinct species infested the suburban world: the mallrat. Fast becoming extinct, these once-great bipeds wasted hours of their lives looking for love, piercing ears, and scooping up compact discs in the great halls of commerce known as malls. Today's world of online shopping appears to spell the end for mallrats. However, lost in the foreboding headlines are pockets of opportunity.

Pg **6** **GREENPIECE: THE BIRTH OF "GREEN BONDS"**

Is top-down government action the only way to address global environmental issues? Not at all. In fact, despite the focus on one global power's exit from a key climate accord, a burgeoning, bottom-up movement is taking shape, with the bond market—yes, you read that right—leading the “green” charge.

Pg **10** **PEAK GLOBALIZATION?**
Has the world reached peak globalization? Whether it is the election of Donald Trump or the Brexit vote, people seem to think that the progress towards and benefits of an increasingly interconnected world have ended. The way most people view these connections is via trade, but we argue that the nature of globalization has changed dramatically since 1870. Fears of peak globalization may be overdone. Also, a more interconnected world is a more prosperous one as seen by the rise in per capita output.

Pg **12** **BEYOND BITCOIN: THE DAWN OF "CRYPTOECONOMICS"**
A few years ago we wrote about bitcoin. Since then, the price of a bitcoin soared to more than USD 4,500. But the media and many investors focus too much on bitcoin's price, betraying little understanding of more fundamental institutional developments. We write to help catch investors up on “cryptoeconomics” and urge them not to dismiss bitcoin's rise so easily.

Mallrats: The Past, Present, and Future of the Shopping Mall



Mallrats were everywhere. These strange creatures, found in suburban shopping malls, would creep from Hot Topic to Sam Goody in search of trendy shirts or hit CDs, or even pranks to pull. The bane of serious shoppers' existence through most of the 1990s and early 2000s, mallrats are now on the brink of extinction.

From the first shopping centers built after World War II until their heyday in the 1990s, malls and their memories are known to Americans across generations. The latest news on enclosed shopping malls, and the mallrats which call them home, is bad news. Not a day goes by without breathless journalists heralding (altogether too gleefully, we think) the death of the shopping mall.

In what follows we sketch the problems and opportunities with which shopping malls and their owners must contend. We start with a brief history of the shopping center craze in the U.S. With the background established, we analyze the two main problems facing shopping centers today: an oversupply of mall space and changing consumer preferences. Hope, not hate, takes us to the finish line as we meditate on the aspects of shopping centers—operational flexibility and valuable land—which we believe ensure their place in the future of American retail.

owned by publicly-traded real estate investment trusts (REIT). In general, these REITs own stronger shopping centers and so do not represent the full spectrum of mall shopping in the United States.

«WE ANALYZE THE TWO MAIN PROBLEMS FACING SHOPPING CENTERS TODAY: AN OVERSUPPLY OF MALL SPACE AND CHANGING CONSUMER PREFERENCES.»

MALLS, ~~ARE~~ A HISTORY

Since the first shopping mall, Southdale Center, opened in Edina, Minnesota, in 1956, the appeal of bundling retailers together in a climate controlled environment accessible only by automobile has maintained a special place in the American imagination.

The popularity of the shopping mall retail format traced the trajectory of America's mid-20th-century development more broadly. Pre-World War I shopping in the United States revolved around a centrally located "Main Street," which housed hardware stores, produce markets and even an occasional department store.

Demographic shifts, wrought in part by World War II, altered American retailing. The explosion of family life and the ensuing exodus to suburbia meant that the prime consumer unit, the family, was no longer near a traditional "Main Street." Sarah Shindler, a land use legal scholar, notes, "Although stores initially remained in city centers, their proprietors eventually realized that they needed to follow their customer base, and thus many moved their shops out of traditional downtowns and to the suburbs."¹

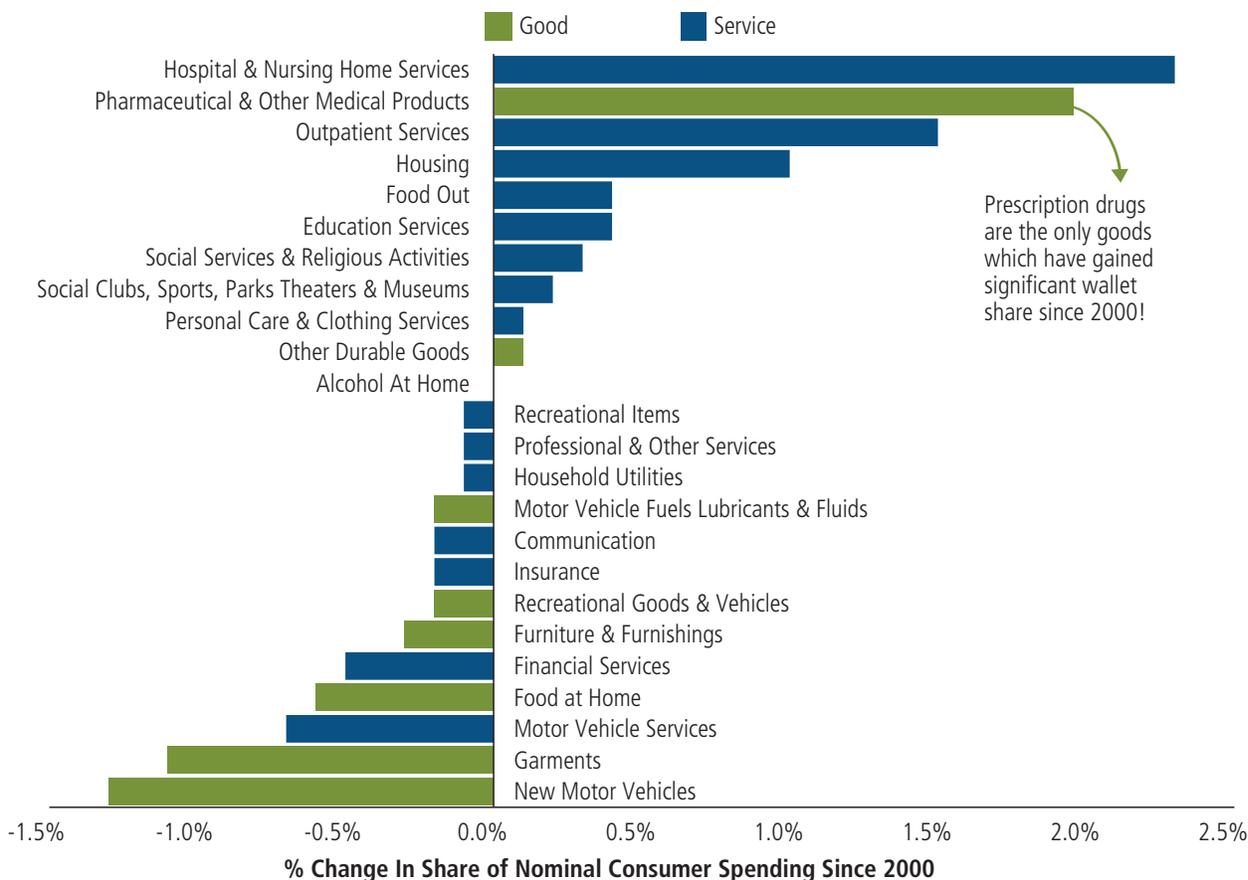
Federal tax legislation in 1954 was the match that lit the demographic gasoline for mall construction. Congress wrote changes into

fig. 1 SHOP 'TIL YOU DROP, AT LEAST IN THE U.S., WHERE THERE IS 12X MORE RETAIL REAL ESTATE PER CAPITA THAN IN GERMANY



Source: Wells Fargo Research, ICSC

fig. 2 UP TO NO GOOD: THE CHANGE IN CONSUMER SPENDING SHARE SINCE 2000 FAVORS SERVICES



Prescription drugs are the only goods which have gained significant wallet share since 2000!

Source: U.S. Census Bureau

the tax code that provided the owners of income-producing real estate the opportunity to take accelerated depreciation.

In many instances, operating expenses and the large depreciation charges more than covered gross income from the property and so allowed owners to shelter nearly all their income (from their real estate ventures and elsewhere!): “accelerated depreciation...suddenly transformed real-estate development into a lucrative tax-shelter.”²

Tax and demographic changes allowed the U.S. suburban mall to catch fire. Only two years after the tax code change, “developers completed twenty-five regional plazas...more than doubling the total previously in existence.”³

UN-SUITED SUPPLY: TOO MANY FOR TOO LONG

Even after the initial tax boom, shopping center growth continued unabated. According to data from the International Council of Shopping Centers (ICSC), from 1970 to 2016, shopping center gross leasable area grew at a compound annual growth rate of 3.2%. The overall retail sector saw gross leasable space ratchet up at an average annual rate of just 1.9% over the same time.

The shopping center boom scars the United States to this day. In 1970 there were 8.7 square feet of leasable mall space per U.S.

citizen. By 2016, the ratio registered at 23.6 square feet per person, nearly three times more saturation. Contrast the shopping center supply in the United States with the rest of the world: American boasts two times more retail real estate per capita than Australia and twelve times (12x!) more than Germany (see Figure 1 on previous page).

“TAX AND DEMOGRAPHIC CHANGES ALLOWED THE U.S. SUBURBAN MALL TO CATCH FIRE.”

DEMAND: REDIRECTED NOT REFUNDED

Creditors in search of missed coupon payments and visitors to empty malls intimately understand the oversupply of mall space in the United States. These same shoppers and investors—when the latter group acts as shoppers—know that their buying habits have changed, too. Here is where the headlines are true. Yes, popular shopping mall tenants of yore are going bust, and yes, the internet has changed the way we shop.

fig. 3 WHO'S AFRAID OF CHANGE? TOP 10 SIMON PROPERTY GROUP TENANTS AS OF 1993 IPO AND CURRENT STATUS

Tenant	% of 1993 Rent	Current Status
The Limited	7.3%	Now in existence as L Brands, 2.1% of SPG rents
F.W. Woolworth	4.7%	Out of business in original form
Melville Corp.	2.9%	Various retail divisions split off, pharmacies renamed to CVS in 1996
U.S. Shoe Corporation	2.4%	Acquired by Luxottica in 1995, 1.2% of SPG rents
The Musicland Group	1.5%	Purchased by Best Buy in 2001
Edison Brothers Stores	1.5%	Bankrupt
Zale Corporation	1.4%	Purchased by Signet in 2014, 1.6% of SPG rents
Petrie Stores	1.3%	Bankrupt
Kmart Corporation	1.3%	Merged with Sears in 2005, 0.5% of SPG rents
Payless Shoe Stores	1.3%	Bankrupt

Source: SPG Company Data, Goldman Sachs

A key problem for malls is that their customers stopped shopping at their most popular (or most prevalent) tenants' stores. In 2016 alone, the mall mainstays of the 1990s and early 2000s completed far-reaching store closures: Aeropostale (-117 stores), Wolverine World Wide (-100 stores), Macy's (-66 stores), and Abercrombie and Fitch (-54 stores) all shrank their brick and mortar footprint.

Why the store closures? Consumer spending patterns in 2017 are very different than they were in 2000. We know, of course, that consumers purchase more goods and services online than ever before—e-commerce purchases rose to 8.5% of all retail sales in Q1 2017, their highest level ever, and up from 3.2% only one decade ago.

Not only have consumers' shifted some of their purchases across media (from brick and mortar to online), the composition of purchases has changed as well. Services have made broad gains in the hearts and wallets of American consumers. Goods, on the other hand, have fallen as a share of total U.S. consumer purchases since 2000 (see Figure 2 on previous page). For malls depending on the traditional vendors of goods (looking at you, apparel retailers!), the secular trend is not a friend.

The shrinking of the consumer demand for these once-great mall tenants relates to the rise of e-commerce and the share of purchases increasingly made online. In April 2017, the *Wall Street Journal* reported, "Retail margins on average fell to 9% last year from 10.5% in 2012."⁴

Corroboration for the growing share of e-commerce sales appears in the foot traffic at malls. Data from Thasos Group, a research service which tracks mall foot traffic from smartphone location data, show year-over-year foot traffic fell roughly 3% at "A" malls, 5% at "B" malls, and 6% in the second quarter of 2017.

RESILIENT MALLS RIDE THE TIDE

Problems abound on both the supply (too much) and demand side (online and the shift toward services) of the mall equation. However, we now direct your attention to possible remedies for the retail maladies discussed above. The underlying principle behind the ensuing possible solutions to the mall malaise is dynamism. While malls may live in our imagination as a fixed concept (think, "Mallrats"), we ought never to forget that these spaces evolve and morph in surprising and successful ways.

The 7.8 billion square feet of leasable shopping center space in the United States may currently play home to certain retail concepts, but it neither needs to host the same retailers nor does it need to stay retail space forever.

Our first example comes from a high-quality mall REIT, Simon Property Group. The largest mall REIT in the world, Simon's shopping mall properties run an occupancy rate of 95.2%, higher than the national average of 90.5%. How can they manage so much shopping center space so successfully? They change with the times. If we think of malls as the wrapping and the underlying tenants/experiences as the present, Simon has demonstrated shrewdness in repositioning its assets over the years.

Consider the tenant mix the mall operator boasted in 1993 at the time of its initial public offering. The ten largest renters—brands like The Limited, F.W. Woolworth, and Melville Corp.—accounted for ¼ of Simon's total rental revenue. Of those top ten retailers, today, three are bankrupt, six operate under new parent companies, and one is no longer in existence (see Figure 3). During this period, Simon has grown its core earnings from USD 78.4 million to USD 3.8 billion and its market capitalization from USD 854 million to USD 56 billion—an increase of nearly 70x!

To be sure, mall REITs still have large exposure to apparel and other goods sales. That said, they have been able to ride mergers, acquisitions, and bankruptcies among their tenants adroitly.

«INVESTORS OUGHT TO REMEMBER A MALL OPERATOR OFTEN GETS ONLY USD 3-4/SQ. FT. IN RENT FROM A TRADITIONAL DEPARTMENT STORE BUT CAN GET 4-5X THAT DEPENDING ON THE REPLACEMENT TENANT.»

You might be wondering, “Sure, the mall operators can handle changes to in-line tenants, but what about all the big-box stores? Surely these tenants occupy plenty of retail space.” Regarding square footage, big-box retailers do dominate. However, as it affects the bottom line of the mall operator, investors ought to remember “a mall operator often gets only USD 3-4/sq. ft. in rent from a traditional department store but can get 4-5x that depending on the replacement tenant.”⁵ In total these cash square-footage hogs not only sometimes own their real estate, but they also account for only 15-20% of a given mall’s cash flows.

Historically, department stores negotiated low rents with their landlords in exchange for the traffic they generated. As mall traffic falls and department stores shutter, re-leasing to smaller retail tenants could generate opportunities for the malls and their owners—whether that means new in-line tenants (e.g., H&M, Zara, Yard House) or other bigger box tenants (Dick’s Sporting Goods, Ulta Beauty, TJ Maxx).

Even in this apparently troubled environment, the best-in-class mall operators still expect same-store net operating income to grow between 2-4%.⁶ The growth is coming not only from reduced expenses but also landlords’ ability to raise rents for new tenants (the re-leasing spread) at 10% or slightly higher. Measured by their ability to generate operating income, regional malls are in a king’s condition (see Figure 4).

RESILIENT MALLS SEE THEIR LAND TURNED TO GOLD AND SEND THE DROSS BACK TO LENDERS

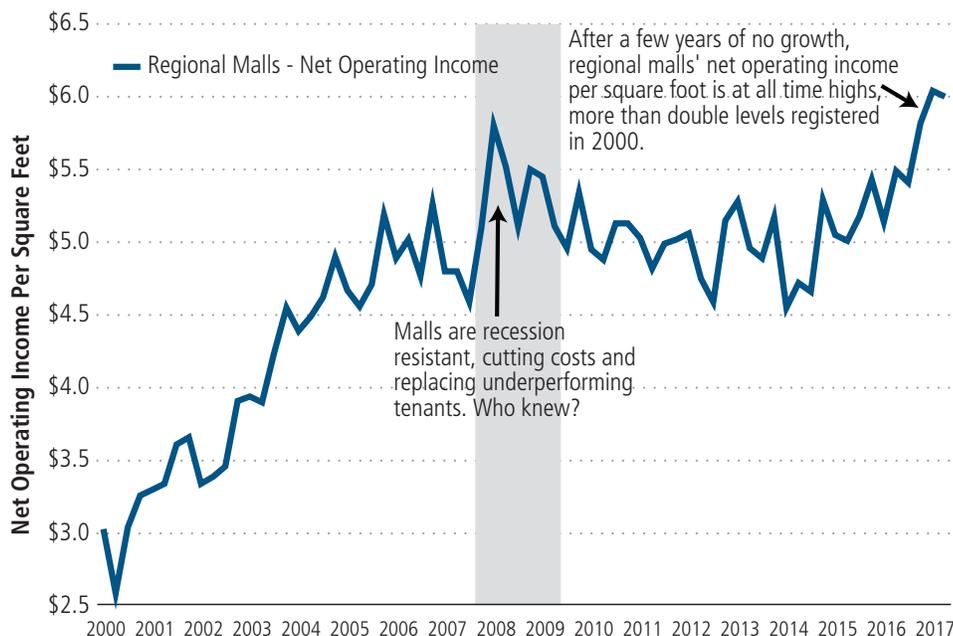
Strong mall operators evolve their tenant mix to better suit their customers. In cases where customers will not materialize even for an optimal tenant mix, and where land values are low enough, redeveloping some or all of the mall into new uses can be a lucrative route for the developer and a benefit to the surrounding community, especially for the weakest of mall properties. Adaptive reuse of the buildings and land is the second reason to envision a relatively bright future for shopping center owners.

Take the Fiesta Mall in Mesa, Arizona, as an example.⁷ After opening in 1979 and running for many years, the Fiesta mall lost its four major anchor tenants and sank to 10% occupancy. In the intervening time, a developer has since acquired the once vacant Macy’s and Best Buy anchor stores and has plans to transform the old space into mixed-use, office, and residential property. As for the main mall, a group spearheaded by a neighboring landowner purchased the mall and intends to invest USD 30 million into the property (nearly 4.5x the multiple of their USD 6.7 million purchase) to create an education and health-care campus.

There are also cases where existing owners can default on the debt backing their underperforming malls and re-enter the same positions at a more attractive price. How is this possible? Lenders are less interested than mall operators in running a shopping mall.

In one representative example, the mall REIT Washington Prime Group (WPG) defaulted on an USD 87.3 million loan collateralized

fig. 4 DESPITE THE HEADLINES, MALL FINANCIALS LOOK AS GOOD AS THEY EVER HAVE



Source: ICSC

by the group's Mesa Mall in Grand Junction, CO. Creditors soon resold the property for USD 63 million. The catch: the new buyer was Washington Prime Group. Lenders lost USD 24.3 million but avoided having to run the mall themselves.⁸ WPG, meanwhile, reduced the asset's leverage profile. The stronger balance sheet may provide needed flexibility for the mall to run a while longer.

«OF THE 72 MALLS THAT CLOSED IN THE PAST DECADE, 41 HAD BEEN REPURPOSED. TWENTY-THREE OF THOSE 41 MALLS WERE REDEVELOPED INTO OTHER RETAIL FORMATS, BUT 18 WERE REUSED OR RE-PURPOSED »

More generally, the trend is for underutilized mall space to change. Research conducted by Wells Fargo analysts concluded that of the 72 malls that closed in the past decade, 41 had been repurposed. Twenty-three of those 41 malls were redeveloped into other retail formats, but 18 were reused or re-purposed as civic centers, museums, county offices, residential towers, or office space. Of the 31 malls which had not been repurposed, only eight remain vacant in place.⁹

The conversion of malls into industrial, warehouse space has begun in earnest. From Union City, Georgia, to Mesquite, Texas, developers are turning old mall space into new distribution facilities, transforming 360,000-765,000 square feet of empty into plenty. Hamid Moghadam, CEO of Prologis, an industrial real estate REIT, recently remarked, "before too long you will see some two-anchor, Class B malls converted into logistic buildings, that is not too far-fetched at all. But, we're definitely looking at some of them."¹⁰

In short, mall landlords have many levers to pull to keep the value of their holdings at more attractive levels than headlines would suggest. Evolving their tenant mix—both in-line and anchor—as well as creative redevelopment, means that even if some malls must die, most will morph and live on.

NOT SO MALL-EFFICIENT

Our survey of the U.S. mall REIT landscape revealed a picture more nuanced than headlines proclaiming the "death of the mall" would have you believe. We are not blind to the risks ahead for enclosed shopping

malls. Oversupply, caused by decades of tax advantages (especially before the Tax Reform Act of 1986) and optimistic growth projections, as well as changing consumer preferences will not soon disappear.

However, malls are more dynamic entities than most casual commentary suggests. Strong operators who adapt their tenant mix appropriately, control speculative capital spending and consistently prune individual properties, as well as their entire portfolios of poor performers, are here to stay.

The fickleness of Mr. Market in 2017 has meant that many mall properties and related securities are on sale. Attractive entry prices as well as cool-headed (though unexciting) appraisals of future occupancy might not repopulate the earth with mallrats, but it will ensure they may remain in their natural habitat for just a while longer. 

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Green Piece: The Birth of “Green Bonds”

President Donald Trump threatened to withdraw the United States from the Paris Climate Accord, but don't think America has turned its back on the planet. Instead, a bottom-up response to environmental concerns is well underway, and the capital markets appear poised to play a crucial role in the effort. In particular, individual cities and corporations can support climate protection by issuing so-called “green bonds.”

As an investment manager, our goal is neither to support nor criticize the United States' economic or climate policies. Instead, we intend to provide a lively introduction to the world of green bonds.

For those feeling a bit “green” when it comes to sustainable finance, let us clear up definitions first: a “green bond” is a financial instrument that signifies a commitment to use the proceeds to finance or re-finance projects that deliver positive environmental impact. Green projects include, but are not limited to: renewable energy, clean transportation, sustainable land use, and energy efficiency.

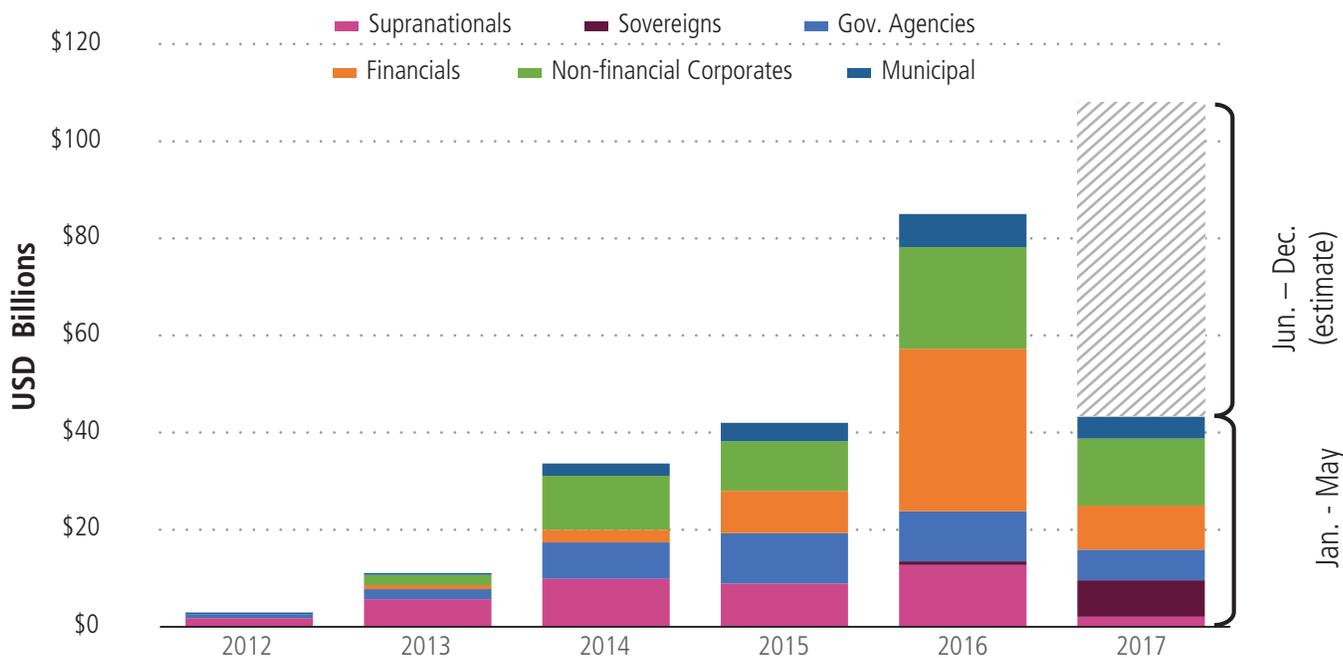
Green bonds are well-suited for large-scale sustainability projects and enable cities, states and corporations to secure large amounts of capital. These “do-good” investments are becoming more popular as corporations and municipalities build brands around “sustainability” and as fund managers increasingly create vehicles to direct capital toward

these projects. Perhaps we should not be surprised by these trends: Millennials are nearly twice as likely to invest in funds that target environmental or social outcomes.¹

«WE THINK GREEN BONDS CAN THRIVE AS A KEY COMPONENT OF THE BOND MARKET IF A UNIFORM DEFINITION IS ADOPTED AND IF INVESTORS KEEP A KEEN EYE ON THE USE OF BOND PROCEEDS.»

The issuance of the green bond market is expected to exceed USD 100 billion by the end of 2017 (see Figure 1), though will remain small and immature, accounting for less than 1% of the worldwide bond market. We think green bonds can thrive as a key component of the bond market if a uniform definition is adopted and if investors keep a keen eye on the use of bond proceeds.

fig. 1 GOING GREEN: ANNUAL GREEN BOND ISSUANCE BY ISSUER TYPE



Source: Bloomberg New Energy Finance

«CORPORATIONS COVET THE “GREEN” LABEL AS AN OPPORTUNITY TO DELIVER SUSTAINABLE NARRATIVES AND TO EXPLICITLY MARKET THEIR BONDS AS ENVIRONMENTALLY AND SOCIALLY CONSCIOUS INVESTMENTS.»

GOING GREEN: HOW GREEN BONDS STARTED

Green bonds have only developed in the last decade, but they have been growing at a fast pace. In 2007, the European Investment Bank issued the world’s first green bond, followed in 2008 by the World Bank. These multilateral development banks were the sole issuers of green bonds until the first corporate green bonds were issued in 2013 by EDF, Bank of America, and Vasakronan. Specifically labeled green bonds attract investors as the securities enable them to invest directly in sustainable projects. Corporations covet the “green” label as an opportunity to deliver sustainable narratives and to explicitly market their bonds as environmentally and socially conscious investments.

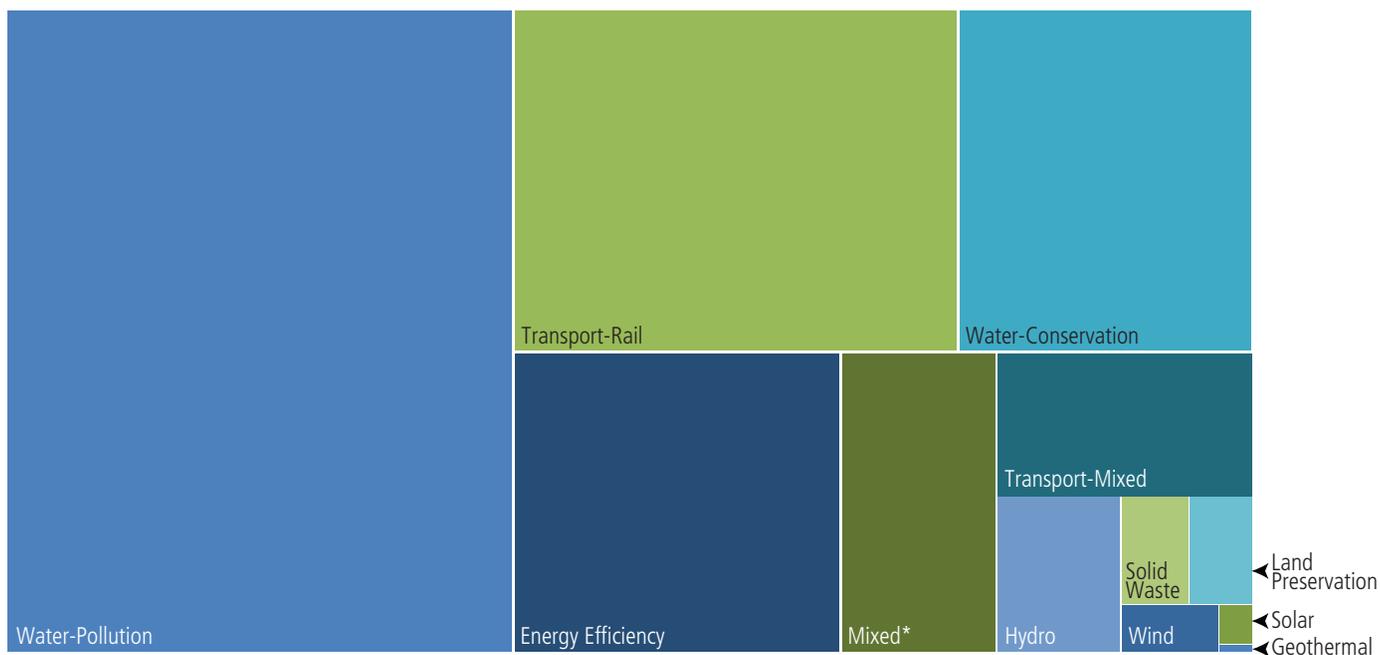
The green bond market expanded greatly in 2015 when 195 countries signed the Paris Agreement—a commitment to cut emission levels and to hold the increase in global average temperature below

2 degrees Celsius above pre-industrial levels.² To meet the aggressive temperature goal by 2030, an estimated USD 93 trillion in infrastructure investment is needed. In response, many cities and municipalities around the world turned to debt financing for low-carbon development projects, especially for renewable energy infrastructure. As of February 2016, green bonds have been issued in 23 currencies and 14 markets of the G20.³

As a result, by the end of 2016, global green bond issuance more than doubled from one year prior, with nearly USD 97 billion in fresh financing. China accounted for USD 32 billion, as one of the leading countries issuing green bonds.⁴ Approximately 40% of the proceeds from new issuance financed clean energy, while nearly 25% went to buildings and industry, and around 10% to transport.⁵

As for 2017, the total green bond issuance haul year-to-date (as of May 5th, 2017) reached USD 45 billion, putting the market on track to best its 2016 total and reach USD 111 billion by year end.⁶ There is a growing trend for green projects, as more institutions support initiatives aimed at preserving the environment. However, the green bond trend goes beyond recent climate initiatives. Emerging markets, in particular, face a growing need for energy-efficient and clean technology. As the cost of constructing clean tech infrastructure falls, countries are shifting towards renewable energy. For example, in South Korea, newly-elected President Moon temporarily shut down all coal power plants and mandated more investment in renewable energy power plants as Seoul, the country’s capital has recently become one of the world’s most polluted cities.

fig. 2 IT’S NOT JUST ABOUT RENEWABLES: U.S. MUNICIPAL GREEN BOND ISSUANCE BY USE OF PROCEEDS, 2014-2017 YTD



Source: Bloomberg New Energy Finance

*Mixed use of proceeds

Some emerging markets still do not have a strong banking or capital markets foundation to help finance high-cost infrastructure projects. In the energy sector, countries with the greatest need for power plants are the ones that rely heavily on international financing. These countries issue project-specific green bonds backed by single or multiple projects to finance high-cost projects. For example, the Philippines financed a geothermal power plant by issuing green bonds, the first local currency green bond in the power sector. By issuing green bonds, emerging economies can enhance the growth of their debt markets and reduce the infrastructure-investment gap.

GREEN BONDS MARRY MUNICIPAL BONDS: GREEN MUNICIPAL BONDS

The U.S. lags the rest of the world when it comes to green bond issuance. Green bonds comprised a mere 0.061% of the total U.S. bond market, a smaller share than that of China, India, and many European nations. The slow pace of development is due to relatively small offering sizes and sporadic deal flow, which leads to a lack of liquidity and stunted growth of the market. Demand also remains mostly retail-driven, through SRI (Social Responsible Investing) funds.

In the U.S., green bonds are most intimately related to municipal bonds, both regarding features and issuance, as most green projects are financing renewable energy power plant and energy-efficient transportation. Similar to the U.S. municipal bond market, key investors for green bonds are individual municipal bond investors who seek tax-exempted income. A growing number of investors, who tend to be of the “buy-and-hold” variety, span a wide range including institutional clients to individual investors.

Over USD 3.7 billion worth of new municipal green bonds were issued in the second quarter of 2017, making one of the busiest quarters of municipal activity (Q1 2017 saw USD 1.5 billion in issuance). As long as the current pace of green municipal bond issuance continues throughout the year, it is estimated that annual U.S. green municipal bond issuance will hit USD 10.4 billion in 2017, according to Bloomberg. State-run entities like infrastructure and public transportation entities are the largest issuers, and green municipal bonds are mostly used for managing water-pollution and rail transportation (see *Figure 2 on previous page*).

CHALLENGES: SHADES OF GREEN

The overall purpose of a green bond sounds great—it facilitates financing for long-term, capital-intensive infrastructure projects and encourages people to be aware of the environment. However, at the same time, green bonds face critical challenges to enhance market transparency.

«ONE OF THE MARKET BARRIERS IS THAT THERE IS NO UNIVERSAL DEFINITION AND STANDARD FOR GREEN BONDS.»

One of the market barriers is that there is no universal definition and standard for green bonds. Try and evaluate the “greenness” of a bond from the following two examples:

- The City of Long Beach, California, issued bonds to pay and/or reimburse the Harbor Department for capital expenditures incurred or to be incurred at the Port of Long Beach. This bond is considered “green” because the proceeds are expected to be used to reduce air emissions at the Port by reducing the number of trucks.
 - » Why does the City of Long Beach need financing when it is not *adding* but rather reducing required facilities? Does “reducing the number of trucks” count as a green project? Can investors accurately monitor changes in emissions around the port?
- The Maryland Economic Development Corporation self-labeled its bond as green bonds based on the Green Bond Principles. The Issuer believes that its project is green because it results in a 16.2-mile light rail transit line that falls under “clean transportation” category.
 - » Since green bonds can be self-labeled, how reliable is this “green” label? What makes a project green?

Likewise, different countries have their distinct definitions, challenging the green bond market to conform to a common understanding. This self-labeled “green” has broad meanings that confuse investors and put issuers at risk of “greenwashing,” which is using the proceeds from green bonds for non-green uses. China, for example, counts clean coal is “green.” For these reasons, investors should be cautious when evaluating the “greenness” of a bond.

One solution to this issue may be to prompt all countries and corporations to adopt a single, rigorous definition of a green bond. However, if it were this simple, you might think, “Why did issuers not pursue this option in the first place? Do people even want to agree to a common definition?”

Issuers face the dilemma of either having a strict or loose definition of a green bond. A specific definition could limit market growth due

to selectiveness but gives clarity on the use of proceeds to investors, whereas a “loose” standard would accomplish the opposite. Even knowing the potential downside of having a strict definition, to enhance the credibility of the “greenness” of a bond, we still believe having a unified and clear definition of the green bond is needed.

CHALLENGES: THIRD-PARTY EXTERNAL “REVIEW”

Currently, the market is trying its best for transparency. Rating agencies such as Moody’s have promoted green bond ratings that assist investors in understanding overall risk factors. These third-party external reviews help investors verify the requirements of the Green Bond Principles of a bond. However, the third-party verification process is still in its infancy. As of October 2015, only 60% of total green bond issuance was officially audited by a third party.⁷ Also, the third-party verification process is costly, with prices that range from USD 10,000 to USD 100,000.⁸

Ratings reviews, like green bonds themselves, bring different approaches for assessment from each rating agency. Each reviewer has her own standard and criteria, challenging investors’ ability to effectively compare and measure.

Learning from FASB (Financial Accounting Standards Board), with its goal to improve financial accounting and reporting standards for investors, SASB (*Sustainability Accounting Standards Board*) was founded in 2011 with a similar purpose but with a focus on material sustainability features. SASB addresses public companies’ disclosure of material, reliable, and comparable data to investors so that they can make decisions with an awareness of environmental, social and governance (ESG) factors. This helps investors to assess a company in a comparable, rigorous way.

DID YOU KNOW?

California, New York, and Massachusetts issued the largest amount of green municipal bonds, with California leading the charge. However, on average, green municipal bonds by state only constitute 0.6% of the total outstanding municipal bonds. Vermont is the greenest state regarding the total amount of outstanding green municipal bonds. The proceeds of the most recent green bonds issued by the Vermont Municipal Bond Bank are expected to be used to install energy-saving equipment, including water heating and heating control systems.

Why not apply this to fixed income? The external reviewer should review the “greenness” of a bond based on a common and well-structured standard created by an independent third-party. Such a development will enhance the transparency and quality of the green bond market, boosting market growth.

«BY 2020, IT IS ESTIMATED THAT GREEN BONDS COULD ENABLE \$120 BILLION IN INCREMENTAL ANNUAL INVESTMENT.»

CLARITY BRINGS SERENITY

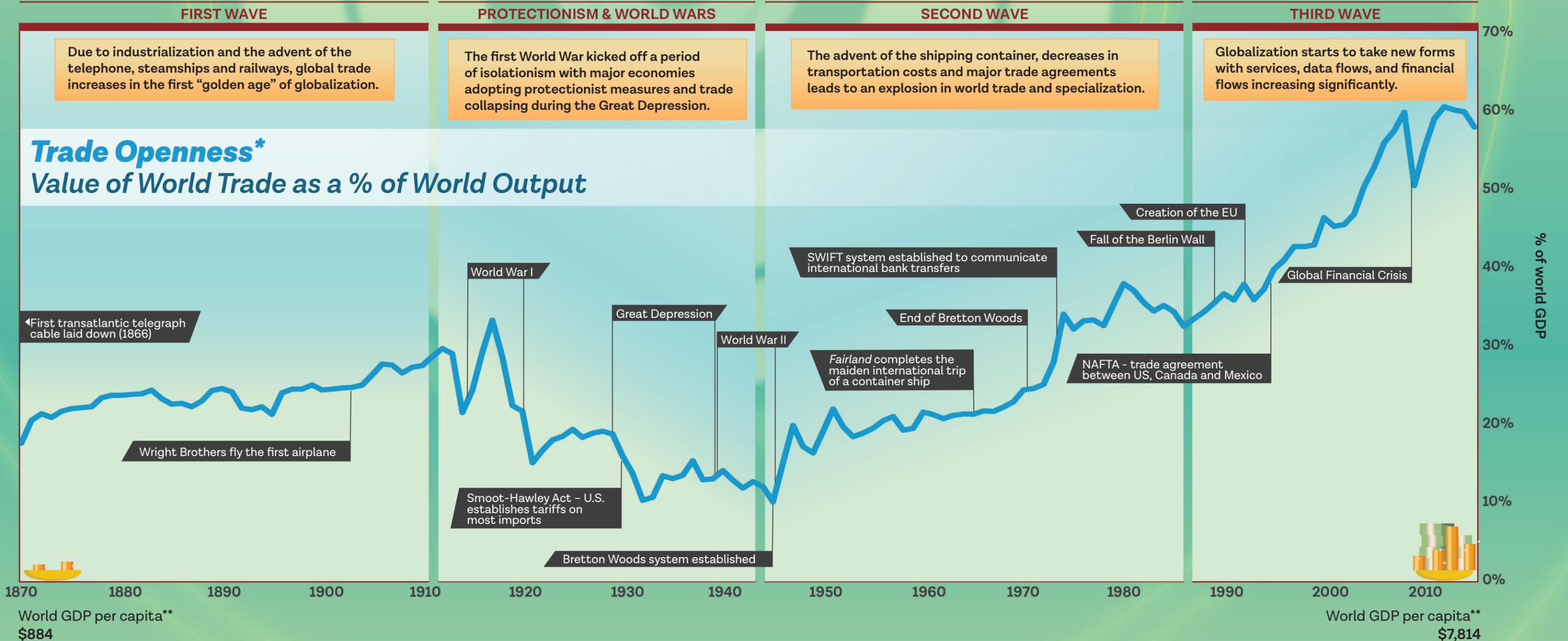
By 2020, it is estimated that green bonds could enable USD 120 billion in incremental annual investment.⁹ As long as there is uniformity in the definition of “green” and rigorous evaluation of the use of proceeds, green municipal bonds have a high potential for further growth and transparency, becoming more diversified across geography and credit quality while targeting a wide range of investors. Cities and states may have their way on climate initiatives whether or not the U.S. federal government supports it. 

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PEAK GLOBALIZATION?

Has the world reached peak globalization? Whether it is the election of Donald Trump or the Brexit vote, people seem to think that the progress towards and benefits of an increasingly interconnected world have ended. The way most people view these connections is via trade, but we argue that the nature of globalization has changed dramatically since 1870. Fears of peak globalization may be overdone. Also, a more interconnected world is a more prosperous one as seen by the rise in per capita output.



Cross Border Data Flows

Cross border data flows have added 3-4% to world GDP. According to McKinsey Global Institute, digital flows now have a larger impact on GDP growth than the trade in goods.

+4,400%

211.3 Gigabits Per second

Remittances

In some economies, remittances (money sent home from foreign workers) can be up to a third of GDP. India and China are the largest recipients.

+28,600%

\$553 Billion

Foreign Direct Investment

After dropping during the 2008 recession, foreign direct investment bounced back, increasing almost 50% since 2009.

+13,200%

\$1.8 Trillion

Tourist Arrivals

Tourism connects the world, too. Around 10 million passengers fly on more than 100,000 flights every day.

+4,600%

1.2 Billion

* Data retrieved from OurWorldinData.org (which uses Klasing and Milionis (2014) from 1870-1949, Penn World Tables 8.1 from 1950-2011) and World Bank from 2012-2015.

** 1990 international \$, retrieved from Angus Maddison

Sources: OurWorldinData.org, World Bank, UNCTAD, BIS, Barclays, McKinsey Global Institute, Aviation Benefits Beyond Borders, World Shipping Council

Beyond bitcoin: The Dawn of “Cryptoeconomics”

If you’re holding on to your university economics textbook as reference material, toss it in the bin. It’s out of date. A new subfield of economics, *cryptoeconomics*, has emerged. So new is the burgeoning field that a query of Webster’s dictionary for “cryptoeconomics” returns: “The word you’ve entered isn’t in the dictionary.”

“Crypto-what?” you might be thinking. *Cryptoeconomics* refers to digital currencies like bitcoin that use a combination of cryptography and economic incentives to function instead of relying on a central authority. *Cryptoeconomics* may be a new term but, surely, you’ve heard of bitcoin before. A few years ago we wrote about the fledgling digital currency (see “Bitcoin: The Future of Money,” January-February 2014)¹. Since then, the price of a bitcoin soared to more than USD 4,500 in September 2017, attracting plenty of media and investor attention alike.

For example, Charlie Munger said of bitcoin, “I think it’s rat poison. I regard it as deeply flakey.”² JPMorgan’s CEO Jamie Dimon opined,

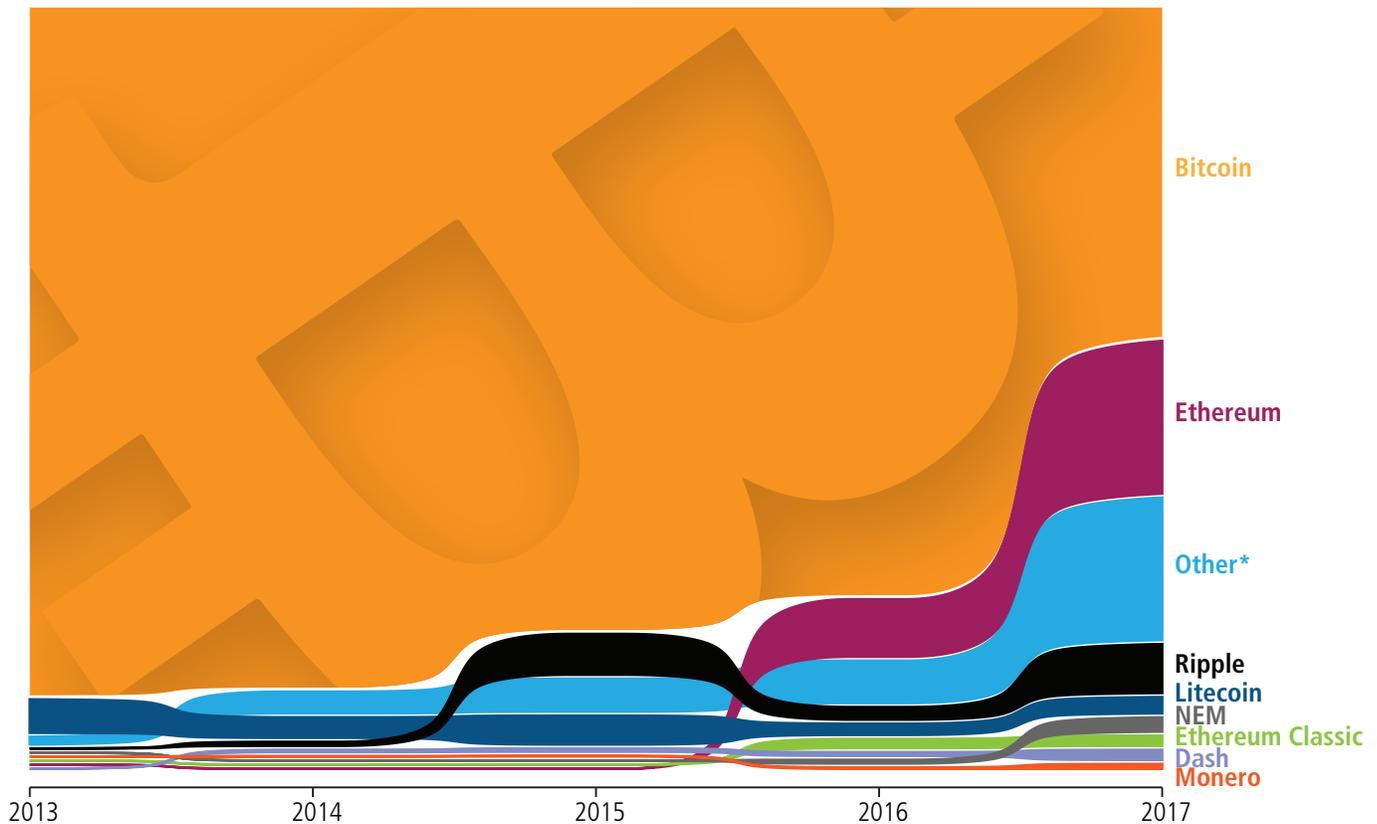
“It’s worse than tulip bulbs. It won’t end well. Someone is going to get killed.”³ Howard Marks wrote: “But they’re not real!”⁴ Robert Shiller, the Nobel Prize-winning economist famous for writing a book on financial bubbles, said, “The best example [of a bubble] right now is bitcoin.”⁵

We think almost everyone is wrong about bitcoin.

**«WE THINK ALMOST
EVERYONE IS WRONG
ABOUT BITCOIN.»**

We write to help catch investors up on “cryptoeconomics.” The birth of bitcoin marks the arrival of a novel economic institution—just like the emergence of nation-states, joint stock corporations, private clubs, or stock markets before it. Below, we’ll explore “cryptoeconomics” through a few classroom lessons using the example of bitcoin. Bit-

fig. 1 BEYOND BITCOIN: SHARE OF CRYPTOCURRENCY MARKET CAPITALIZATION



Source: Coinmarketcap.com, Payden Calculations

*Includes more than 800 different types of cryptocurrencies

coin is the first of what are now more than 900 cryptocurrencies, with a handful of others gaining share of the global cryptocurrency market capitalization of late (see Figure 1 on previous page).⁶

So, sit up, pay attention, class is in session.

LESSON #1: THE PROBLEM TO BE SOLVED

To start one must ask: “what is *the* problem bitcoin solved?”⁷ You have two main options when buying stuff: cash (from your pocket) or credit (from a trusted third party like Visa).

With cash, the merchant has an advantage: your shoeshine guy doesn’t care who you are, he only cares that the dollar bills you present aren’t fake. Once the cash changes hands, the transaction is complete.

Historically, many types of “difficult-to-counterfeit” objects served the same role in cash-like payments, including shells or gold coins. In the modern era, banknotes fit the bill (*ahem*). Again, either banknotes are made such that they are “difficult-to-counterfeit” and/or feature serial numbers so that a trusted third-party like a bank can verify their authenticity.⁸

But, buying stuff on the internet is more of a challenge. Cash payments? Impossible. And credit card online purchases present plenty of frictions, too. Often one needs to re-enter the card and cardholder information each time one makes a purchase. Worse, transaction fees are high and many people around the world don’t own credit cards.

These are the problems bitcoin sought to remedy. The world needed a way to make peer-to-peer, “cash-like” payments *online*. In 2008, the pseudonymous bitcoin creator Satoshi Nakamoto wrote in a paper detailing the idea behind bitcoin that, while “costs and payment uncertainties can be avoided in person by using physical currency...no mechanism exists to make payments over a communications channel without a trusted party.”⁹

Lesson: *the entire point of bitcoin* was to create a form of “digital cash” for use in *the digital world*.

LESSON #2: A CHAIN OF ENCRYPTED MESSAGES INSTEAD OF “BANKNOTES”

In the digital world, nothing seems scarce. Think about the digital items you own: such as music or pictures from your summer vacation. Think of how easily you can copy, paste, and send photos to grandmas and grandpas around the world.

Imagine, then, the challenge of creating “difficult-to-counterfeit” digital money! How can we guarantee that Alice hasn’t just “copy-pasted” her digital cash to send to Bob, much like she made a copy of her

favorite new Taylor Swift song? Where would the value be in such a currency?

Previous digital money attempts used a “mint”—a central institution that checked every transaction for authenticity. Think of it this way: if sending “digital cash” meant sending a picture of a dollar bill, there would need to be a single, central authority to check the serial numbers on the bills to make sure they weren’t spent elsewhere.

On the bitcoin network, when Alice sends Bob some value, she broadcasts to the entire network the transaction.¹⁰ And she doesn’t just send any message, using cryptography Alice can send a message to Bob that only Bob can unlock and only Alice can send. It’s an irrevocable message once it’s broadcast—just like a cash payment exchanging hands.

Who collects the messages?

The answer: *anyone* and *everyone*! All one needs to do is download the open source software and, voila, you’re a participant in a global network. But, more specifically, the group creating a running list of all transactions are called “miners.” Miners gather ALL the transactions and group them into “blocks” every 10 minutes. And this is very important, by gathering and verifying ALL transactions in the order the message are sent, the miners prevent Alice from sending money first to Bob and then sending the same money “copy-paste”-style to someone else.

What’s created is a single, “time-stamped,” agreed-upon list or “chain” that serves as “a single history of the order in which they were received.” In that way any user could track whether a sender had already spent “coins” elsewhere. The inclusion of transaction in chain of transactions that the majority of the network agrees upon is what makes the transaction “real.” “We define an electronic coin as a chain of digital signatures,” as Satoshi says. Digital scarcity is imposed by the list or chain of transactions through time.

«SO MUCH COMPUTING POWER IS DEDICATED TO THE NETWORK THAT IF WE LINED UP THE WORLD’S TOP 500 SUPERCOMPUTERS AND DEVOTED THEM TO BITCOIN MINING, THEY WOULD ADD UP TO LESS THAN 0.001% OF THE NETWORK COMPUTING POWER!»

Lesson: In bitcoin, instead of “difficult-to-counterfeit” coins or cash, we have a chain of “impossible-to-fake” encrypted messages transferring value from Alice to Bob.

LESSON #3: SHOW YOUR WORK, PROVE YOUR WORTH

You might wonder: couldn't a miner just add new transactions to the list or alter older transactions? In theory, yes! Fortunately, the author of bitcoin adopted a novel way of dealing with such a problem.

Bitcoin requires that each miner solve a “proof of work” puzzle to participate in the adding of blocks of transactions. In short, the puzzle requires nodes to “guess” at a certain number, and devote computing resources to making the guesses. The difficulty of solving that puzzle adjusts based on network transaction volume. The more computing resources devoted to the problems, the more guesses per second, or “hashes,” a miner can make.

The “proof-of-work” idea was originally conceived as a spam email deterrent. In order for a random financial newsletter writer to email you, they would first have to show you they devoted time, money and resources to solving a tedious puzzle. If each email required a puzzle that cost computing resources and, say, one second to solve, would spammers send as much email? Perhaps not. While the process was never adopted by email providers (just look at your “spam folder!”), bitcoin made use of the scheme to control contributions to the chain of blocks.

In an economics sense, the “proof of work” means that miners must devote real resources to the computer network, enforcing “skin in the game”—time, computing power, electricity, etc.—in order to participate. In the words of Satoshi, “If a majority of CPU power is controlled by honest nodes, the honest chain will grow the fastest and outpace any competing chains. To modify a past block, an attacker would have to redo the proof-of-work of the block and all blocks after it and then catch up with and surpass the work of the honest nodes.”¹¹ A miner *could* deviate from the consensus protocol. But doing so would be costly. At present, the so-called “hashing power” of the network is enormous, approaching 8 million terahashes per second (trillions of hashes per second), a rough proxy for how much computing resources are devoted to the network.¹² In fact, so much computing power is dedicated to the network that if we lined up the world's Top 500 supercomputers and devoted them to bitcoin mining, they would add up to less than 0.001% of the network computing power!¹³

As of September 2017, nearly 10,000 computer “nodes” run the bitcoin open source software, spanning 96 countries.¹⁴ There's now even a satellite in space running a full bitcoin node.¹⁵ It's a truly global, distributed network. Counter to JPMorgan's CEO Jamie Dimon's

recent claim (“It's just not a real thing, eventually it will be closed”), the network will prove difficult to shut down.¹⁶ No single person or entity controls the bitcoin network. And with a decentralized network that has no single owner nor a single physical location there's no single point of failure.

«THE PROCESS ALSO MAKES NEW BITCOINS “PROVABLY COSTLY TO CREATE,” PLAYING THE ROLE IN THE DIGITAL WORLD OF GOLD IN THE PHYSICAL WORLD, GOLD BEING RARE AND COSTLY TO EXTRACT THUS PROVING ITS SCARCITY.»

Lesson: “skin in the game” through computing resources deters mischief-makers from joining or altering the network, making it more likely—or at least less *costly*—they will cooperate.

LESSON #4: WHY MAINTAIN A LEDGER? WHAT'S IN IT FOR ME? THE ADDED ECONOMIC INCENTIVES

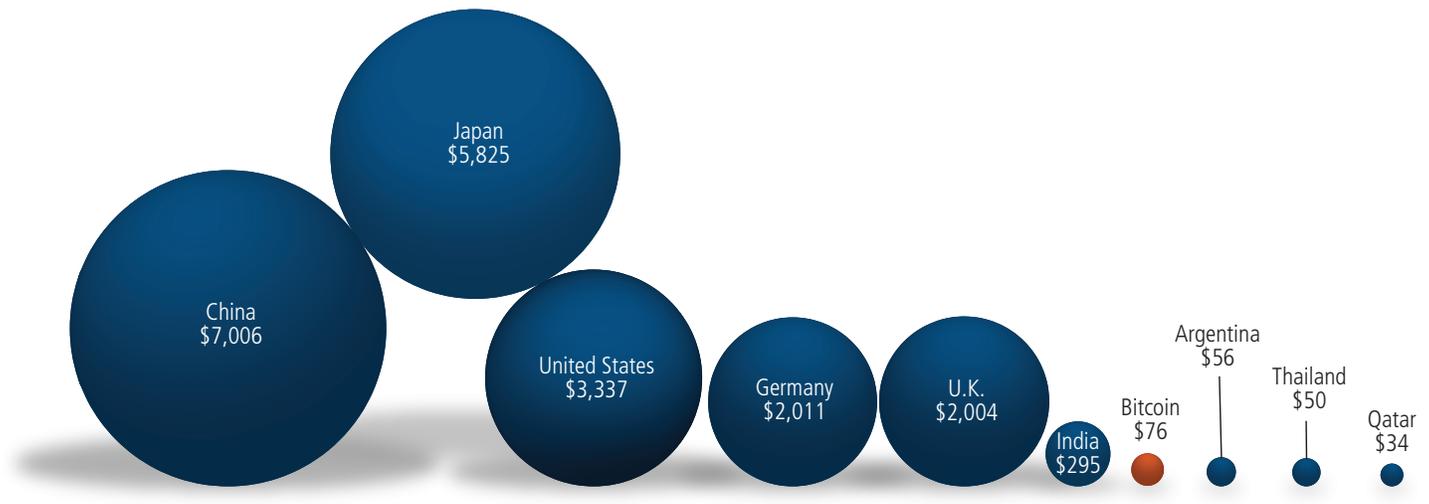
Ok, so now we have a chain of blocks (the list of transactions), appended only by “miners” who conduct a “proof of work” (puzzle) to show that the transactions are valid and that the miners have devoted real resources to the network. We still have a nagging question: who would actually spend time and resources to maintain such a ledger?!

Simple: the maintainers of the network derive value from securing the ledger by earning 12.5 bitcoin with every new, confirmed block added to the chain in which they solve the puzzle first.¹⁷ The process also makes new bitcoins “provably costly to create,” playing the role in the digital world of gold in the physical world, gold being rare and costly to extract thus proving its scarcity.

In other words, the network does not depend on the altruism of contributors to create the list or volunteers helping build the consensus list. Instead, bitcoin incentivizes good behavior to generate a consensus about who owns what. It's not the stick but the carrot that helps the network.

Lesson: The built-in incentives, in effect, glue people together. Devoting more resources to the network secure it while; the more secure the network the more economic value stakeholders derive.

fig. 2 IS BITCOIN THE HOTTEST CURRENCY? M1 MONEY SUPPLY* VALUE IN VARIOUS COUNTRIES COMPARED TO TOTAL VALUE OF BITCOIN (BILLIONS OF USD)



Source: Oxford Economics, Bloomberg, Payden Calculations
 *M1 money supply = banknotes, coin and bank deposits

CRYPTOECONOMIC TRUST

Let's pause a moment and admire what's been created: to create a scarce, digital asset, we replaced the "mint" or "bank" with a single, agreed upon list (a "chain of blocks") maintained by a distributed network of computer nodes spread around the globe. It's the result of a combination of cryptography, a distributed ledger, "proof of work" and game theory (the incentives of the miners). Hence, cryptoeconomics.

As the term cryptoeconomics implies, bitcoin is not *merely* a new currency or technology or new asset, it's a new way of organizing economic activity. Think of the institutions important to the functioning of modern society: first to mind are often the nation-state, a central bank, the stock market, the joint stock corporation, and non-profits. Each embodies ways of organizing humans to achieve a desired end. More generally, these institutions create trust. In turn, "empirical studies, however, confirm the important role of trust in overcoming social dilemmas".

DID YOU KNOW?

We take technologies for granted that once appeared strange and novel—or even useless. Take for example the idea of a corporation owning its own internet address. Sounds normal, right? But in 1994, *Wired* magazine tried to give McDonald's—yes, the burger chain—the URL McDonalds.com. The reporter couldn't get anyone at the Golden Arches global headquarters on the phone to accept the free offer. Will every corporation one day have its own cryptocurrency?¹⁸

Those are the words of Elinor Ostrom, winner of the Nobel Prize in Economics in 2009. In her work she sought a "new theory to explain phenomena that do not fit in a dichotomous world of 'the market' and 'the state.'"¹⁹

The cryptoeconomic institution described above is in fact a new way to form consensus about underlying information *without* relying on a nation-state or a corporation. Stakeholders find motivation in the economic incentives associated with the network. The network bootstrapped itself into existence in a bottom-up process creating trust without relying on a central authority.

BUBBLE TROUBLE?

Of course, new technology and institutions breed hype—and often over-hype. In the words of Roy Amara, "We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run."²⁰

Carlota Perez, who has studied technological disruption and the role of finance, wrote: "What one can say with little risk of erring is that, once the design, product and profit space of a new paradigm is visible, the imagination of a vast number of potential engineers, designers and entrepreneurs is fired to innovate within the new general trajectories. As available finance makes their projects possible and as their astounding success makes the paradigm even more visible and attractive to a great number of people, the ranks of those that feel the calling will invariably swell."²¹

Nobody can predict the future. There are in fact, plenty of other cryptocurrencies that could do as well, if not better than bitcoin. But it's important to recognize important shifts when they happen. The birth

DID YOU KNOW?

Cheap Compared to Gold and Many “Currencies”

Based on the bitcoin protocol, the supply of bitcoin will approach 21 million in 2140. With 16,586,438 already in digital wallets around the world, scarcity and predictability are baked into the software’s design.²² Why does that matter? Are you prone to doubt the wisdom of central bankers tinkering with currencies in say, Venezuela or Argentina or China? Do you seek to protect the wealth of your family from the whims of monetary policy makers and their mistakes? Are you drawn to the shiny metal, gold? Or rare paintings? Well a scarce digital asset may provide you an additional option. We’re not saying put all your assets in the cryptobasket. But, one recent example, the German central bank completed a move of gold bank from New York and Paris to its vault in Frankfurt. The bank moved EUR 24 billion worth of gold bars. It took four years to complete.²³ Maybe there are better options? And despite the recent runup in price, bitcoin remains cheap compared to roughly comparable assets. For example, the current market capitalization (i.e., the amount outstanding multiplied by the current market price) of gold is USD 9 *trillion*, roughly 120 times the market cap of bitcoin at USD 76 billion as of September 2017. Further, compared to the M1 money supply of many major world economies, bitcoin also appears to have plenty of upside value potential (see *Figure 2 on previous page*).

of a new economic institution is one of those shifts. It’s not every day or year or even every decade or even every century that a new asset class supported by a new, novel institution comes along. Whether or not the new institutions bears fruit—and what that fruit may be—remains to be seen. 

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