AFRICA’S DEMOGRAPHIC FREIGHT TRAIN

- Unlike most economic trends, demographics are predictable by their very nature and present remarkably little uncertainty. Like freight trains, they are powerful forces and difficult to derail.

- The research paper ‘Demographic Changes, Financial Markets and the Economy’ finds that young adults are the driving force behind GDP growth, middle-aged adults are the locomotive for stock market returns and old-aged adults erode both economic growth and stock market returns.

- The demographic trends that drove US economic growth and stock market returns over the past 50 years allow us to draw some interesting parallels with the current position of African countries. Demographics is only a part of the puzzle of economic and stock market performance so direct country comparisons should be treated with caution.

- Population distributions for the key listed equity markets in Africa in 2011 (Egypt, Morocco, Nigeria and Kenya) bear a striking resemblance to the position of the US in 1960 and are well-positioned to benefit from a ‘demographic tailwind’ in terms of real per capita GDP growth and longer-term excess stock market returns.

- High-quality banks and real estate companies are well-positioned to benefit from the ‘demographic freight train’ over the next 10-20 years. From a stock picking perspective, demographics provide an additional guide to selected company-specific opportunities at attractive valuations to disciplined, long-term investors.

Greg Barker - Head of Investment Research

Introduction

“Prediction is difficult, especially about the future”. Niels Bohr, Danish Physicist (1885-1962)

Its human nature to overestimate our ability to accurately predict the probability of future events. At Sustainable Capital, we are generally sceptical of investment approaches that rely heavily on top-down analysis and ‘crystal ball gazing’. The reality is that most economic trends and variables are a ‘random walk’ and therefore practically impossible to forecast. For evidence of this, simply review historical forecasts of GDP growth, interest rates or exchange rates made by economists over the past 5, 10 or 20 years. This renders elaborate projections of economic growth, interest rates and commodity prices of limited use to investment decision-making and stock selection.

However, demography – the statistical study of human populations – presents a rare exception to this rule. Demographics are predictable by their very nature and present remarkably little uncertainty. In contrast to the unpredictable moving parts of financial markets, demographic trends behave more like freight trains. Freight trains are powerful; they travel with strong momentum; their direction is predetermined; their speed is predictable, and its difficult to derail them. If you put your ear to the tracks and listen carefully, you can hear them coming from a long way off.

“Long-term price trends for both stocks and bonds are dominated by demographics and this is where I would turn first in forecasting the future of either”. Long-term PIMCO bond investor Bill Gross.

In his book ‘Bill Gross on Investing’¹, published 15 years ago, Mr Gross used demographic trends to analyse the progress of the “baby boomers”² to successfully predict: a) Declining US consumption growth; b) Lower nominal GDP growth in the US; c) Falling US inflation rates and bond yields; and, d) The decline of the US housing market.

Demographic Changes, Financial Markets and the Economy

An excellent piece of research titled ‘Demographic Changes, Financial Markets and the Economy’ is presented in the Jan/Feb 2012 Financial Analysts Journal. Using 60 years of data (1950-2010), the authors use a rigorous methodology to demonstrate a clear link between demographic shares (the spread of country populations by age group) and: a) Real GDP per capita growth; b) Excess stock returns; and, c) Excess bond returns. The study overcomes weaknesses in existing research on similar topics by using 5-year GDP growth rates across a large cross-section of countries and stripping out the effect of inflation and valuation levels. This approach produced statistically significant results and some meaningful economic findings that are summarised in the graphs below.

GDP Growth and Demographic Shares (chart source: FAJ Paper, Arnott and Chaves, 2012. Comments and lines added by Sustainable Capital)

The solid curved line in the graph below represents the correlation between population age groups and real GDP growth (on the vertical axis) plotted against population age groups (on the horizontal axis). The shaded portion of the graph shows the 90% confidence interval of the analysis, meaning that we can be 90% sure that the results will fall within this range.

Key findings of the impact of demographics on real GDP per capita growth:

- Real economic growth peaks for countries when the population is dominated by young workers in their late 20s and early 30s at a coefficient of about 1.4, which implies that a 1 percent higher concentration in this age group results in 1.4% higher annual GDP growth. In contrast, populations with a 1 percent higher concentration in senior citizens (70+ age group) exhibit 3.3% lower GDP growth.

- If the working population (20-60 year olds) is growing faster than the overall population, we should expect demographic tailwinds in real GDP per capita growth. More specifically, the research findings indicate a positive correlation with GDP growth that starts with young populations (5-10

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1 A baby boomer is a person who was born in the US during the demographic Post-World War II 1946-1964 period (U.S. Census Bureau). By the sheer force of its numbers, the boomers were a demographic bulge that remodelled the US society and economy as it passed through it.


3 ‘Excess return’ in this case is defined as the return over a specific time period relative to local interest rates (effectively adjusting for inflation).
year age group) and peaks when productive workers in their late 20s and early 30s dominate the population. The opposite applies to countries with ageing populations, which face demographic headwinds in real GDP per capita growth.

- Although peak worker productivity has been shown to be in the 30-40 year age group, it is important to note that productivity growth is highest in the 20-30 year age group (children and teenagers are not productive in economic terms, which means that new workers grow their productivity off a very low base when they enter the workforce). Productivity actually declines for workers in their 50s, even prior to retirement.

- Young adults are therefore the driving force behind GDP growth and old-aged adults erode real per capital economic growth.

**Stock Returns and Demographic Shares** (graph source: FAJ Paper, Arnott and Chaves, 2012. Comments and lines added by Sustainable Capital)

The solid curved line in the graph below represents the correlation between real population age groups and excess stock returns (on the vertical axis) plotted against population age groups (on the horizontal axis).

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**Key findings of the impact of demographics on excess stock returns:**

- The relationship between demographic shares on excess stock returns shows a similar pattern to that of real per capita GDP growth but the curve shifts to the right, with stock returns peaking when the population is dominated by 40-50 year olds at a coefficient of about 1, suggesting that a 1 percent higher concentration in this age group results in 1.0% higher annual excess stock returns. This is intuitive, as 20-30 year olds are more intent on borrowing and consuming and typically only begin meaningful savings through stock investing in their 30s and 40s.

- Stock returns trough in the 10-14 year age group and turn to a positive correlation from the late 20 year age group onwards. Note that after peaking in the late 40s age group, the positive correlation for stock returns declines rapidly, turning negative just after retirement age (late 60s) and reaching a coefficient -1.8 for the +70 age group (implying that excess stock market returns are 1.8% lower for each 1% higher concentration of old-aged people).

- Countries with very old populations should expect poor stock returns due to ‘demographic headwinds’. Again, this makes sense because investors in their late 50s and early 60s tend to divest and shift their portfolios from stocks to bonds in order to generate income.

- Middle-aged adults are therefore the locomotive for stock market returns and old-aged adults dilute stock market returns.
Other Key Findings

Changes in demographic shares:
The authors of the ‘Demographic Changes, Financial Markets and the Economy’ paper run the same statistical analysis using the change in demographic shares (rather than the absolute level of population distributions). The key findings are that the graphs shift slightly to the right (as expected due to the lag effect of change) and that the magnitude of the coefficients (the effect on real per capital GDP growth and stock returns) roughly doubles. We can conclude that changes in demographic shares have twice the impact of absolute levels of demographic shares.

Bond returns:
The study also considers excess bond returns (as opposed to stock returns) and finds a similar curve to stock returns but shifted to old age groups, which is not particularly surprising since bond investments grow in importance to savers in the +50 year age category.

Forecasts:
The authors use their research findings to make specific country forecasts of real GDP growth and conclude: “In the case of GDP growth, the implied forecasts are bleak, with rare exceptions that include India and most African countries.” Their conclusions fit with the notion of a ‘demographic tailwind’ for the young populations of African countries that we present in the following section.
Learning from history: The US Baby Boomers (graph source: Sustainable Capital research, population data from UN statistics)

In the graph and analysis presented below, we review the demographic trends that drove US economic growth and stock market returns over the past 50 years and draw some parallels with the current position of African countries, with specific reference to the development of the US Baby Boomers.

- **US Demographics in 1960**: Note the high visibility of the Baby Boomers ‘freight train’ 10-20 years before their arrival in the workplace that subsequently resulted in the rapid growth of consumers in the 1970s and 1980s.

- **US Demographics in 1970**: Baby Boomers enter the workplace in earnest, leading to rapid and sustained growth in house prices and consumption levels for a 20-year period.

- **US Demographics in 1980**: A peak in new workers leads to a spike in productivity and consumption. Note that the difference between the 1980 and 1970 graphs at the 30 year age group effectively represents an entire cadre of new stock investors, which was likely a major contributor to the excess stock returns enjoyed in the US market over the following 20 years.
The US and Nigeria: 50 Years apart in demographic terms (graph source: Sustainable Capital research, population data from UN statistics)

The graph below shows the US demographic in 1960 plotted against the Nigerian demographic in 2011 on the same axis.

**US Demographic in 1960 v Nigeria in 2011**

- **Nigeria in 2011**: A similar demographic picture to the US in 1960 in both size and distribution
- **The US in 1960**: About to embark on a sustained economic and stock market expansion

Data source: UN Population Division Statistics, 2011
The US in 1960 v major African listed equity markets (graph source: Sustainable Capital research, population data from UN statistics)

- **The US in 1960 relative to major African listed equity markets in 2011:** The graph presented above contrasts the US demographic in 1960 (plotted on the left-hand axis) relative to the demographics for African countries that, alongside Nigeria, represent the major listed equity markets on the continent.

- **Implications for the main listed equity markets in Africa:** The young populations of the key listed equity countries in Africa leave them well-positioned to benefit from demographic tailwinds in the form of real per capita GDP growth and longer-term from excess stock returns. Both Egypt and Morocco have already experienced an influx of potential new workers that are currently in the consumption phase and would likely begin their savings in stocks within the next 5-10 years. Nigeria and Kenya both have steep demographic share curves and will see the entry of a new generation of workers within the next 5-10 years. The challenge for these countries is to create sufficient employment to ensure that their boomers become productive workers that contribute to economic growth. The risk of failure in this context is high numbers of unemployed youths, which history has taught us can lead to social unrest and political instability.

**Implications for African economies and equity returns**

**Ungeared personal balance sheets:**

The capacity for the ‘freight train’ of new African workers to gear up their personal balance sheets is relatively strong when compared to the US position in 1960. U.S. household leverage, as measured by the ratio of debt to personal disposable income, increased modestly from 55% in 1960 to 65% by the mid-1980s. Over the following two decades, leverage more than doubled, reaching an all-time high of 133% in 2007. US Mortgage debt as a portion of GDP was already over 25% in the US by 1960 and has since risen to over 70%. In contrast, African household balance sheets are exceptionally strong. Mortgage penetration rates (the % of the population that have home loans) are well below 5-10% and mortgage debt to GDP is in single figures in most cases. Asset owners in African countries have historically paid for their assets (homes, vehicles, consumer goods) with cash.
rather than credit, which is the reason why their balance sheets are in such good shape. The emergence of reputable banks offering viable consumer credit loans and mortgages is now enabling new workers to finance some of their purchases with debt.

**Stock market structure and foreign participation:**

In the 1970s, foreign companies owned less than 1.5% percent of all corporate U.S. assets. The share of foreign-owned U.S. companies as a percentage of the total has since moved closer to 15%, with listed equities at less than 10%. African stock exchanges are currently dominated by local investors (with a surprisingly high component of local retail investment). However, foreign investors are likely to continue to play an important role on a proportionate basis over the next 50 years, particularly given the ‘demographic headwinds’ they are facing in their domestic stock markets. In our opinion, the search for inflation-beating earnings yields and returns is likely to draw further interest in African equities from developed market investors. This is supported by similar trends in other emerging market stock markets, where the component of foreign ownership has grown over time. The table below presents local and foreign ownership for the US (1970 and 2010) and % of value traded for the major African stock markets:

<table>
<thead>
<tr>
<th>Stock Market</th>
<th>Local %</th>
<th>Foreign %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign ownership of US stocks 2010</td>
<td>86%</td>
<td>14%</td>
</tr>
<tr>
<td>Foreign ownership of US stocks 1970</td>
<td>99%</td>
<td>1%</td>
</tr>
<tr>
<td>Egypt % of trade 2011-2012</td>
<td>75%</td>
<td>25%</td>
</tr>
<tr>
<td>Morocco % of trade 2011-2012</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>Nigeria % of trade 2011-2012</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Kenya % of trade 2011-2012</td>
<td>60%</td>
<td>40%</td>
</tr>
</tbody>
</table>

**Limitations of demographics as a predictor:**

Clearly, demographics are only a part of the puzzle in determining economic and stock market performance, particularly when making comparisons between countries. Companies require operating environments with political stability, rule of law, effective governments, environmental stability and infrastructure in order to grow their earnings base in real terms over long-term time horizons. In this regard, it is critical to note that it is the change in these factors that is more important than their position in absolute terms. In other words, the base effect plays a major role. Most African companies have made significant progress in these areas over the past 15 years but are still coming off a materially lower base than the US in 1960. For example, for African countries with severe infrastructure constraints, even relatively modest progress can lead to significant multiplier effects throughout the economy.

**Market efficiency:**

If the ‘demographic freight train’ is truly highly predictable, it begs the question why this information has not simply been ‘priced in’ to stock markets, thereby rendering any demographic information as useless. Several researchers have laid this criticism to rest, following the rationale that it is not possible to arbitrage differences in the demand and supply for financial assets, which is a reflection of differences in age group size across generations ahead of time because “only living generations trade in financial markets at a point in time” (IMF, 2004 World Economic Outlook). Our own experience of African equity markets is that prices are led at the margin by short-term investors whose time horizon leads them to investment decisions based on quarterly data rather than the 5-20 year information provided by demographics.

**Asset allocation: GDP growth first, then stock returns and lastly bonds:**

In the context of African population curves, which display young populations, the research provides compelling evidence that demographic tailwinds will be seen first for real per capita GDP growth (peaking for the late 20s age group), then for stock investments (peaking for the 40-50 year age category) and finally for bond investments. This is in keeping with the typical order of spending for the average citizen (consumption in the 20-30 year

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age category, followed by savings in stocks in the 30-50 age group and finally investments in bonds in the 40-70 year age group). On this narrow basis, long-term asset allocation in African markets should favour stocks over bonds for at least the next 10-20 years.

**Stock selection:**

For the purposes of investment decision-making, we are interested in the impact of demographics on specific companies. Demographic data is no substitute for detailed company research (our approach being bottom-up, company-specific and typically derived from in-situ ‘kicking the tyres’ due diligence and extensive management contact). Even so, it is worth noting some of the more obvious stock selection implications of the demographic profiles of the key listed equity markets in Africa.

The experience of the US and other countries has given us a good preview of the companies in Africa that are most likely to benefit the most from the ‘demographic freight train’ over the next 10-20 years, namely: **a) High-quality commercial banks and microfinance lenders:** Banks are set to benefit from both corporate and retail loan growth (including consumer loans and mortgages), with earnings growth accentuated by the high financial gearing of banks. Detailed due diligence is required to identify company-specific opportunities in banks that are able to manage the credit risk of consumer lending where valuation levels are attractive; **b) Real estate:** Well-managed real estate companies are likely to gain from the influx of new workers and the consequent rise in households. This trend is already clearly visible in the marriage rates of North African countries, where there are structural deficits in family housing and selective options to enter real estate stocks at material discounts to their land bank values; c) **Consumer companies** themselves are fundamentally well-positioned, although we note that in most cases this prospect has already attracted strong industry competition, which is likely to challenge the sustainability of returns on capital over time. The ‘Africa consumer story’ has also drawn keen investor interest, with several of the current consumer stocks already ‘priced for perfection’, which makes them unappealing on a valuation basis relative to the rest of the African listed equity universe at this stage.

**Conclusions**

Unlike most economic trends, demographics are predictable by their very nature and present remarkably little uncertainty. Like freight trains, they are powerful forces and difficult to derail. Young adults are the driving force behind GDP growth, middle-aged adults are the locomotive for stock market returns and old-aged adults erode both economic growth and stock market returns. The demographic trends that drove US economic growth and stock market returns over the past 50 years are similar to the current position of African countries. Population distributions for the key listed equity markets in Africa in 2011 (Egypt, Morocco, Nigeria and Kenya) bear a striking resemblance to the position of the US in 1960 and are well-positioned for ongoing real long-term per capita GDP growth and, in the longer-term, for excess stock market returns. From a stock selection perspective, selected high-quality banks and real estate companies are well-positioned to benefit from the ‘demographic freight train’ over the next 5-20 years, offering attractive valuations to disciplined, long-term investors.

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Greg heads up Sustainable Capital’s investment team. Sustainable Capital is an independent, owner-managed, responsible investment asset manager that specialises in the research and management of listed African equity securities. The firm’s investment philosophy is that the sustainability performance of countries and companies is fundamentally linked to long-term investment returns, yet inefficiently priced by African financial markets. Greg has extensive experience in sustainable investment research in Africa and developed a strong track record of investment decision-making in his previous role as a fundamental investment analyst at a leading responsible investment management firm in South Africa. Since co-founding Sustainable Capital 4 years ago, Greg has been travelling into African countries to conduct fundamental research on companies. Greg is a CFA Charterholder with over 13 years of industry experience. He is a graduate of the University of Cape Town, having completed a Masters Degree in Sustainability and subsequently an MBA from the Graduate School of Business.