

Annual Investor Report

Magellan Global | June 2016

- Magellan Global Fund
- Magellan Global Fund (Hedged)
- Magellan Global Equities Fund (ASX:MGE)
- Magellan Global Equities Fund (Currency Hedged) (ASX: MHG)



I am delighted to write to you as an investor in the Magellan Global Fund (the 'Global Fund' or the 'Fund'), the Magellan Global Fund (Hedged), the Magellan Global Equities Fund and the Magellan Global Equities Fund (Currency Hedged) for the

12 months ended 30 June 2016.

Over the past 12 months the Magellan Global Fund has returned -0.1%, in Australian dollar terms after fees. Over the past three and five-year periods the Magellan Global Fund has returned 13.1% and 19.0% per annum, respectively. Since we commenced the Fund (1 July 2007) the Magellan Global Fund has returned 10.6% per annum.

The Magellan Global Fund (Hedged)¹ recently reached its three-year anniversary since being launched. Over the past 12-month period this version of the fund returned -0.9% in Australian dollar terms after fees. For the two-year and three-year periods, the Magellan Global Fund (Hedged) has returned 5.6% and 8.7%, respectively.

We launched the Magellan Global Equities Fund and the Magellan Global Equities Fund (Currency Hedged), in March and August 2015, respectively. Over the last 12 month period the Magellan Global Equities Fund returned -0.1% in Australian dollars after fees. The Magellan Global Equities Fund (Currency Hedged) returned -4.6% since its inception on 4 August 2015.

Our returns over the past 12 months have been negatively impacted by two key events:

1. The Brexit vote on 24 June 2016. It materially impacted the share price of Lloyds Banking Group (which fell by 23% between 22 June and 30 June), and the British pound which fell by 10% between 22 June and 30 June, impacting the Australian dollar performance of our investments in Lloyds Banking Group and Tesco. The combined impact on the Fund's performance from the decline in the Australian dollar value of these investments since the Brexit vote, was a deduction of 1.2% during this period. Whilst the uncertainty created by the Brexit vote is likely to impact Lloyds Banking Group in the short-term, our assessment remains that both Lloyds Banking Group and Tesco will deliver attractive investment returns over the medium term.

2. We had been anticipating that the US Federal Reserve (the 'Fed') would progressively increase short term interest rates over the past 12 months and longer term bond yields would start to rise from historically low levels. Consistent with this view we positioned the Fund over the past few years by selling down our investments in consumer staples, increasing our holding of US dollar cash to approximately 15% and holding investments in three US-based banks (Bank of New York Mellon, State Street and Wells Fargo). Contrary to our expectations, the Fed has made only one rate increase and longer term bond yields have fallen rather than risen (the US 10 year treasury yield has fallen from 2.38% at 1 July 2015 to 1.47% at 30 June 2016). Clearly I have been wrong on the rate of

¹ Hedged to movements in the Australian dollar, relative to the currencies of stocks' domiciles.

tightening of US monetary policy and the direction of longer term bond yields over the past 12 months. This has impacted our investment performance over the period. Whilst we continue to remain cautious and believe that it is more probable than not that the Fed will tighten monetary policy over the next few years, we have moderated our expectations on the extent of the likely rise in longer term bond yields over the next three to five years.

Figure 1: Performance to 30 June 2016 in Australian dollars (after fees).

Yearly results to 30 June 2016	Magellan Global Fund (%)	MSCI World Net Total Return Index	Difference
2007/08	-17.2	-21.0	3.8
2008/09	7.1	-16.3	23.4
2009/10	13.9	5.5	8.4
2010/11	2.5	3.0	-0.4
2011/12	18.2	-0.8	19.0
2012/13	39.7	32.8	6.9
2013/14	11.7	20.3	-8.6
2014/15	29.5	24.6	4.9
2015/16	-0.1	0.4	-0.5

Annual compound results (%) per annum			
1 Year	-0.1	0.4	-0.5
3 Year	13.1	14.6	-1.5
5 Year	19.0	14.7	4.3
Since Inception (1 July 2007)	10.6	4.0	6.6

Whilst short-term investment returns have been impacted by the Brexit vote, US monetary policy and the fall in long-term bond yields over the past year, as investors it is important that we also remain focused on fundamental shifts that could affect investment returns over the longer term. We believe that we are nearing an inflexion point in the rate of technological advancement, which could have profound impacts on conventional business models and challenge conventional investment paradigms. We have spent considerable time researching and assessing a range of issues linked to technological advancement and are pleased to share our thoughts in the following discussion.

The Technological Arms Race

I am often reminded of the sage advice from Sir John Templeton: "The four most dangerous words in investing are 'this time it's different'." As investors, I think we need to question whether we are entering a new technological and machine age over the next 10-25 years that could disrupt most businesses and possibly society as we know it. In this regard, the

new technological and machine age may be more important than The Industrial Revolution. Quite possibly, this time it is different and whilst heeding Sir Templeton's advice, as prudent investors we believe it would be neglectful to ignore the technological developments that are almost certain to provide substantial threats and opportunities to businesses.

In a recent TED interview, Charlie Rose asked Larry Page (Co-Founder of Google) what is his most important lesson from business. He said that he has studied why many large businesses fail and he concluded: "They missed the future". As investors, can we afford to miss the future? In our view, there is mounting evidence that we are approaching a tipping point of exponential technological advancement, particularly through accelerating improvements in artificial intelligence, 3D printing, genomics, computing power and robotics.

We have numerous recent powerful lessons on the rapid disruption of businesses from technological innovation:

- In 1998, Kodak had 145,000 employees and sold 85% of all photographic film. In 1999, Kodak's stock price peaked and in January 2012 it filed for bankruptcy. What is surprising about the Kodak story is that it invented the digital camera in the 1970s and yet the company was effectively destroyed by its own invention.

- In 1998, Nokia overtook Motorola to become the world's largest mobile phone manufacturer. By 2007, Nokia controlled in excess of 40% of the mobile phone market and was highly profitable. In July 2005, Google bought Android and in January 2007, Apple launched the iPhone. In September 2013, Nokia sold its loss making mobile phone business to Microsoft.

- Google was founded in September 1998. In 1999, newspapers' share of global advertising revenue was approximately 35%. In 2015, Google generated advertising revenues of over US\$67 billion, or 14% of global advertising. Meanwhile, newspapers' share of global advertising revenue had fallen to approximately 12%².

Another lesson is that large scale/global disruption from technological advancements appears to be occurring at a faster and faster pace. Uber was founded in March 2009 and is now the world's largest 'taxi company', with operations in 429 cities in 71 countries. Facebook was founded in February 2004 and has in excess of 1.6 billion monthly active users. The company is expected to generate advertising revenues in excess of US\$20 billion this year. Airbnb was founded in August 2008 and is now the world's largest accommodation company, with over two million listings in 34,000 cities in over 190 countries.

² Advertising market size and share sourced from MagnaGlobal.

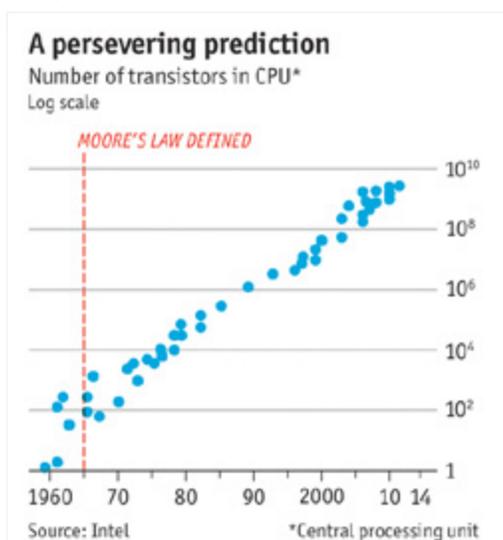
Exponential versus linear growth

It is difficult to comprehend that we could rapidly face a radically different world from the advancement of technology, when our own experience suggests that fundamental change is occurring incrementally and at a gradual pace. A reason why we may be underestimating the impact of technological change is that most changes in our life (like ageing, learning, career progression, etc.) occur in a well-established linear trajectory whereas technological progression is exponential.

In exponential growth, a measurement is multiplied by a constant factor for a given unit of time (e.g. computation power doubles every year), whereas for linear growth the measurement is added to incrementally and by a constant factor (i.e. we grow older by one year per year). Early on, it is difficult to feel the difference between linear and exponential growth (i.e. from 1,2,3,4 ... to progressions of 1,2,4,8...); however, after 30 iterations the linear sequence is at 30 whereas the exponential sequence is over 500 million. In an exponential world nothing is perceived to be changing in the early stages and then suddenly change starts occurring at an explosive rate.

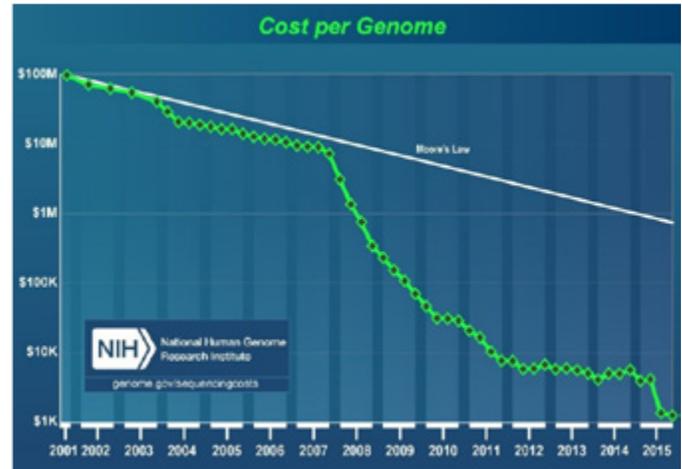
There are numerous examples of technology progressing at an exponential rate. Three well cited examples are:

- **Computational power** - In 1965, Gordon Moore, Co-Founder of Intel, predicted that the number of transistors in an integrated circuit would double every two years (the so-called Moore's Law). Over the last six decades, computation power has increased over one trillion times per integrated circuit. An iPhone 5 released in 2013 has twice the processing power of the 1985 Cray-2 supercomputer, which at the time was the world's most powerful computer. At the current rate of progression, a mobile phone is likely to have the processing power of the current largest supercomputer – China's Tianhe 2 – in around 15 years.



Source: Intel Corp. The Economist, "Ever more from Moore", April 2015.

- **Genome sequencing** - When the project to sequence the human genome was started in 1990, given the speed at which the genome could be scanned at that time, it was thought it would take thousands of years to sequence the entire human genome (six billion bases). The full genome was sequenced 10 years later. In 2000, the cost to sequence an entire human genome was around US\$100 million and by 2015, the cost had fallen exponentially to US\$1,000.



Source: National Human Genome Research Institute, "The Cost Sequencing a Human Genome", July 2016.

- **Data** - it has been estimated that the amount of digital data in the world is doubling every two years. To put it another way, estimates suggest that more data has been created in the past two years than in the previous history of the human race.

In order to predict what will happen in the future through technological change, you need to extrapolate and think exponentially.

Ray Kurzweil, a natural language processing pioneer and entrepreneur, a renowned futurist and currently Director of Engineering at Google, wrote in a March 2001 paper titled "The Law of Accelerating Returns":

"An analysis of the history of technology shows that technological change is exponential, contrary to the common-sense intuitive linear view. So we won't experience 100 years of progress in the 21st century, it will be more like 20,000 years of progress (at today's rate)."

"It is important to ponder the nature of exponential growth. Toward this end, I am fond of telling the tale of the inventor of chess and his patron, the Emperor of China. In response to the Emperor's offer of a reward for his new beloved game, the inventor asked for a single grain of rice on the first square, two on the second square, four on the third and so on. The Emperor quickly granted this seemingly benign and humble request. One version of the story has the Emperor going bankrupt as the 63 doublings ultimately totalled 18 million trillion grains of rice."

"As exponential growth continues to accelerate into

the first half of the 21st century, it will appear to explode into infinity, at least from the limited and linear perspective of contemporary humans. The progress will ultimately become so fast that it will rupture our ability to follow it. It will literally get out of control."

Bill Gates has commented that "we always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next 10."

This tendency to overestimate change in the short-term and underestimate the long-term creates an interesting (and possibly dangerous) paradigm for an investor – acting too early by selling or short selling businesses that are most likely to be disrupted may well be detrimental to short-term returns, whereas waiting too long could be very costly, as in the end disruption may occur very rapidly. Judging where we are on the exponential path of technological development is becoming critical for any longer-term investor.

In thinking about the investment impact of exponential growth, it is instructive that five of the world's 10 largest companies by market capitalisation are currently technology companies (Apple, Alphabet³, Microsoft, Facebook and Amazon) and three of these companies did not exist less than 25 years ago. Tellingly, all of these companies are making significant investments into artificial intelligence.

Artificial intelligence

Artificial intelligence is the field of computer science involved with the development of computer systems capable of performing tasks normally requiring human intelligence.

According to Nick Bostrom, an Oxford philosopher and leading artificial intelligence thinker, the progression of artificial intelligence can be split into three categories:

- Artificial Narrow Intelligence (Narrow A.I.) Narrow A.I. is artificial intelligence that specialises in one area, such as a computer beating the world chess champion or winning the quiz game, Jeopardy. Narrow A.I. is responsible for Facebook automatically labelling your friends in photos, for Amazon and Netflix making personalised product and video recommendations, and for airline reservation systems automatically setting prices. Google search is likely the world's largest Narrow A.I.; ranking, sorting and retrieving relevant information from across the internet. Computer engineers are rapidly advancing Narrow A.I. with many uses today such as search, translation, voice recognition, and image recognition.

- Artificial General Intelligence (AGI) is a computer system that is as smart as a human across any intellectual task (including complex reasoning, thinking abstractly and learning from experiences). It is said that an AGI will be unpredictably creative. This will require a computer to have the mental capacity to solve problems, think creatively, understand language, interpret images, think abstractly, learn quickly and learn from experience. Whilst it is likely to take many years to develop a computer system that has AGI, it would appear that the building blocks for AGI are being rapidly developed, with material advances in machine learning, voice and image recognition, computational power and the development of advanced neural networks⁴.

- Artificial Superintelligence or Singularity is when computer intelligence surpasses human intelligence and then rapidly advances to say a billion times more powerful than all human intelligence. Leading thinkers, including Stephen Hawking, Bill Gates and Elon Musk, have warned of Artificial Superintelligence posing an existential threat to humanity. Others, including Google's Eric Schmidt and IBM's Gini Rometty, have argued that artificial intelligence is a positive force that will augment human abilities.

In thinking about whether AGI remains in the realms of science fiction and whether it's likely within a reasonable timeframe (maybe 10-15 years), it is worth reflecting on some recent comments by Mark Zuckerberg (Founder and CEO of Facebook):

"So the biggest thing that we're focused on with artificial intelligence is building computer services that have better perception than people. So the basic human senses like seeing, hearing, language, kind of core things that we do, I think it's possible to get to the point in the next five to 10 years where we have computer systems that are better than people at each of those things."

Zuckerberg continues, describing how artificial intelligence can improve the experience of Facebook users: "That's because today our systems can't actually understand what the content means. We don't actually look at the photo and deeply understand what's in it or look at the videos and understand what's in it, or read the links that people share and understand what's in them. But in the future we'll be able to, I think on a five or 10-year period."

Jeff Bezos, Founder and CEO of Amazon, said in an interview at the 2016 Code Conference: "I think it's gigantic. I do. I think natural language understanding, I think machine learning in general, artificial intelligence...it's probably hard to overstate how big of an impact it is going to have on society over the next 20 years. It is big."

³ Alphabet was formed in 2015 and is the listed parent company of Google and other businesses previously owned by Google.

⁴ Neural networks are simplified models of neurons that can self-organise and solve problems - Kurzweil.

He also spoke of the growing synergy between data, computation power and language, stating that “The combination of newer and better algorithms, vastly superior compute power and the ability to harness huge amounts of training data – those three things are coming together to solve some previously unsolvable problems and they are going to drive a tremendous amount of utility for customers and customers are going to adopt those things.”

Are we nearing a tipping point?

We believe there is evidence that technology may be nearing a tipping point – technology is now advancing at such a rate that a breakthrough in AGI may be rapidly approaching.

Firstly, we believe that the world’s major technology companies are collectively assembling the equivalent of the “Manhattan Project” that led to the development of the atomic bomb in World War II. Companies such as Alphabet (Google), Facebook, Microsoft, IBM, Alibaba, Baidu, Amazon and Apple are investing unprecedented amounts of money in artificial intelligence research and development, expansion of computational power, collation of the world’s data and knowledge and assembling the world’s leading intellectual capital by hiring leading graduates and researchers/scientists in fields of artificial intelligence and computer engineering from the world’s leading universities.

Secondly, over the last few years there have been dramatic advances in machine learning, voice and image recognition, machine understanding of language (machines can now read and understand documents) and the early development of quantum computers. Each of these areas appear important in the development of AGI and it seems reasonable to expect accelerating advances in the years ahead.

Finally, March 2016 may well be remembered as a seminal moment in the advancement of artificial intelligence, when AlphaGo (a computer program developed by Google DeepMind) beat the Go world champion, Lee Sedol, in four out of five games. Experts had predicted that a computer program would not master Go, an ancient Chinese board game still played today, for another decade given the complexity of the game. There are apparently more possible moves in a game of Go than there are atoms in the universe. The breakthrough with AlphaGo is that it is a self-learning algorithm that learns from raw data. AlphaGo taught itself to play by playing itself 30 million times. Google DeepMind’s website states: “The algorithms we build are capable of learning for themselves directly from raw experience or data, and are general in that they can perform well across a wide variety of tasks straight out of the box.” An algorithm that learns for itself is a fundamental

building block of developing AGI.

The potential commercial advantages for companies that create a lead in the development of AGI are enormous and may well be definitive. The winners in the AGI arms race are likely to have access to:

- the best intellectual capital;
- massive computing power; and
- vast data across all areas (personal, written documents, image/video).

Predictions

In making any predictions, and at the risk of appearing naïve in hindsight, I am reminded of the famous quote from one of the most prominent names in American Baseball, the late Yogi Berra: “It’s tough to make predictions, especially about the future.”

With this health warning it appears possible/likely over the next 10-20 years that the following could occur:

1. Development of an intelligent virtual personal assistant that knows who you are, understands natural language, anticipates what you want, reads and understands your email, is able to answer most questions and organises your life. The major global digital platforms all have early virtual personal assistants including Google Assistant, Apple’s Siri, Facebook’s M, Amazon’s Alexa and Microsoft’s Cortana.

2. Development of augmented and virtual reality through widespread adaptation of new computing interfaces.

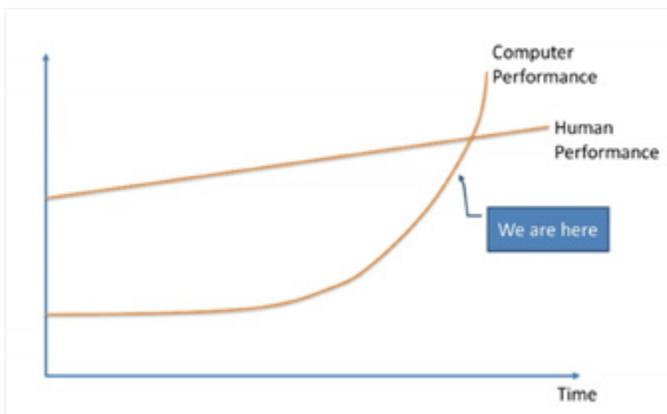
Augmented reality is a live direct or indirect view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data. Augmented reality interfaces have been used by the military where data is delivered and viewed as a heads-up display on the inside of a helmet’s visor. Microsoft is developing HoloLens which is an augmented reality interface that can project images to supplement the wearer’s physical vision. It is likely that HoloLens and other devices will be initially developed for use in commercial settings, such as to interact with architectural blueprints or to display schematics to a surgeon or to a mechanic. Over time, augmented reality could become an integrated communication interface, where a video or holographic representation of people you are communicating with, or information you are reviewing, are projected into your world.

Virtual reality replaces the real world with an immersive simulated experience. In the future a virtual reality experience may be indistinguishable from a real life experience. Initial applications of augmented

virtual reality are focussed on entertainment, such as Pokémon Go. In the longer term, virtual reality could replace any real world experience such as shopping or an overseas excursion for a group of school children. Facebook's Oculus Rift, HTC Vive and Google Cardboard have already launched their virtual reality devices and software.

3. Digitisation of goods via the mass commercialisation of 3D printing (also known as additive manufacturing). The mass commercialisation (with exponential reduction in cost and improvement in performance) of 3D printing could ultimately result in most hard (and possibly soft) goods becoming virtual goods, similar to what has happened in the music and book publishing industries. While 3D printing is primarily currently used for industrial prototyping, early consumer applications are appearing, like Adidas' Futurecraft 3D, a running shoe made with a 3D-printed midsole tailored to the consumer's foot. With the commercialisation of 3D printing, many goods we consume could effectively be digitalised with a source code that could be downloaded from the internet and printed at home or at a local 3D printing facility (UPS is already setting up a network of local 3D printing facilities in the United States).

4. Digitalisation/automation of white collar tasks. It is likely that advancements in artificial intelligence (machine learning, voice and language understanding, image recognition) will lead to the development of software that could one day replace many white collar professionals (lawyers, accountants, journalists, doctors, dentists and fund managers). A 2013 paper⁵ concluded that "according to our estimate, 47 percent of total US employment is in the high risk category, meaning that associated occupations are potentially automatable over some unspecified number of years, perhaps a decade or two."



Source: <http://waitbutwhy.com/2015/01/artificial-intelligence-revolution-2.html> - Author: Jeremy Howard

5. Development of advanced fully autonomous specialised robots, which could replace most highly

specialised manual labour such as surgeons. In May 2016, the Smart Tissue Autonomous Robot (STAR) undertook complex soft tissue surgery on pigs with a lower error rate than human surgeons.

6. Commercialisation of driverless cars and expansion of car sharing. Google's self-driving car fleet has driven more than 1.5 million miles with only one minor accident, demonstrably safer than humans. Should regulatory hurdles be cleared, it would appear likely that within the next 10-20 years, fully autonomous driverless cars will become widely available. The social implications for driverless cars are enormous. Driverless cars have the potential to dramatically reduce road accidents and the 1.2 million global road deaths annually. Through networked intelligence, autonomous cars are likely to dramatically reduce road congestion, bringing down transportation costs. They also unlock peoples' travel time for productivity or to engage in entertainment. A car is the second largest capital expenditure item in most developed market households, yet they are utilised only approximately 5% of the time. Gabe Klein, futurist and former Head of the Chicago and Washington D.C. transportation departments, has estimated that driverless cars and expanded car sharing could reduce the number of cars by 85% and dramatically increase urban space – approximately 25% of the land area of Los Angeles is taken up with roads and car parks.

7. Breakthrough advances in medical technology and longevity. It appears likely with continued advancements in genome sequencing epigenetics, gene editing, image recognition, machine learning, big data and nanotechnology/implantable devices that there will be major breakthroughs in medical science over the next 10-20 years. Improvements in data collection, sharing and analysis will further accelerate breakthroughs and shift healthcare from ad hoc care to one that is personalised and primarily preventive and proactive. These advancements are likely to improve health, reduce disease and possibly radically extend human lifespan. Development of AGI (assuming it occurs) and genomics is likely to advance medical science to the point that we will eventually solve the causes of ageing and virtually all known medical problems. The speed of advances in medical technology is likely to be slower than in other areas, and meaningful advances in longevity may well be outside the 10-20 year timeframe due to the need to pass regulatory approval to ensure full diligence checks are completed and the many complex ethical issues are addressed, particularly around reprogramming the human genome.

8. Development of humanoid intelligent robots (i.e. robots that look and sound and react

⁵ Frey and Osborne (2013), "The Future of Employment: How Susceptible are Jobs to Computerisation?", 17 September 2013, Page 38.

exactly like humans). A humanoid robot could undertake many tasks that require human interface, such as a receptionist, a store assistant, a waiter or bartender. A humanoid robot could eventually become a personal/home assistant, or even a companion.

Investment implications

It is likely that advancements in technology will disrupt many industries and economies over the next 10-20 years. Issues that spring to mind include:

- Will personal digital assistants begin to erode the value of brands and advertising as a means of product discovery? What will happen to the media companies that rely on advertising?
- Will advancements in 3D printing and robotics lead to the re-localisation of manufacturing, effectively reversing globalisation? Will this lead to the future loss of hundreds of millions of manufacturing and transportation jobs in emerging markets? Will 3D printing and advanced robotics change the paradigm in manufacturing economies of scale?
- Will the advancement of 3D printing technology lead to the digitisation of many goods we purchase? What will the digitisation of goods mean for manufacturers and brand owners? Will they own the source code for goods of the future or will many goods be openly sourced and be essentially free of brand and intellectual property costs? Who owns the intellectual property in a digital world? Will many/most manufacturing industries go the way of newspapers, books and music?
- Will 3D printing and drones shrink existing supply chains and distribution systems? What will be the role of wholesalers and retailers? Will many existing transportation/logistics companies cease to exist?
- Will integration of virtual/augmented reality and 3D printing lead to the decline of the retailing industry as we know it? Will consumers ever need to visit a shop when they can experience shopping in virtual reality, including trying on clothes, and then downloading the digital source code for the good and having it printed on their 3D printer?
- How will driverless cars and expanded car sharing impact car manufacturers and insurance companies? With vast amounts of real estate being freed up, what will happen to land prices? What will be the impact on employment and economies with the mass displacement of truck and taxi drivers around the world (there are 3.5 million truck drivers in the United States alone)?
- Will the falling cost of renewable energy and

battery technology lead to an all-electric transport future? What will renewably-fed electric vehicles do to the demand for oil and gas? Will energy companies (oil, gas and coal) cease to exist in the future?

- Will advances in language, speech and image/video recognition lead to the automation of many knowledge-based human tasks over the next 10-20 years? Will this displace millions of white-collar workers such as accountants, lawyers, doctors and even fund managers in the years ahead?
- Will advances in machine learning and robotics lead to the displacement of highly specialised white-collar jobs like surgeons?
- How will people spend their leisure time in the future? Will we travel or experience things in virtual reality? What will this mean for hotels, airlines and airports? Will people still commute to a (remaining) job if they can experience it virtually? What will this mean for car manufacturers and toll roads?
- Will people leading extremely long and healthy lives still require pharmaceuticals? Will hospitals, retirement homes, funeral homes and crematories face massive overcapacity?

As investors, we need to assess many issues that could arise from rapidly advancing technology, including:

- Over what timeframe will technology develop and what will be the pace of disruption? How will regulation mute the pace of innovation and disruption?
- Are there industries that will be safe or immune in this rapidly advancing world? It appears likely that people will still go to KFC and drink coffee!
- What industries/companies are best positioned to win from advancing technology? Technology platform companies appear well positioned, although picking the winners may prove difficult.
- Who will control the distribution of digital goods?
- Will there be fundamental shifts in widely held investment beliefs, such that:
 - » As an investor can you continue to rely on a reversion to the mean in this new world? Is this consistent with an exponentially changing world? Evolutionary processes do not appear to mean revert; rather, they adapt and improve.
 - » What should we be assuming about the growth of emerging markets over the next 10-20 years? Can we rely on a rise in the middle class in emerging markets if manufacturing jobs are massively displaced?
 - » Is it right to assume rising demand for health care services if there are radical breakthroughs in

medicine that dramatically reduce the incidence of age-related illnesses?

» Could 3D printing, driverless cars, machine learning and automation lead to massive labour displacement and persistent structural deflation? How will this affect interest rates and savings in the longer term?

» What assumptions should we make about longevity and the impact of ageing? What would this mean for retirement ages and adequacy of pensions?

» How do you value businesses in this rapidly disruptive world?

As a society, it is likely that we will be facing a rapidly changing landscape which will raise many issues, including:

- What are the jobs of the future?
- Will inequality continue to widen as the number of well-paying jobs shrink?
- Will there be increasing social instability, leading to a rise in radical political parties?
- Where are the boundaries for privacy?
- Will certain companies become too powerful?
- What will be the geopolitical implications of the reducing demand for fossil fuels?
- Will there need to be a universal basic income to support people who have been permanently displaced from the workforce?
- Can policy and regulation keep pace with a rapidly advancing world? Will regulation stifle innovation?
- Where are the ethical boundaries for genomics?
- Will advances in solar and battery technologies and electrification of transportation solve problems associated with climate change?

In our view, disruptive and profound changes to businesses, industries and economies from exponential advances in technology appear to be ever closer to our door step. As investors, we need to carefully weigh up nearer-term investment opportunities against the likelihood of exponential progress and be prepared and positioned for fundamental and disruptive change over the longer term. The risk is that we will fail as investors if we fail to see the future. This time it may *well* be different.

Portfolio Summary

On 30 June 2016, the Fund held investments in 24 companies, consistent with the number held at 30 June 2015. The top 10 investments represented 46.6% of the Fund, while they represented 51.6% at 30 June 2015.

Magellan Global Fund as at 30 June 2016 (%)	
Apple Inc	5.9
Microsoft Corp	5.5
Visa Inc	4.8
Alphabet Inc	4.7
Yum! Brands Inc	4.7
Oracle Corp	4.5
Lowe's Co Inc	4.4
Intel Corp	4.1
eBay Inc	4.0
CVS Health Corp	4.0
Other	37.0
Cash	16.4
TOTAL	100.0

Over the 12 months to 30 June 2016, the three investments with the strongest returns in local currency were Lowe's (+19.8%), Microsoft (+18.7%) and Nestle (+13.7%) while the investments with the weakest returns were Lloyd's Banking Group (-34.0%), Woolworths (-18.7%) and Tesco (-17.8%). On an absolute basis, the three largest contributors to the Fund's return, in US dollar terms, were Microsoft, Lowe's and Visa, which added +1.4%, +0.9% and +0.6%, respectively. Conversely, the three bottom contributors were Lloyd's Banking Group, Tesco and Apple which detracted -2.0%, -1.2% and -0.7%, respectively.

The table below sets out some key statistics for the Fund's portfolio as at 30 June 2016:

Average market capitalisation (US\$ billion)	146
Average daily liquidity (US\$ million)	707
Number of companies	24
Concentration of top 10 Investments (%)	46.6
PE – 1 year forward*	16.2
Average return on equity (%)*	20.7
Beta*	0.75

* Magellan Asset Management Limited estimates.

Equity markets are being influenced by a mixed set of macroeconomic and geopolitical forces that are likely to continue to weigh on sentiment. In the short term these dynamics may continue to negatively influence share prices of some of the Fund's investments. This environment will likely challenge performance in the

short term and we remain cognisant of these risks.

That said, we retain confidence in the longer term proposition for our investments and are comfortable with the Fund's overall risk profile and construction. The Fund has delivered attractive returns over the medium term and we expect that it is well positioned to deliver satisfactory returns over the next three to five years, notwithstanding the current macroeconomic uncertainty.

The Fund is exposed to the following major investment themes:

- **Advancements in artificial intelligence:**

Exponential advancements in computing power and the unprecedented investment that leading technology companies are making in research and development is increasing the likelihood that we are approaching a tipping point in the development of artificial intelligence. In the medium-term, advancements in machine learning, image and voice recognition, language understanding, and cognitive computing could advance artificial intelligence to the point where it enables a major disruptive force to many existing services and businesses. Over the longer-term, a breakthrough in artificial intelligence would have profound implications for the way society functions and the businesses that ultimately succeed or fail. On 30 June 2016, approximately 18.1% of the Fund was exposed to the advancement of artificial intelligence, including investments in Apple, Microsoft, IBM and Alphabet.

- **Cloud computing and big data:** Computing power and data storage are concentrating in centralised data centres as organisations seek to optimise performance and flexibility across increasingly massive data sets and complex workloads. Entrenched global software companies such as Microsoft and Oracle are in advantaged positions to lead this shift to 'cloud computing' through the development of cloud-based applications, infrastructure and services. As the dominant developer and manufacturer of leading-edge semiconductors, Intel benefits from the demand for ever increasing compute power. On 30 June 2016, approximately 16.2% of the Fund was exposed to the advancement of cloud computing and big data including investments in Microsoft, IBM, Oracle and Intel.

- **Global technology platforms:** Globally, there are two major mobile platforms (Apple's iOS and Alphabet's Android), a single dominant desktop and enterprise platform (Microsoft's Windows) and a leading social platform (Facebook). These leading digital platforms have tremendous opportunities to monetise new services and products (even when they are not the originator). Digital platforms have

entrenched positions with users, which creates high switching costs and barriers to entry. Their leading positions are unlikely to be challenged in the foreseeable future. On 30 June 2016, approximately 16.0% of the Fund was invested in technology platform companies through exposure to Apple, Microsoft and Alphabet.

- **Healthcare and ageing population dynamics:**

The healthcare sector has attractive growth tailwinds due to rising patient volumes, increasing expenditure, and large unmet healthcare needs. Aging populations, expanding insurance coverage with the Affordable Care Act ('Obamacare') and increasing incidence of chronic diseases are key drivers of rising demand for healthcare services. The Fund gains exposure to this theme through healthcare companies including CVS Healthcare, Novartis and Sanofi. As the largest integrated pharmacy provider in the US, CVS Healthcare benefits from increasing drug usage whilst being well aligned to the cost reduction objectives of its payer clients. Leading pharmaceutical businesses, such as Novartis and Sanofi, have strong existing drug franchises and the R&D expertise to lead the development of potential new treatments for large, currently unmet, health care needs. On 30 June 2016, approximately 12.2% of the Fund was exposed to healthcare.

- **The move to a cashless society:** There continues to be a strong secular shift from spending via cash and cheque to cashless forms of payments such as credit cards, debit cards, electronic funds transfer and mobile payments. In our opinion, the explosion of smart and internet-connected, mobile devices will accelerate this shift on a global basis. We believe that there are only a limited number of companies that are well positioned to directly benefit from this structural shift. These companies are typically highly attractive, with strong network effects, low capital intensity, high barriers to market entry and high returns on capital. On 30 June 2016, approximately 11.3% of the Fund was invested in the payments space through exposure to companies such as PayPal, Mastercard and Visa.

Macroeconomic Commentary

Market risk update

We remain cautious about the outlook for equity markets over the next few years given the recent Brexit vote, the environment of abnormally low interest rates, historically elevated price-earnings multiples, the risks associated with the recapitalisation of the Italian banking system and the continued withdrawal of US monetary policy stimulus.

Brexit

On 24 June, the UK people voted to leave the European Union ('EU') by a narrow margin (52% 'Leave' to 48% 'Remain') in a non-binding referendum. The result triggered volatility in markets, including a sharp depreciation of the British pound and dramatic falls in the share prices of UK and European banks. However, there were limited signs of financial system stress. Eurozone periphery sovereign bonds and credit insurance costs, measured by credit default swap ('CDS') spreads, have moved only modestly since the Brexit vote. In our view, the probability of a major global systemic risk event due to Brexit in the short term is low.

In the event of financial system stress, we expect the Bank of England ('BOE') and the European Central Bank ('ECB') to provide sufficient liquidity to ensure their banking systems continue to function. Quantitative easing ('QE') could also be redeployed in the UK or stepped up in the eurozone to support sovereign bond markets if needed. The Brexit vote is likely to lead to a prolonged period of uncertainty for the UK economy, which may result in reduced investment, increased savings and lower economic growth in the short term. In addition, businesses and government will be distracted by the legal and functional requirements of a Brexit. The BOE may decide to decrease the cash rate in response to this uncertainty.

The major second-order risk is increasing pressure from other members of the EU to leave. There has been political noise by right-wing parties in France and the Netherlands; the French National Front (led by Marie Le Pen) and the Dutch Party for Freedom (led by Geert Wilders) are pushing for a 'Frexit' or 'Nexit'. In our opinion, the significant uncertainty and market volatility caused by this vote may have reduced the likelihood of other nations wanting to leave the EU in the short term. It is important to distinguish between the nine nations that are members of only the EU, and the 19 nations that are members of both the EU and the eurozone (whose currency is the euro). There is no existing legal mechanism for a country to leave the eurozone, and an exit by a country would be extremely problematic and have far more material systemic implications than a country seeking to leave the EU. Both France and the Netherlands are part of the eurozone and, as such, we would regard an exit by these countries as highly unlikely.

In our view, there appears to be three possible outcomes for the UK:

1. The UK does not proceed to trigger Article 50 of the Lisbon Treaty and the UK remains a member of the EU. We put a probability on this scenario at 25%. As stated earlier, the referendum was non-

binding and the vote may heighten the possibility of a break-up of the UK. Both Scotland and Northern Ireland citizens voted strongly in favour of remaining in the EU, and have raised the prospect of illegality in relation to Westminster triggering Article 50 without the approval of both the Scottish and Northern Ireland parliaments. They have both also raised the possibility of holding a referendum to leave the UK if the UK leaves the EU. The uncertainty about a break-up of the UK could pave the way for holding a second Brexit referendum.

2. The UK proceeds to trigger Article 50 and negotiates an agreement to remain in the single market. We put a probability on this scenario at 50%. There are already four countries that are outside the EU but are part of the single market as members of the European Free Trade Association (Norway, Iceland, Switzerland and Lichtenstein). Norway, Iceland and Lichtenstein remain part of the European Economic Area, and Switzerland has negotiated separate bi-lateral agreements with the EU. Each of these countries have agreed to the free movement of labour by EU citizens, abide by certain EU laws and contribute to the EU budget. In order for the UK to remain part of the single market, it is highly unlikely that the EU will agree to access on more favourable terms than these. Faced with the reality of a choice between access or no access to the single market, we believe it is probable that the UK will cede to similar requirements. In many ways, the most probable Brexit scenario would leave the UK in a similar position to being a member of the EU, but with less influence.

3. The UK proceeds to trigger Article 50 and does not agree to the terms required to remain part of the single market. We put a probability on this scenario at 25%. The stumbling block for certain UK politicians will be reaching an agreement to allow the free movement of labour by EU citizens. Under this scenario, the UK would have to negotiate its trade terms with the EU, with the likely outcome of materially less favourable terms than exist now. The EU has already flagged a negotiation process could take several years. In the absence of a material concession by the UK on the movement of labour, there is a risk that any negotiated trade deal with the UK will not be ratified by each of the 27 EU member state parliaments. In our view, this is the most negative long-term economic scenario for the UK, considering that around 50% of UK exports go to the EU.

Recapitalisation of the Italian banking system

It has been estimated that the Italian banking system is holding around €360 billion of non-performing loans and if banks were required to write down these loans to current market values the Italian banking

system could be required to raise up to €40 billion of new capital. The issue is that the most vulnerable banks are not able to raise new capital and the Italian Government is not able to provide financial assistance to bail out a bank under new EU rules until private sector creditors, accounting for 8% of the bank's liabilities, have been forced to convert to equity. The junior debt which is first in line to be bailed in is largely held by retail investors. The risk is that a large bail in of retail bonds could trigger a depositors run on the Italian banks.

The Italian Government is currently in negotiations with Brussels about the extent of losses that must be forced upon the holders of junior debt as part of a recapitalisation of the banking system, involving aid from the Italian Government. There may well be more market volatility ahead, depending on the outcome of these negotiations.

Quantitative tightening

In my last investor update I wrote on the dangers of quantitative tightening. In that piece we posed the question of whether asset prices predominantly reflect the current economic reality of lower growth and inflation, or are they being significantly distorted by the extraordinary monetary policy (including asset buying) and foreign exchange policies of the G7 central banks⁶. We stated that as central bank asset purchases diminish over the coming years there is the potential for material declines in some asset prices.

A key reason that asset prices remain elevated is the ongoing QE programmes of the ECB and Bank of Japan (approximately US\$150 billion per month combined), the stabilisation of the renminbi and the fact that the Fed and BOE have not yet started shrinking their balance sheets. The distorting effect of central bank asset purchases is extraordinary:

- More than US\$10 trillion of sovereign bonds are now trading on negative yields.
- The G7 central banks have bought around US\$10 trillion of sovereign bonds and other high-grade credit/assets over the past eight years. This represents approximately 70% of the total increase in government debt in the US, the eurozone, the UK and Japan over this period.
- The bonds of some large corporate borrowers such as Nestle, Johnson & Johnson and General Electric trade on negative yields, while Sanofi and Unilever recently issued zero coupon bonds.
- Major consumer staples companies are currently trading at around 21x forward earnings, which is above their historical average and at their highest level in over 10 years. The S&P 500 index is trading on a one-year trailing price-earnings multiple

of 24x, which is historically elevated.

Since that update, sovereign bond and high-grade corporate yields have fallen further. In our view, the further reduction in bond yields over the past six months reflects the change in the demand dynamics for high-grade bonds due to the following:

- The ECB announced the expansion of its QE programme by €20 billion per month to €80 billion per month. The ECB also announced a further cut in the deposit rate to -0.4%, along with a new round of targeted longer-term refinancing operations (TLTROs) to lower capital costs for banks and their borrowers, and to encourage lending.
- The renminbi appears to have stabilised in the short term, which has resulted in a material slowdown of the liquidation of China's foreign exchange reserves.
- Considerable uncertainty has been created by the Brexit vote.

We continue to believe that the current asset pricing environment does not reflect economic reality, but reflects a distorted reality. While the central banks believe that their policies are highly stimulatory by lowering interest rates (and hence reducing borrowing costs), it is important to understand that their policies also act as a tax on the world's savers by reducing or eliminating interest income. Another way of looking at the current environment is a forced transfer from savers to borrowers. It has been argued that a primary reason for the extraordinarily low nominal and real interest rates is due to a global savings glut. The global savings glut is argued to be structural and due to large current account surpluses of countries such as China and Germany, and the effect of ageing demographics on demand for investment assets. We are sceptical about the global savings glut thesis explaining the current extraordinary low level of nominal and real interest rates. QE policies undertaken by the world's major central banks over the past eight years have contributed a large portion of the global savings glut, as central banks have effectively added trillions of dollars to savings via printed money. It may be that monetary policy is becoming counter-productive as the negative effects of low to negative interest rates on savers may be outweighing the stimulatory benefits of low interest rates to borrowers. This may be due to the fact that the multiplier effect on consumption of reducing interest income for savers may be higher than the multiplier effect of reducing interest expense for borrowers.

There are some commentators who believe that the central banks will need to implement even more aggressive forms of monetary policy, such as the monetisation of government debt or a "helicopter

⁶ US Federal Reserve, European Central Bank, Bank of Japan, Bank of England, People's Bank of China, Saudi Arabian Monetary Agency, Swiss National Bank.

drop⁷ of printed money in order to induce inflation. Such policies are almost certain to create inflation via the devaluation of money. If such policies were to be implemented, interest rates would almost certainly need to rise in response to rising inflation. While we are unable to handicap whether central banks will go down this path (although we do not believe it is likely in the US or Europe), we would caution investors about the medium-term impact on asset prices of such action. Initially, investors may react euphorically to more monetary stimulus; however, asset prices will eventually react to the prospects of rising inflation and interest rates.

It is likely that the uncertainty resulting from the Brexit vote has put on hold any tightening of monetary policy in the short term, resulting in interest rates remaining lower for longer. As noted above, whilst we continue to remain cautious and believe that it is more probable than not that the Fed will tighten monetary policy over the next few years, we have moderated our expectations on the extent of the likely rise in longer term bond yields over the next three to five years. We continue to believe markets are mispricing the likely future path of the federal funds rate and long-term interest rates in the US. As at 30 June the futures market was pricing US 10-year Treasury yields at only 2.40% in 2026, compared with the spot market yield of around 1.50%. Expectations for such historically low 10-year Treasury yields well into the future reflect anchoring bias to current rates (that are distorted by the aforementioned monetary policies).

It is prudent to remain cautious in this environment.

Global Economic Update

Our views on the world's largest economic zones have not changed materially since my last investor letter. Our base-case outlook for the next three years assumes a continued recovery in the US with modestly rising inflation, a continued slowdown in China (but not a financial crisis or hard landing) and an improvement in the economic outlook for Europe.

United States

A range of economic indicators show that the US economy continues to recover, albeit with some headwinds.

The household sector is buoyed by strengthening labour markets, rising house prices, lower debt, falling commodity prices and low interest rates. Households are approximately US\$900 a year better off from lower oil prices, and approximately US\$1300 a year better off from lower interest rates. Average weekly earnings increased by 2.2% over the year to May 2016 and the number of people employed is now 151 million – 4.4 million more than the previous

peak in November 2007. Higher goods and services consumption by households is supporting a growing corporate sector. As household formation returns to normal, we expect housing starts to grow further to at least 1.3-1.4 million per annum, this being our estimate of normalised demand. Improvements in the household and corporate sectors are flowing through to the banking sector, with total loans and leases outstanding increasing by 7.7% per annum and, notably, commercial and industrial loans increasing by 9.6% over the year to June 2016.

Meanwhile, the government sector's drag on the economy has abated. The Congressional Budget Office forecasts the federal deficit to remain fairly stable at 2.5-3.0% of GDP over the next few years.

Although the US economy is facing some headwinds, most are likely to be transitory. Headwinds include the impact of a stronger US dollar and a weaker global economy on trade-exposed industries, a contraction in energy sector activity, and weakness in industries and regions reliant on oil and gas production and investment.

Despite the appreciation of the US dollar, US wages remain competitive, energy costs remain low compared to global peers, and household consumption is likely to be boosted by lower prices of imports. In addition, the US is a predominantly domestically driven economy, with a relatively low reliance on exports (which account for approximately 12% of GDP).

We expect consumption growth to strengthen as the US labour market continues to recover. Tighter labour markets will lead to faster growth in real wages and potentially lower profit margins for businesses that lack pricing power. Meanwhile, scope remains for further job creation due to the prevalence of underemployment and the cyclically depressed participation rate. The 'U6' unemployment rate, which includes part-time workers who want a full-time job and those marginally attached to the labour force, has been falling steadily since the crisis but remains elevated at 9.7%⁸. The U6 has fallen to 8% or lower in previous cycles. Furthermore, the proportion of 25-54 year olds in the labour force has fallen from just over 83% before the crisis, to 81% as at May 2016.

Several transitory factors have been keeping inflation below the Fed's 2% target. However, as the oil price bottoms out, the US dollar stabilises, and the labour market continues to tighten, wage growth and inflation pressures are likely to normalise. Consistent with previous cycles, this will require the Fed to tighten monetary policy, probably more so than the market is expecting.

We expect the US economy to continue along its path of a steady and solid recovery over the next few years, barring unforeseen events.

⁷ A term coined by Milton Friedman in 1969 that describes the printing of money by a central bank, which is then distributed to households to spend as they wish. This would stimulate aggregate demand, as well as debase the currency, since there would be more money chasing the same goods and services.

Eurozone

Real GDP growth in the eurozone has improved, but remains modest (around 1.6% p.a. in aggregate since December 2014). The periphery economies of Spain and Ireland are bouncing back with growth of 3.5% and 9.3% p.a. respectively, following deep recessions. Meanwhile, Greece's economy has stagnated. The eurozone as a whole is likely to continue benefiting from a weaker currency, a stronger US economy, lower commodity prices, and an improvement in borrowing conditions and credit flows in an environment of ultra-low interest rates. However, the pace of eurozone growth is likely to remain modest for the foreseeable future as high levels of government debt, unresolved banking system issues, political impediments, uncertainty created by the Brexit vote and an emerging markets slowdown hold back the economy.

Labour markets are gradually recovering in the eurozone, although considerable slack remains. Aggregate employment increased 3.8 million to 152.6 million from June 2013 to April 2016, but remains below the pre-GFC peak of 154.4 million. Meanwhile, the aggregate unemployment rate has fallen from 12.1% in June 2013 to 10.2% in March 2016. Over the past year the unemployment rate has fallen in Germany, France, Portugal, Ireland, Greece, Italy and Spain.

The rise of Eurosceptic political parties in a number of eurozone countries reflects a long period of adjustment following deep recessions and accompanying high levels of unemployment, which has created difficult policy choices for governments. These parties often threaten an exit from the eurozone (and a dispensing of the euro as currency) and/or debt defaults, which could spark renewed uncertainty in sovereign debt markets.

The combined effects of high debt levels, labour market rigidities and unfavourable demographics are likely to present ongoing headwinds for growth.

The eurozone also remains vulnerable to major shocks, such as an escalation of geopolitical tensions with Russia, the election of Eurosceptic governments or a collapse in the renminbi. Each of these scenarios could trigger a dramatic uplift in periphery eurozone sovereign bond yields, and would heavily test the resolve and mandate of the ECB.

China

While we remain concerned about the short-to medium-term outlook for China, we do not believe that China is about to have a financial crisis or experience a hard economic landing.

China's rapid economic growth in recent years has been unsustainable. When demand for Chinese

manufacturing exports deteriorated in the global financial crisis (GFC), China launched the largest credit stimulus in history, fuelling an investment boom that continues today. From 2008-2013, China's state owned banks issued new credit of US\$10 trillion, equivalent to the entire US banking system. Although credit growth has slowed, it continues to grow at 15% per annum. The problem is that GDP benefits from new loans have fallen from around 75 cents per dollar of loan to just 20 cents. Currently, it is estimated that \$1.3 trillion in corporate loans are owed by Chinese companies whose profits aren't sufficient to cover interest payments, which suggests potential bank losses of around 7% of GDP (excluding shadow banking exposures).

Almost half of China's credit growth since the GFC (or around 50% of GDP) may have gone towards financing property market activity. There appears to be approximately four years of excess housing supply in China, comparable to recent property booms in the US, Spain and Ireland. According to the China Household Finance Survey, 22% of urban housing in China is vacant. Meanwhile, vacant floor space on developers' books has increased by around 500% since 2007. Property prices are growing rapidly in Tier 1 cities with supply shortages, but are stagnant or falling in lower-tier cities where most of the excess supply is located.

The potential implications of China's property oversupply are serious. Real estate and related industries account for 20-25% of China's GDP. Fiscal positions are vulnerable, particularly for local governments who have relied on land sales for 35-40% of revenues. A large contraction in China's property construction sector would cause a major slowdown in the economy and perhaps even a recession.

Although economic data out of China is problematic, a range of indicators suggest that China's economy is slowing as the housing oversupply problem broadens. Weakness is most apparent in the industrial space (41% of GDP), a large portion of which is linked to property. Cement production contracted by 2% per annum from 2013 to 2015, compared to 11% growth per annum in the decade prior. Steel production, electricity production and freight traffic have all slowed materially, growing at just 1-2% per annum in the past two years. Although industrial sector data showed signs of improvement in early 2016, we believe this is due to a temporary credit impulse by the Chinese government. Real trade data also shows that imports have slowed materially, while exports are contracting.

Since 2010, China has contributed around a quarter of total global economic growth, despite its economy only representing around 12% of world GDP. We are

⁸ Marginally attached to the labour force are those who currently are neither working nor looking for work, but indicate that they want and are available for a job, and have looked for work sometime in the past 12 months.

cautious about adverse knock-on effects, including currency movements, linked to changing economic fortunes in China. A number of commodity exporters such as Russia, Brazil, Australia and Canada have experienced material depreciations in their currencies against the US dollar as commodity prices have fallen. In some cases, these economies may also be vulnerable to the unwinding of commodities-linked domestic credit booms. Asian economies with strong trade and financial linkages to China could also be at risk.

The outlook for the Chinese renminbi, which has appreciated around 50% on a real trade-weighted basis since 2005, is uncertain and difficult to predict. While modest RMB depreciation is likely over time to partially offset rising wages, a large devaluation is less likely. In early 2016, China introduced new and tighter capital controls that appear to have stemmed outflows, at least for the time being.

Chinese policymakers must carefully manage the credit and property excesses in its economy. If China moves too quickly to address the moral hazard and implicit government guarantees in its financial system, this could lead to a tightening of credit conditions and a pullback in loan demand from the private sector, triggering an economic downturn and possibly a panic in the poorly regulated shadow banking system. On the other hand, if credit stimulus continues unchecked or is ramped up to maintain GDP growth rates, returns to new credit may diminish further and result in material loan losses in the future.

The Chinese leadership appear to be aware of the problems and have the policy tools needed to stabilise the economy. This makes a financial crisis unlikely. Fortunately, most of China's debt is held domestically, which makes it easier for the government to manage large-scale defaults, as it did in the late 1990s. Further monetary stimulus will almost certainly be deployed to reduce interest burdens and ease banks' reserve requirements. Meanwhile, a huge pool of foreign exchange reserves and a large current account surplus make China resilient to external financial shocks.

Major portfolio holdings

Apple Inc.



Apple Inc's ('Apple') growth has been driven through its position as a consumer hardware vendor. There are few, if any, examples of consumer hardware vendors which have endured over the long term as the products have typically commoditised over time. However, having built a powerful, enduring ecosystem, we view Apple today as a leading

mobile platform and services company, with sales of its devices reflecting effectively a "subscription" payment to access its platform and services.

Apple displays several attractive investment characteristics which support our longer term outlook for the company.

Global digital platform

Along with Windows and Android, Apple's iOS is one of the major global digital platforms. There are only two main mobile platforms globally – Apple's iOS and Google's Android – which is unlikely to change in the foreseeable future. Almost all consumer software and services will be developed for these two platforms and the vast majority of digitally connected people will connect via one of the two.

Being the mobile platform owner gives Apple immense opportunity to monetise services (like iTunes, music and video). Apple also has optionality to launch new devices (such as Apple Watch, Apple TV and Apple Car?), and services such as Apple Pay (payments), HealthKit (health wearables) and HomeKit (home network connectivity). The integration of these devices and services within the iOS ecosystem makes the platform increasingly valuable and switching harder, thereby lowering iPhone churn. Importantly, while iOS is not the leading mobile platform by users, it currently dominates use among premium phones and the highest-spending consumer demographic, which is particularly valuable.

Increasingly annuity-like revenues

iPhone sales are becoming more annuity-like. As the installed base of iPhone users has grown and matured, Apple's dependence on winning new users has diminished. User satisfaction among iPhone users is typically very high and thus renewal rates are also high. We expect sales of new devices to existing users will represent a significant majority of iPhone revenues going forward.

Little exposure to typical hardware commoditisation

During the rapid expansion in the smartphone market over the past decade, we held concerns that iPhones would commoditise. This view reflects the experience of former successful high-tier phone vendors - Motorola, Sony Ericsson, Nokia, Blackberry and HTC. Despite the relatively high price of the iPhone, continual functional improvements of lower-priced Android competitors and greater phone price transparency, Apple has continued to attract new users of iPhones at high margins. We believe this resilience in iPhone prices and margins will continue due to the iPhone's premium positioning, the iOS ecosystem and very high user retention.

Growth opportunity

At the end of 2015, smartphones represented an installed base of approximately three billion phones globally and this figure is expected to reach 4.7 billion in 2020⁹. While smartphones now enjoy very high penetration rates among high-value device user groups, much of the market's growth will come from low-value device users. We see Apple's growth being generated from:

- **Growing share of high value device segment.**

Android switchers to iPhone have risen to record levels since release of the large-screened iPhones.

- **Growth in high value device users.** Emerging markets now contribute 34% of Apple's total revenue and the company is seeing rapid growth in the proportion of the population able to afford an iPhone. While there is some caution around global consumer weakness in the short term, the expanding middle class globally is expected to benefit Apple over the long term.

- **iPhone addressable market expansion.**

Apple's recent decision to lower the cost of its entry level iPhone demonstrates Apple's increased focus on expanding its market.

- **Monetisation of services.** Being the platform owner gives Apple tremendous opportunity to monetise services and launch new devices and services.

Our view of Apple's long-term prospects is framed by its iOS operating system, embedded switching costs, pricing power, brand strength, installed base size, replacement cycles and optionality. At prevailing market pricing, we consider Apple to be an attractive investment.

Microsoft Inc.



Microsoft Inc ('Microsoft') is the largest software vendor globally, with over US\$90 billion in annual sales. While best known for its consumer oriented businesses, including Windows, Xbox, and Bing, the majority of its earnings are attributable to software products sold to businesses, including its Office productivity suite (approximately 45% of earnings), and data centre products (approximately 35% of earnings). In aggregate, we estimate that approximately 80% of Microsoft's earnings are sourced from business customers. Microsoft's business-focused software segment is large, strategically advantaged, and entrenched:

- **Productivity software**

Microsoft Office has over 90% market share of productivity software globally, having withstood competition from vendors of alternative products for decades. Microsoft is now offering annual

subscriptions for Office 365 on all platforms (Windows, iOS and Android), delivered via the cloud, which enables new functionality such as cloud storage and collaboration, and is easier to deploy, attracting new users. We expect the recent acquisition of LinkedIn to further extend the functionality of its productivity software products.

- **Data Centre software**

Microsoft's data centre software products benefit from structural barriers to entry and switching costs. For example, an established ecosystem of third-party applications has formed around Microsoft's incumbent Windows Server operating system and its SQL Server database software. Its data centre software products tend to form part of the plumbing of enterprise software systems, rendering them difficult to replace, with material inherent transition risk.

- **Cloud infrastructure**

Microsoft has built a hyperscale public cloud, Azure, second only to Amazon's AWS, designed to offer Microsoft's existing customers a more manageable pathway to the cloud than competitors' solutions.

- **Windows PC operating system**

The Windows PC operating system remains critical to businesses' operations globally, with millions of business-focused Windows applications developed for PCs over 30 years.

Adapting the business to changing consumer dynamics

The characteristics of Microsoft's smaller consumer business are less attractive, though it is making progress restructuring its business. Windows operating system license revenue from the consumer segment has been pressured by contractions in the broader PC market, owing to cannibalisation by new form-factors and a lengthening PC replacement cycle. Microsoft is executing its stated strategy of increasingly monetising its Windows platform through consumers indirectly via peripheral services such as the app store, content, gaming and search advertising. Similarly, Microsoft has written-off and divested the vast majority of its Phone business, following the poor performance of Nokia since its acquisition in 2013, choosing to instead focus on higher-value devices.

In summary, Microsoft's entrenched enterprise software business and improvements in its relatively smaller consumer businesses, are expected to drive long-term revenue and earnings growth, and significant shareholder returns.

⁹ Source: Gartner, 24 March 2016.

Visa Inc.



Visa Inc. ('Visa') owns the world's the largest global payments network. There are over three billion Visa credit and debit cards issued to customers by 17,100 financial institutions, on which there were over US\$7 trillion of payments annually. Visa cards were accepted at more than 40 million merchant locations, as well as eight million mobile points of acceptance.

Visa was demutualised by its former bank owners, except for the Western European business, and listed on the stock exchange in 2008. In June 2016, Visa received all regulatory approvals to purchase the Western European business from Western European banks for a maximum price of €18.25 billion.

Visa provides a network that "switches" payment information between cardholders' banks and merchants' banks around the globe. It charges the banks fees, being small percentages of the value of transactions. Importantly, Visa does not extend credit to cardholders, with those facilities being extended by banks.

Visa is a privileged member of a select group of global payment networks, alongside MasterCard, American Express and PayPal. Indeed, PayPal is the only new successful global payment network since the launch of MasterCard in the 1960s. It is extremely difficult to establish a payments network, because there needs to be simultaneous acceptance of the network by both consumers and merchants. This requires mass awareness, simplicity of payment, technology ubiquity, fulfilment of arduous customer and merchant servicing needs, as well as strict regulatory requirements.

In a decades-long global trend, the means of payment continues to shift from cash and cheque towards electronic payments. This is being driven by various factors, including convenience, necessity as commerce shifts to online, and changes in public policy. This trend has a long way to go. The number of cash payments in many developed economies still comprises more than 50% of transactions and in developing countries, more than 90% of transactions. This trend supports growth rates in electronic payments which are a multiple of nominal GDP growth.

Competition in the payments sector is increasing, with the big players of the technology sector seeking to expand their capabilities in the mobile payment space. Apple Pay, Samsung Pay, and Android Pay are all offering mobile and in-app payment facilities via their mobile handsets and through over 1,000 applications. Microsoft and Facebook also have plans to develop their own payment methods.

These companies do not have direct payments relationships with consumers and merchants, rather, these payment capabilities piggyback the existing payments infrastructure of the payment networks (including Visa), banks and merchants. Indeed, higher growth in mobile payments, encouraged by the technology sector, actually increases the usage of Visa's network.

Visa is a highly scalable business with continued strong growth prospects as electronic payments take share away from cash and cheques. Visa's position as the largest payments network in a privileged industry is evidenced by consistently reporting operating margins in excess of 60% and EPS growth of almost 20% over the last four years.

Alphabet Inc.



Alphabet Inc. ('Alphabet') is a highly innovative company with an incredibly valuable and dominant search business which continues to grow strongly and generate substantial free cash flow. This has enabled it to invest in new, often radical, products and services with a long-term view to building leading positions in potentially massive markets.

Dominates search

Alphabet's primary business is Google Search, which represents around three-quarters of its total sales and an even higher proportion of its earnings. Google's Search is a highly effective, measurable and scalable form of advertising, which has grown from next to nothing in 2000 to around 15% of global media advertising spending in 2015.

We estimate Google has over 80% share of the global search market (ex-China). The economics of Search favour the market leader, given significant fixed-cost hardware and software investments and the virtuous cycle of greater usage. More user data (what a user does, and does not, click on) allows the incumbent to test changes, iterate and improve search results faster and more effectively than competitors. Google's strong brand and continually improving product has stymied competitors' attempts to attract users away. Microsoft's Bing, the second largest search engine outside China, has never made a profit.

The proliferation of mobile devices over the last decade has made search accessible at all times to more people, increasing usage and improving results with location data. Search queries now mostly come from mobile phones. Google's Android is the dominant mobile operating system, with global market share of over 80%, extending and entrenching Google's position in search (for now).

Leader in machine learning and artificial intelligence

Google has invested considerably in the rapidly advancing fields of machine learning and artificial intelligence (A.I.) in part to improve its search engine so that it provides the most relevant information or content to users. This has kept it ahead of search competitors, but the implications are much broader. These capabilities have the potential to radically improve on and augment human capabilities and analyse complex systems, for example, to improve cancer diagnosis or climate science. One of the potential uses of A.I. includes a digital personal assistant. Google's Chief Executive Officer, Sundar Pichai, has noted "looking to the future, the next big step will be for the very concept of the "device" to fade away. Over time, the computer itself—whatever its form factor—will be an intelligent assistant helping you through your day. We will move from mobile first to an A.I. first world." Digital personal assistants have a tremendous opportunity to create improved services and efficiency for users and value for the assistant. While the major digital platforms are now investing in their own assistants (Siri, Cortana, Alexa), Google is the clear leader in the race.

A collection of underappreciated call options

Google has built a collection of adjacent businesses, many leveraging Search's assets, which have large global addressable markets.

YouTube has created a platform for video creators large and small to reach and monetise its over one billion monthly active users. Google is attempting to bring the customisation, automation, targeting and measurability of Search to video advertising. As people watch an increasing amount of video content online, YouTube will grow its share of the US\$200 billion global video advertising market.

Google Cloud Platform is the company's hyperscale public cloud, which is how enterprises and developers are increasingly purchasing and managing their IT resources. Google is leveraging its much larger distributed cloud infrastructure to compete with current leaders, Amazon and Microsoft, in this nascent market with enormous potential for high growth over the long term.

Alphabet's Other Bets segment represents ventures unrelated to its internet businesses (Google) which are disruptive and could become large stand-alone companies. These include Google Fiber (US wireline internet/TV provider), Nest (home automation devices) and the operating system for self-driving cars. While Other Bets represented less than 1% of Alphabet's 2015 revenue, they collectively incurred US\$4 billion in costs in 2015, representing over 15% of Alphabet's pre-tax earnings.

While many of Alphabet's businesses have entrenched market positions and massive growth opportunities, they do face several threats including government regulation, competition from Microsoft, Amazon, Apple and Facebook, together with potential disruption (e.g. intelligent assistants). In addition, there is a lack of transparency with respect to its Other Bets investments and its intentions regarding its large and growing cash balance.

Despite Google's history of successful and profitable innovation and its unique global assets, we believe that Alphabet's current share price materially undervalues its search (including maps), YouTube and enterprise cloud businesses and has no (possibly negative) value for many of its potentially massively disruptive businesses or success in achieving dramatic advances in A.I.

Yum! Brands



Yum! Brands ('YUM') develops, operates, franchises and licenses a worldwide system of nearly 43,000 restaurants under the brands of KFC, Pizza Hut and Taco Bell – each respectively a global leader in chicken, pizza and Mexican-style food categories. Units are operated by either the company or independent franchisees or licensees under franchise or license agreements. Franchisees, which range in size from individuals owning just one restaurant to large publicly traded companies, operate the restaurants, invest the capital and pay YUM a royalty based on sales. As measured by system sales, YUM is second to McDonald's globally, but the leader in emerging markets by a sizeable margin.

YUM has established a very significant business in China where it has more than 7,000 restaurants. YUM is the dominant quick service restaurant operator in the country and KFC is a leading brand with deep customer recognition. YUM is in the process of separating its China business into a master franchisee structure. This business will be largely debt-free and able to self-fund its growth plans, which are to triple its store count in China over the longer term.

YUM has unmatched scale in emerging markets, with nearly 16,500 restaurants, almost twice that of the next largest restaurant company, McDonald's. Today, almost two-thirds of its operating profits are generated in these faster growing, rapidly-developing countries. One of the most exciting regions for YUM is Asia; clearly in China, but also in countries like India, Indonesia, Malaysia, Thailand, where vast populations are growing in affluence and YUM's KFC and Pizza Hut brands already have high brand recognition and loyalty, and compelling unit economics.

Despite a setback in 2013 as a result of issues around food safety within the KFC business in China, the company's management have taken measures to tighten controls in its supply chain, refresh its menu and employ dynamic marketing which have collectively contributed to success in restoring brand trust and loyalty.

The company has generated an impressive track record in delivering sales growth through organic expansion via a generally well executed store rollout program and has benefited from strong operating leverage. The company is on track to finalise the separation of its China business, via a tax free spinoff, into a master franchisee structure. This will reposition YUM as a predominantly global franchisor (targeting 95% franchised stores by 2017). As a franchisor, YUM will be far less exposed to operating risk, require minimal capital investment and generate high returns on capital. The lower earnings volatility will enable YUM to increase financial leverage and thus deliver substantial shareholder returns in conjunction with the separation. Together with a growing dividend yield, we expect the separation to be a positive for shareholders.

Hamish Douglass

A handwritten signature in black ink, appearing to read 'Hamish Douglass', with a long horizontal stroke extending from the end of the signature.

Chief Executive Officer, Chief Investment Officer and
Lead Portfolio Manager

26 July 2016

Please note: From June 2016, Magellan Asset Management will be producing this Investor Letter on an annual basis.

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