Investing in the Age of Disruption

The emerging disruptive forces of technological, political and demographic change threaten to destabilise long-term investment performance. It will take special kind of capacity building and flexibility for institutional investors to benefit from disruption rather than fall prey of it.

The year 2017 nicely rounded off what was already a nine-year-old bull market with double-digit equity returns and a corporate tax cut of historic proportions in the US. Despite the doom and gloom expectations of permanently lower returns by analysts (including ourselves), it appears that delivering double-digit returns was just a matter of turning up to the party.

Rationalising such a strong performance is moot at best: no amount of knowledge can help rule out a strong performance of equity market[1], so we will never find out whether the recent good performance was due to the strong economic recovery, the Trump administration or monetary policies, or neither of the above. It is worthwhile to remind ourselves that most of institutional portfolios are still fully invested, paper profits are not in the bank and high equity returns just like tax cuts today, will not help if they are based on and borrowed from expectations of tomorrow's earnings.

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[1] It is a matter of odds. Extremely high historical readings of LINKS Graham Risk (GR) (overpriced markets) were usually followed by either good or bad market performance, i.e. expected return close to zero with large positive and negative values around, whereas low GR values were followed by high returns. Asset pricing intelligence can improve the odds of good return, but they cannot rule them out.

A more constructive approach is to concentrate on what lies ahead, take stock of the economic realities and outline a long-term investment strategy that considers those realities, rather than glosses over them and hopes for the best. In this issue of Risk Wire, we do just that: we depart from the tradition of focusing on risks alone and build an investment policy that in our view delivers the best odds of high return and controlled risk given the non-trivial challenges lying ahead.

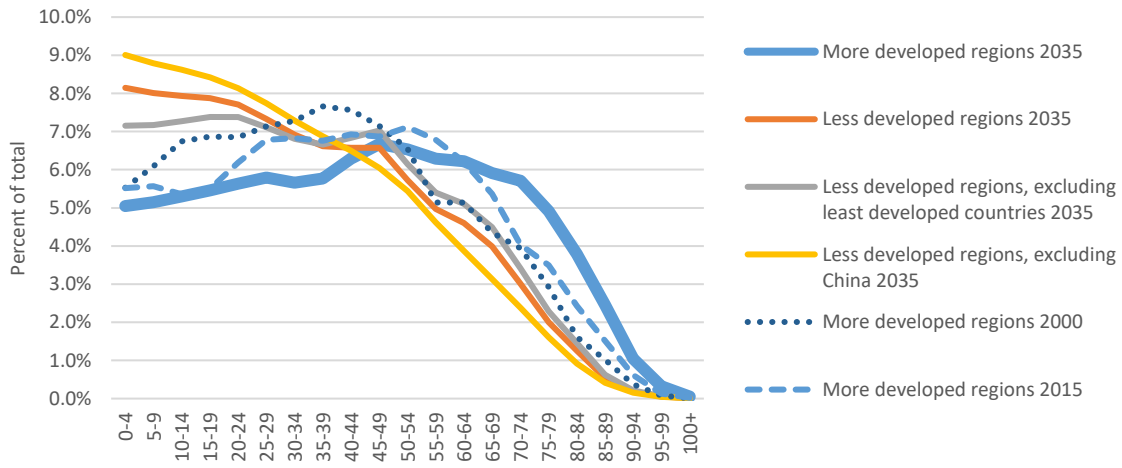
Generational Change

The investment environment changes all the time – this is not new. What is new is the sheer breadth and depth of simultaneous change that is about to impact the global economy. We have bundled these environmental changes in two groups: macroeconomic and microeconomic. However, this bundling is arbitrary, as many micro trends are driven by macroeconomic developments and vice versa.

The main macroeconomic trends have been covered in our Risk Wire issue of September 26, 2017:

i. **Demographics:** aging population in Europe and the US will save less and consume more and differently. The baby boomer generation is about to enter the age group of over 65, which typically results in 5-6-fold decline in savings. This is likely to cut the demand for equities and possibly increase the demand for bonds. Furthermore, lower number of people working in the economy means productivity gains should be even higher to achieve the same level of growth in per capita income. Demographics in the Emerging Markets are more supportive of economic growth in the next decade or two (Figure 1).

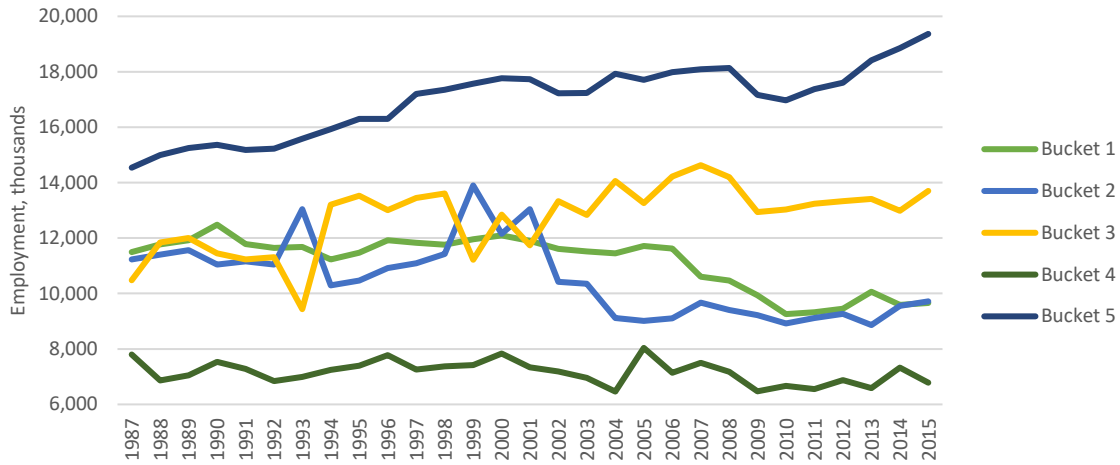
Figure 1: Age distribution of global population, current and forecast, Source: UN DESA/Population division



ii. **Extreme productivity trap:** automation improves productivity in many industries to an extent that those industries require much smaller work force. The resulting migration of work force from high productivity industries to low productivity jobs or

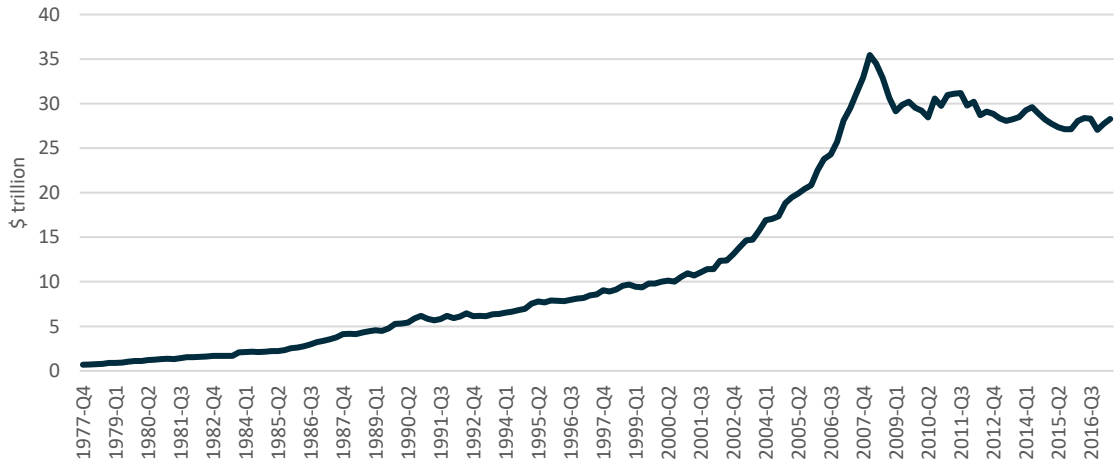
permanent unemployment (Figure 2) causes overall lower level of productivity gains and higher dependency rates.

Figure 2: Number of people employed in groups of industries based on productivity ranking, Bucket 1 represents the group of industries with highest productivity, Bucket 5 – lowest, Source: US BLS, BEA, LINKS calculations



iii. **Reversal of globalization:** a significant shift in global geo-political attitudes towards populism, protectionism and isolationism is hard to ignore. Some of the visible signs of this trend are Brexit, the election of Trump as the US president, populist and isolationist policies in Europe, particularly Poland and Hungary, emergence of severe autocratic regimes in Russia, Turkey, Philippines. The clear economic manifestation of this trend is the shrinking cross-border asset base of all institutions (not just banks – Figure 3). The likeliest early result of this trend is the disruption of global trade and supply chains (Mexico-US, Canada-US, Britain-EU), disruption to large-scale energy and resource projects (Exxon – Russia) and wars.

Figure 3: Cross-border assets of institutions, Source: Bank of International Settlements

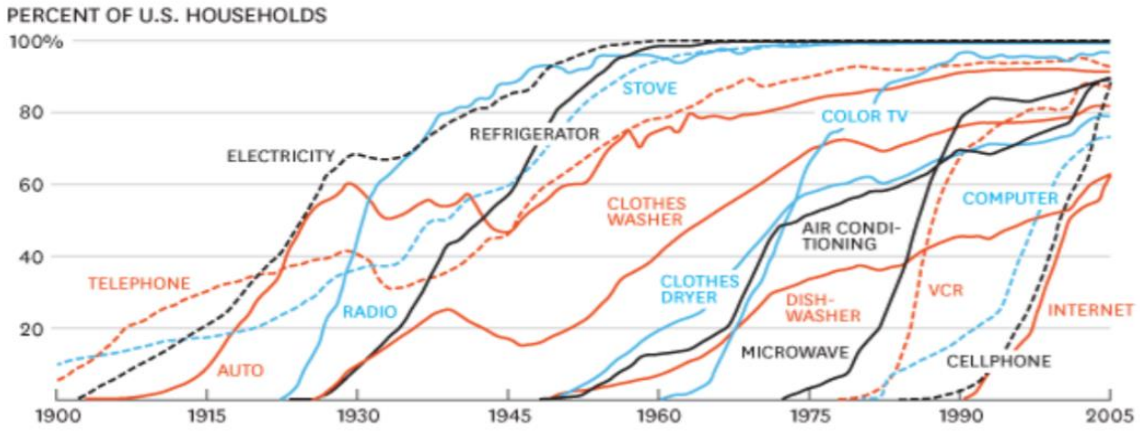


The three macroeconomic trends combined result in lower productivity growth rates and lower propensity to save, as well as lower average income and consumer spending. The macroeconomic drivers suggest that the currently observed long-term trend of lower GDP growth and interest rates should continue and get worse.

The **microeconomic trends** are related to (in terms of cause-effect) the macroeconomic observations:

iv. **Higher pace of innovation adoption:** a clear trend of faster innovation adoption, which causes several issues for companies. The hyper growth period of modern companies is much shorter and more abrupt. Products reach their full potential quicker and are disrupted and replaced quicker (Figure 4). Companies are forced to innovate quicker, as there are fewer and fewer sustainable "cash cow" products.

Figure 4: Technology adoption pace, % of US households



Source: Michael Felton, The New York Times

v. **Digital disruption: digitization brings disruption in most industries, from attacks on** dominance of banks in global finance to distributed power generation impact on utilities and changes in manufacturing models due to mass customisation with 3D printing – many industries face existential threats due to dramatically lower cost of entry and competitive solutions (Table 1). The net impact is lost revenue and value accretion to the consumer.

Table 1: Cost of selected key technologies, Source: World Economic Forum

TECHNOLOGY	YEAR	PRICE PER UNIT ($)
3D PRINTING	2007	40,000
	2014	100
INDUSTRIAL ROBOTS	2007	550,000
	2014	20,000
DNA SEQUENCING	2007	10,000,000
	2014	1,000
SOLAR POWER (PER KWH)	1984	30
	2014	0.16
SENSORS (3D)	2009	30,000
	2014	80
SMARTPHONES	2007	499
	2015	10

vi. **Environmental disruption:** public policy to address the CO2 emissions has caused a major shift and threats in industries that were less susceptible to technological shifts, such as energy, utilities and automotive. As new technologies required in each industry are fundamentally different from the core competencies possessed by the incumbent companies, there is a real risk of "betting on losers".

Implications of these observations are dramatic for virtually every industry. With a notable exception of health care, all industries will struggle with at least one major challenge (Table 2). In our assessment, the threat is existential in nature for six of ten industries, which means that revenue generation can potentially disappear altogether, unless the main players make drastic changes to their business models.

Table 2: Implications of trends by sector, existential threats in red, Source: LINKS analysis

Industry	Demographics	Extreme Productivity Trap	Reversal of Globalisation	Higher Pace of Innovation	Digital Disruption	Environmental Disruption
Energy	Aging population saves and invests less, which cuts the demand for equities and increases the cost of equity. Lower number of people employed in the country due to aging puts additional demands on productivity gains required to pay for health and social care. Per capita growth lower as a result. Employment concentrates in low productivity industries such as care, education and catering. Low wages in those industries result in lower aggregate demand for all products and services.		Large-scale energy projects threatened by political instability and trade wars			Electric drivetrain will cut the demand for oil
Utilities					Distributed generation has the potential to marginalise utilities.	Increasing share of intermittent renewable power increases the cost of load balancing.
Telecommunications					OTT companies (Skype, WhatsApp etc.) attacking revenue	
Consumer Durables			Global supply chains under threat			Electrification of drivetrain poses a threat to car manufacturers
Technology			Localised internet limits expansion	Revenue models challenged, including advertising		
Finance					Fintech companies carve out payments, lending, deposits, trading	
Industrials			Global supply chains and markets under threat	Product life cycle faster, requiring quicker profitability and replacement	3D printing, mass customisation put pressure on traditional manufacturing	
Health Care						
Consumer Staples					Retail moving to online renders traditional chains obsolete	
Materials			Mining rights threatened by political instability and trade wars			Lower oil volumes will disrupt the petrochemical supply chain.

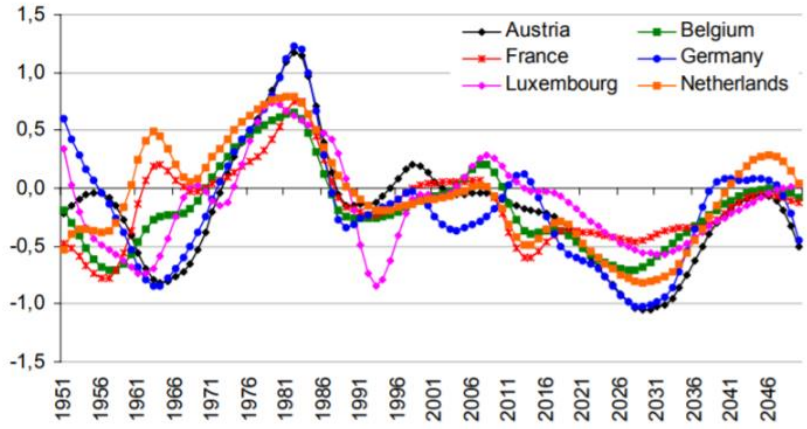
Consequences for Investment Policy

To some extent most industries have always been in the state of creative destruction and permanent renewal. Companies were able to reinvent themselves and come up with new products and business models to compete in the changing environment. What is new this time around is the scale and pace of multiple simultaneous challenges. A similar study that we carried out ten years ago yielded only one industry with existential level of threat[2].

Regional preference

In the pre-2000 period the most significant demographic in the world in terms of income growth was the working age population in the United States. In Europe, working age population grew about 1% faster than the total population between 1970s and 2000s (Figure 5). In the next several decades, on the other hand, this trend will reverse: in Europe, total population growth will be above the working population growth, while in the US, the single most influential demographic will be over 65 retiring baby boomers.

Figure 5: % growth difference between working and total population, Source: (A. Prskawetz, 2007)



Unfortunately, this does mean lower economic growth rates will follow, partly due to the simple accounting effect, but also through many pathways, such as lower savings rate and lower productivity growth rates due to higher requirement of labour in health and social care (A. Prskawetz, 2007). The demographic that will have the largest impact on consumption patterns is 60-plus population in the United States, Europe and Northeast Asia. Between now and 2030, they will contribute up to a third of total consumption growth compared to only 2% contributed by the European millennials (Richard Dobbs, 2016).

The fastest growing working age population, on the other hand, is found in Emerging Markets, however, not uniformly, which makes the current regional classification of Emerging and Developed markets ineffective. Countries such as Poland, Russia, Taiwan and Thailand together constitute about 20% of the MSCI EM index and have poor demographic profile. Indonesia, India

[2] Incidentally, it was the automotive industry facing extraordinary hurdle in terms of environmental regulations. This was followed by emergence of Tesla as a new challenger and the Volkswagen emissions scandal.

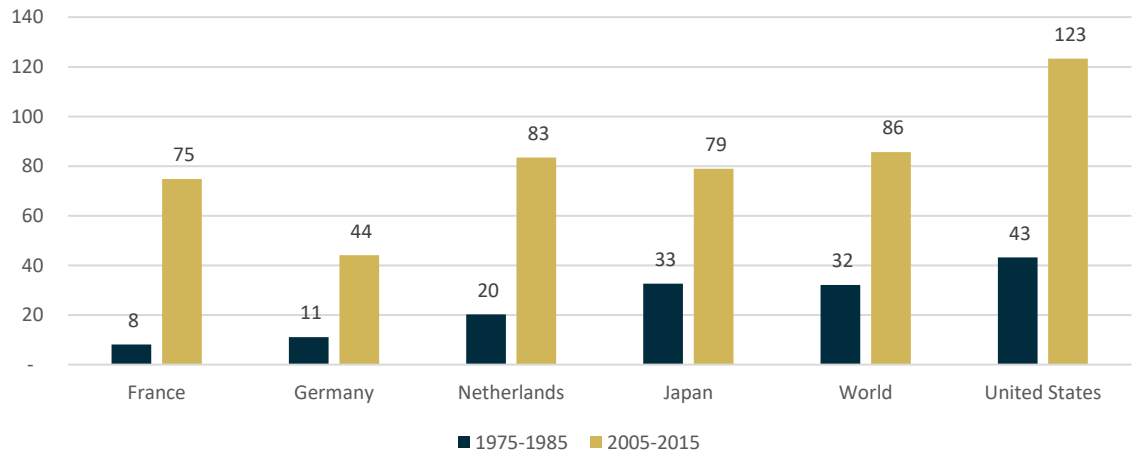
and Malaysia on the other hand, have the strongest population growth rates. When simple growth rates are combined with contribution to income generation, China's working age population stands out as the cohort that will contribute the greatest share of spending, as their numbers rise by 20% and their per capita consumption levels double.

Conclusions from this general trend are nuanced. Domestically orientated industries such as health and social care in the US and Europe will see strong tailwind. Generally, the type of "blanket coverage" of index investing that was unbeatable in the last thirty years will still make sense in the health care sector. But that will be more an exception than the rule. **Countries with the strongest demographic profile that have also high cultural, legislative or other barriers to entry, have or will develop strong domestic industries with deeper and better knowledge of the domestic consumer and access to capital to cater for it.**

Instrument and Liquidity Preference

The shift from the United States as the major driver of consumption to elsewhere in the world raises a more fundamental issue. The public equity based corporate finance model has become the de factor global standard in theory. In practice, financing growth with equity issuance is a cultural thing. European companies fund their expansion predominantly by bank finance and this has not changed much in the last decades. If anything, the equity culture has become even less dominant globally: between 1975 and 1985 average market capitalisation to GDP ratio gap between US and the rest of the world was only 11%. Currently this gap stands at 37% (Figure 6). One argument could be of course that the US market has become more expensive compared to its economy. But a more convincing reason is that more companies choose the bank/private financing route and avoid public markets altogether.

Figure 6: Market capitalisation to GDP ratio in %, Source: World Bank



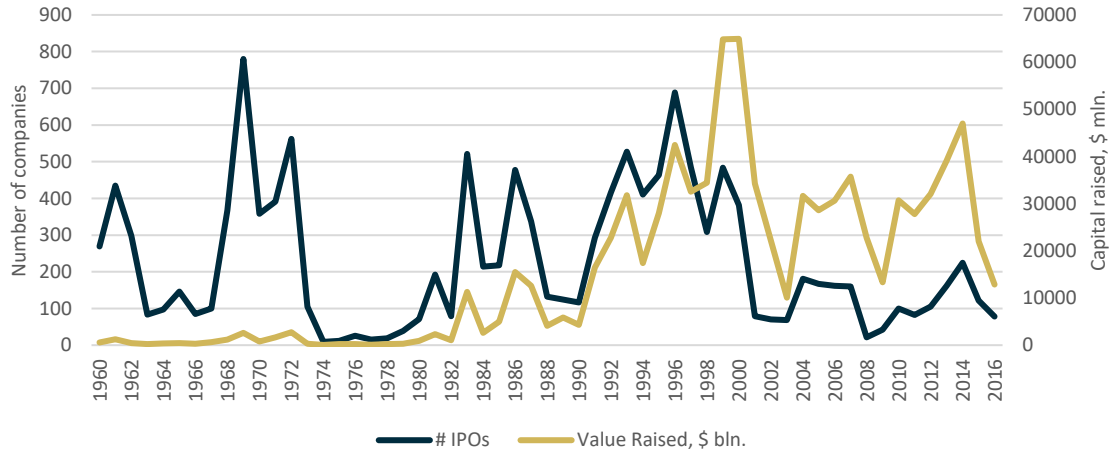
Historically, this has not been an issue, as growth has mostly come from the US where investors had access to the equity of growing companies. Going forward, there is an argument to be made that public equity investments will become less attractive for a combination of reasons:

i. As the sources of growth migrate to Asia and selected emerging markets, accessing this growth via public equity becomes difficult, since much smaller proportion of GDP is listed, and not always the most attractive part.

ii. Traditionally and culturally, equity investments are not as well protected, understood or supported even in developed Asian countries. In a typical Japanese understanding, for instance, companies belong to the employees, clients, the society and the shareholders in equal measure. It is often suggested that high degree of public market investment will follow when emerging markets tackle the issue of minority shareholders' rights. The assumption is, of course, that a large public equity market is essentially the only development path.

iii. As product lifecycles and the longevity of companies shrink, there is less time for stable profit growth on the public domain; companies tend to either stay private or come to the market prematurely, without any profits. The question of very low level of IPOs in the US despite the nearly decade old bull market is still open: is the market struggling to regenerate this time round? (Figure 7)

Figure 7: Number of US IPOs and capital raised, Source: CRSP (Amex, NYSE, NASDAQ offers, with prices over $5 per share)



A natural consequence for this move away from the public equity markets is that **gradually** the traditional index-based access to public (equity) markets will be less effective in gauging the global economic growth. Simply buying broad indices in the US and Europe will leave out the real sources of growth – developing countries. While broad equity exposure to emerging markets will not provide access to that growth. **The next two decades will see institutions striving to build exposure away from public and liquid and into private and illiquid markets and away from equity and into debt and hybrid instruments.**

Diversification Preference: Products vs. Platforms

Companies have reacted to shortening product life cycles and shelf lives by attempting to transform products into platforms. Examples of this are Amazon (internet retail and Amazon Web Services), Google (search, mail, documents, Android etc), Tesla (fast charging infrastructure, home batteries and solar power generation), Apple (iTunes). Majority of the top companies in the current line-up of the largest companies in S&P 500 are based on platforms (Table 3). Although the split between products and platforms is somewhat arbitrary, the intuition is that a platform is an intermediary that connects groups of users and other products (Feng Zhu, 2016). A feature of a

platform is that its replication is costly and risky, the cost of switching for clients are high. Another more familiar name for an extreme version of a platform is infrastructure.

Table 3: Top ten companies by market capitalisation in S&P 500 by year and classification of business model, Source: Bloomberg, LINKS analysis

1980		1990		2000		2017	
IBM	product	IBM	product	General Electric	product	Apple	platform
AT&T	platform	Exxon	product	Exxon	product	Microsoft	platform
Exxon	product	General Electric	product	Pfizer	product	Amazon	platform
Standard Oil of Indian	product	Philip Morris	product	Citigroup	platform	Facebook	platform
Schlumberger	product	Royal Dutch	product	Cisco Systems	product	Berkshire Hathaway	product
Shell Oil	product	Bristol-Myers Squibb	product	Wal-Mart Stores	platform	Johnson & Johnson	product
Mobil	product	Merck	product	Microsoft	platform	JP Morgan Chase	platform
Standard Oil of Califor	product	Wal-Mart Stores	platform	AIG	product	Exxon Mobil	product
Atlantic Richfield	product	AT&T	platform	Merck	product	Alphabet	platform
General Electric	product	Coca-Cola	product	Intel	platform	BofA	platform

A natural consequence of platforms is limited competition and consolidation of power in the hands of the single platform owner in each category. Notice the dominance of oil companies in 1980s and compare it to the technology firms in present days. Oil companies all produce virtually the same product and compete directly. In contrast (Table 4), although we consider Apple, Microsoft, Amazon, Facebook and Alphabet all technology firms, their respective platforms that generate bulk of the revenues, do not compete:

Table 4: Selected companies and the nature of platforms, Source: LINKS analysis

Company	Platform
Apple	Apps & music
Microsoft	PC OS + Office
Amazon	Cloud, Commerce
Facebook	Social Network
Alphabet	Search

The problem for investors in terms of “platform-isation” is that there is no space for five or ten sustainable and profitable platforms in each category. What this means is that there is little space for a rich and diversified “tail” of companies that compete successfully, innovate, get funded, become profitable and are listed in the public market. Another consequence is that the established companies that are parts of major indices would be too slow to adapt to the significant shifts in the winning business model, while the new winning companies would remain in private hands.

Consequences for Investment Selection

Investment selection in the world away from indexing and diversification benefits becomes a lot more important. The issue here is not the traditional question of alpha generation: the problem is that building “the market” portfolio in the global non-equity centric world is much harder and is a question of access. Accessing specific investments that stand on the correct side of the macro- and microeconomic trends is going to be the differentiating factor.

In each of the industries that faces existential threat, there are companies and sets of assets in certain geographies that stand to benefit from the changing status quo. Whereas historically it would have sufficed to build a portfolio of companies exposed to these so far niche markets, the trend away from the public equity and platform based business models mean that this approach would be ineffective too.

Instead, institutions can build access to the assets using flexible instruments directly. The most obvious industries that are poised for change are energy, financials, retail/commercial property, materials and automotive.

Energy

Most countries, particularly in Europe, have experienced a large increase in the share of solar and wind renewable energy generation in the total energy mix. The share of renewables however has arguably reached its limit, as further conversion would require energy storage solutions: as both solar and wind generation are intermittent in nature, any additional capacity would require alternative sources of energy for when there is limited renewable production. The need is particularly acute in the Emerging Markets, where according to IFC estimates the market will grow at 40% annually until 2026 (A. Eller, 2017). Investing and owning this large storage capacity will deliver stable, mid-double digit return with limited economic risks.

Banks

Financial institutions will undergo the same transition as telecommunications and utility companies went through in 2000s. The regulatory reform that “opens the market” for third parties will create the banking version of Skypes and WhatsApps. These, however, will have to be built on standardized infrastructure – something that is missing in the emerging markets and is in infancy in the West. So called Application Programming Interface (API) platforms are ideal technology-agnostic infrastructure assets that would enable the transition.

Retail

The pace of bankruptcies of global retail franchises has been unabated, which leaves significant large-scale retail property unoccupied. The next wave of opportunities in this space is driven by the logistics infrastructure: last-mile warehousing and courier services. Existing retail space will be converted into smaller close-to-customer warehouses that would enable broader same-day delivery option.

Materials

As oil supply chain becomes more expensive due to falling volumes and underinvestment, the market for bioplastics (predominantly PLA) will have to grow faster than the most recent annual mid-teens level, to become a viable substitute.

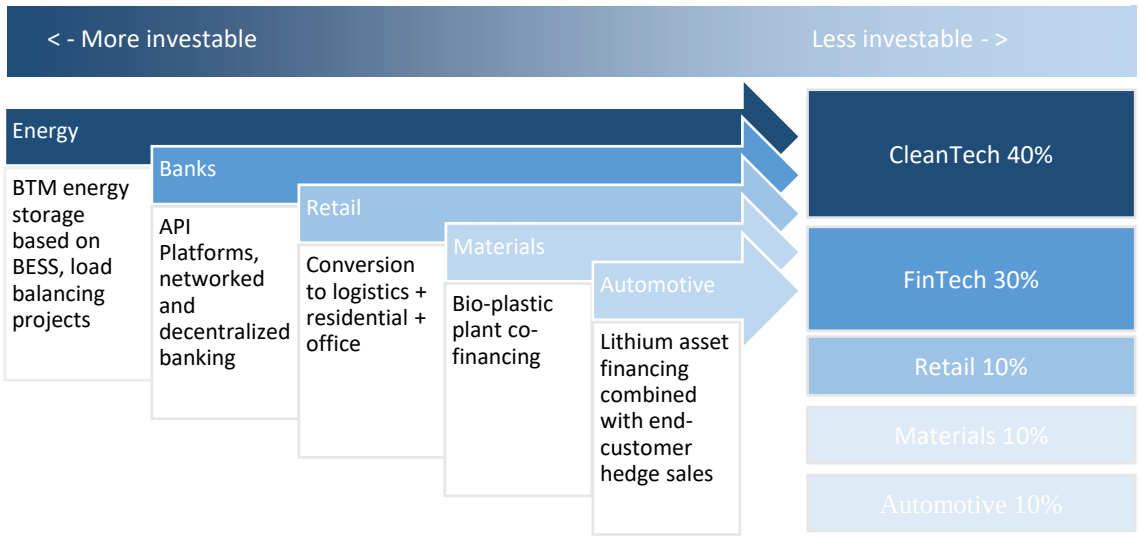
Automotive

Conversion of the drivetrain from internal combustion to electric has already begun. However, the issue of key supply chain vulnerabilities is still open: lithium, cobalt and other key material

prices are far too volatile and driven by mismatch between production, mine development and volatile demand. Major investments in scale like the railroad and oil investments in the twentieth century are required in combination with financial intermediation to sustain the supply chain.

A balanced portfolio of direct asset, debt and hybrid equity investments in these verticals is likely to deliver double digit returns[3] with limited market-related and legacy exposure risks. Some of the areas are currently more investible than others (Figure 8), however, over time the ability to build exposure to these markets will become the key enabler for successful institutional investors to generate returns that cover the liability structure.

Figure 8: Assets and investments, their maturity and size



Structure and vehicles for these investment pools already exist in the form of infrastructure investment funds. Such an approach would mimic the relatively successful approach to infrastructure investment taken by Canadian, Australian and recently, UK pension funds. Building investment vehicles with proper alignment of interest will ensure the appropriate investment and instrument selection.

Conclusion

In the past few years it has certainly paid to be broadly exposed to US-centric equity markets. Despite the overwhelmingly positive performance though, there are macro- and microeconomic trends that raise a question whether traditional public market index-based asset allocation will continue to deliver the desired results.

Among the macroeconomic trends, demographic challenges, automation and reversal of globalisation pose significant challenges for public equities in developed markets. From the bottom-up perspective, higher pace of innovation diffusion, digital and environmental disruptions

[3] The assessment is based on IRR estimates of projects in each industry that range from 8% to 35%. Risk assessment requires an entirely new project-based risk management like infrastructure investments.

create existential threats to many sectors. Although change as such is nothing new to the companies and under normal circumstances they are able to adapt and grow, the sheer scale and abruptness of what is coming may be unprecedented.

From the investment policy point of view, these trends mean that institutional investors will have to seek returns away from public equities and in private debt, quasi-equity and private asset markets predominantly in developing countries with strong demographic trends (Table 5).

Table 5: Investment preferences set to benefit from disruption

	1900-2000	**2000 - …**
Region	United States, Europe	Asia, EM
Instrument	Corporate Equity	Debt, Asset ownership, Quasi-Equity
Liquidity	Public	Private
Diversification	Product	Platform
Excess returns	Access	Access

Absent a change in investment policy, the legacy asset allocation process is likely to result in overexposure to the companies with defunct business models and higher volatility of returns going forward. The greatest differentiating factor that would enable the required returns without unwarranted risks will be the degree of flexibility and ability to gain access to investments, which will not be as easy as before due to limited number of specialised asset managers.

Having prepared and created the necessary institutional capacity will enable the more flexible institutions to gain access to energy, financial, retail and other infrastructure that would generate double digit predictable returns.

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About LINKS:

LINKS Analytics B.V. has a focused offering of industry leading systemic risk management solutions for institutional investors. Our unique and proven methodology of estimating the degree of systemic risk is based on the assessment of asset valuation dislocations globally (Graham Risk) and the degree of interconnectedness and concentration.

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