

# Investment Funds

## Technology Fund Profiles

**WEALTH MANAGEMENT RESEARCH**

wmr@forsythbarr.co.nz  
+64 4 499 7464

**FLORIAN BURCH**

florian.burch@forsythbarr.co.nz  
+64 9 368 0106

This report profiles a selection of equity funds that invest in companies which sell or use technology extensively, that have innovative business models, or that specialise in robotics and artificial intelligence. For investors seeking broad-based technology exposure, our preferred technology fund in the current heady environment is Polar Capital Global Technology UCITS (POLGTIU, an unlisted wholesale fund available only to PPM or wholesale accounts), or its listed sister fund Polar Capital Technology (PCT.L) when it is trading at a discount to net asset value (NAV) of more than c.-4%. Allianz Technology Trust (ATT.L) and Scottish Mortgage (SMT.L) are good alternatives for risk-tolerant investors with long investment horizons who are seeking higher conviction funds.

### How can you not like a sector that's returned over +20% pa for the last ten years?

Helped by the extraordinary growth of some exceptional companies, **the sectors these funds invest in have delivered very strong returns to investors over the last decade.** With stock prices having outpaced earnings upgrades, valuations have expanded to elevated levels over 2020. As a result, **the probability of such high returns being repeated over the next decade doesn't look as high as it did ten years ago.** But technology and innovation will continue to play an important role in enhancing the productivity and competitiveness of businesses, particularly in the current environment of fast-paced development and industry disruption, and so **technology stocks will probably remain important contributors to investment returns.** The question is, which ones?

### Role in portfolios

**The active fund managers we reviewed are well-placed to identify tech investment opportunities as they emerge.** We view these funds as having a "satellite" role in portfolios of augmenting the tech sector exposure already provided by broader "core" global equity funds. Alternatively, they can be the main source of tech exposure in otherwise tech-lite portfolios of directly held stocks.

### Our current preferences – We hear the siren song of recent strong performance, and steer towards slightly more cautious funds

The Polar Capital technology funds have a good performance track record, their managers are experienced and well resourced, and their positioning and track records make them appear slightly more cautious than some of the other tech funds we reviewed. **The key point of difference between the two Polar Capital tech funds is that PCT is more benchmark-aware and therefore often has a higher weighting to large cap tech stocks than POLGTIU,** which is usually more mid-cap oriented. **POLGTIU is bought/sold at NAV while PCT trades at varying discounts to NAV,** which can accentuate the volatility in its price – hence our preference for POLGTIU unless PCT's price is at a discount to NAV of c.-4% or more.

For investors with a greater tolerance for bumps on the road to long-term performance, **Allianz Technology Trust (ATT.L) provides a higher-octane exposure to the tech sector.** The Silicon Valley-based managers' bias towards mid-caps and a slightly more concentrated portfolio are consistent with our preference for high conviction equity funds, as research suggests that more active, benchmark-agnostic portfolios outperform over the long-term. But the fund has historically provided a more volatile ride than peers, and after a period of strong performance by the fund and the sector, we are more wary than usual of the risk that a period of weaker returns could be around the corner, for example if valuations de-rate.

We are similarly cautious on Scottish Mortgage (SMT.L) in the short-term given the recent strong run, but believe it has a lot to commend it longer-term. While the Polar Capital and Allianz funds are focussed on technology-related companies, **SMT also invests in other sectors where the managers find opportunities,** including biotech and consumer discretionary. The manager's focus on buying and holding companies that have the potential to be among the top c.1% of performers over the very long term is difficult for most investors to replicate using direct stocks or more mainstream funds. SMT's c.20% exposure to high-growth unlisted companies, combined with the manager's very low fees, make it an attractive way to invest in private equity.

## I. Introduction

### Three "tech" fund flavours: Technology, Innovation, Robotics

We have grouped the tech-related funds we are reviewing into three categories:

- **"Technology"** funds, which invest in companies that develop and sell tech-related products and services, mainly in the information technology, e-commerce and online media sectors: **Allianz Technology Trust (ATT.L)**, **Polar Capital Technology (PCT.L)**, **Polar Capital Global Technology UCITS (POLGTIU)\***. For comparison purposes we also show some data on two passive ETFs: **iShares Global Tech (IXN.P)** and **iShares Expanded Technology (IGM.P)**.
- **"Innovation"** funds, which invest across numerous sectors in growth companies that often have a significant technology component to their business models, or other drivers of growth: **ARK Innovation (ARKK.K)** and **Scottish Mortgage (SMT.L)**; and as a passive point of comparison, **Invesco QQQ (QQQ.O)**.
- **"Robotics"** funds, which invest in companies that make or use automation or artificial intelligence technology: **ARK Autonomous Technology & Robotics (ARKQ.K)** and **Polar Capital Automation & Artificial Intelligence (PLAIUA)\***; **iShares Automation & Robotics (RBOT.L)** is a comparable passive ETF.
- \* POLGTIU and PLAIUA are wholesale funds. They are available only for PPM/wholesale accounts.

### Prefer active over passive in this sector

Compared to the passive funds, **the active funds have the advantage of active management oversight, greater diversification, and long records of outperformance**. We would expect these advantages to normally outweigh their disadvantages of higher fees, volatility and risk of discounts widening. Similarly, we believe high conviction funds like ATT, POLGTIU, ARKK, SMT, ARKQ and PLAIUA are usually better placed to outperform over the long run than more benchmark-aware funds like PCT.

But **with higher conviction usually comes greater risk and volatility**, which accentuates behavioural risks for investors. Several of these funds (ATT, ARKK, SMT and ARKQ) have performed particularly strongly recently. They profited from positions in high-growth stocks that benefitted from pandemic-related momentum. With valuations at high levels, a period of underperformance – though not inevitable – is a real risk.

For this reason we currently prefer the (slightly) more cautiously managed **POLGTIU in the technology sector (or PCT when it is trading at a discount of more than c.~4% or for non-PPM/wholesale accounts)**, and **PLAIUA among the robotics funds**. While SMT can't be called cautious, we believe the manager's distinctive investment philosophy, long investment horizon and unlisted investments mean that at appropriate weightings it has a place in the portfolios of risk-tolerant, long-term investors.

### Quality management teams & processes

PCT/POLGTIU, PLAIUA and SMT are run by long-standing managers, supported by teams of analysts at highly regarded firms. They undertake in-depth research of investment themes, have suitably long investment horizons (especially SMT), and their investment decisions are based on company fundamentals. The managers clearly communicate their investment beliefs and outlooks, and disclose their portfolio holdings. Portfolio liquidity risks appear to be appropriately managed for the respective fund structures. SMT's large size relative to investment capacity is probably becoming a headwind, but its fees are cheap even compared to some passive ETFs. PCT, POLGTIU and PLAIUA charge high management and performance fees but have outperformed despite this. Discount risk is non-existent in POLGTIU and PLAIUA and tolerably managed in SMT, but bears watching in PCT and ATT.

### Report structure

This report is structured as follows:

- **Section II – Fund Matrix** has a table summarising our qualitative view of the key characteristics of the funds
- **Section III – Fund Overviews** outlines how each fund is managed
- **Section IV – Investment Views** expands on our opinion of each fund
- **Section V – Key Attributes & Section VI – Portfolio Characteristics** use charts to compare the funds' key attributes, portfolio construction, fundamentals and ESG characteristics
- **Section VII – Risk & Return** covers historical fund volatility and performance
- **Section VIII – Discounts to Net Asset Value** shows how the listed closed-end funds have traded compared to fair value
- For readers who prefer tables over charts, **Appendix A** provides more detailed, tabulated versions of the data highlighted in Sections VI & VII. **Appendix B** lists the funds' largest portfolio holdings

## II. Tech Fund Matrix

Figure 1. Our qualitative summary of key fund characteristics

Sector Fund	Technology					Innovation			Robotics			World
	Allianz Tech Trust	Polar Capital Tech Trust	Polar Capital Global Tech UCITS	iShares S&P Global Tech	iShares Expanded Tech	ARK Innovation	Scottish Mortgage	Invesco QQQ	ARK Autono- mous Tech & Robotics	Polar Capital Automa- tion & AI	iShares Automa- tion & Robotics	iShares MSCI ACWI
Fund code	ATT	PCT	POLGTIU	IXN	IGM	ARKK	SMT	QQQ	ARKQ	PLAIUA	RBOT	ACWI
<b>Style</b>												
Portfolio objective	Active	Bench- mark aware	Active	Passive	Passive	Active	Active	Passive	Active	Active	Passive	Passive
Portfolio concentration	Moderate	Moderate	Moderate	Moderate	Moderate	High	High	Moderate	High	Moderate	Low	Low
Market cap bias	Mid	Large	Mid & Large	Large	Large	Small & Mid	All	Large	Small & Mid	Mid & Large	Mid & Large	All
Style tilt	Growth	Growth	Growth	Moment- um	Moment- um	High growth	High growth	Moment- um	High growth	Growth & GARP	All	All
Valuations	Very high	High	Very high	Moderate- High	Moderate- High	Very high	Very high	High	Very high	High	High	Moderate
Use of gearing	Seldom	Seldom	Never	Never	Never	Never	Usually	Never	Never	Never	Never	Never
Explicit ESG criteria	No	No	No	No	No	No	No	No	No	No	Yes	No
<b>Expenses</b>												
Fees & expenses	High	High	High	Low	Low	Moderate	Low	Low	Moderate	High	Low	Low
Tax efficiency	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Discount management	Some	Little to none	n.a.	Very tight	Very tight	Very tight	Tight	Very tight	Very tight	n.a.	Very tight	Very tight
<b>Performance</b>												
NAV track record	Strong	Strong	Strong	Strong	Strong	Very strong	Very strong	Strong	Strong	Strong	Strong	Moderate
Volatility track record	Volatile	Volatile	Moderate	Moderate	Moderate	Volatile	Volatile	Moderate	Volatile	Moderate	Volatile	Moderate
Risk/reward track record	Good	Good	Very good	Good	Good	Very good	Very good	Good	Adequate	Good	Adequate	Adequate
<b>Management</b>												
Mgmnt continuity risk	High	Moderate	Moderate	n.a.	n.a.	High	Moderate	n.a.	High	Moderate	n.a.	n.a.
Independent board	Yes	Yes	No	No	No	No	Yes	No	No	No	No	No

Source: Forsyth Barr analysis

## III. Fund Overviews

### Technology funds

#### Allianz Technology Trust (ATT.L)

ATT is a UK-listed, closed-end investment company. The fund has been managed by the same small San Francisco-based global technology team at Allianz Global Investors since 2007. The managers aim to achieve long-term capital growth by investing in quoted companies worldwide for which technology is a differentiating factor. The fund has a concentrated portfolio of 60–70 stocks and a bias to the US. The managers prefer mid-cap and higher-growth companies, which they believe have greater potential to multiply in value than mega-caps do, but which also have higher valuations. They think about the portfolio in three groups: High growth companies (>20% pa.) with high but justifiable valuations, growth-at-a-reasonable-price companies (+5–20% pa, e.g. the mega caps), and value or cyclical stocks with good prospects (e.g. semiconductor and pandemic-hit stocks). Key themes are cloud computing, security, AI and internet-of-things.

#### Polar Capital Technology (PCT.L)

PCT was launched in 1996. The UK-listed investment company aims to maximise long-term capital growth by investing in a diversified portfolio of technology-related companies around the world. The fund is managed by one of the largest Europe-based technology investment teams. The managers look for 90–100 quality, established companies that are well-positioned to exploit technological growth trends while avoiding areas that are over-hyped (too early in the S-curve) or approaching decline. The managers' preferred technology themes are currently 5G and mobility, online ads and ecommerce, software-as-a-service, artificial intelligence, digital entertainment, cloud infrastructure and security, semiconductors, payments and fintech, and automation.

#### Polar Capital Global Technology UCITS (POLGTIU/LP)

**Because POLGTIU is an unlisted wholesale fund it is only available to PPM or wholesale clients.** POLGTIU was launched in 2001. The Irish-domiciled, open-ended investment fund aims to maximise long-term capital appreciation by investing in a 60–85 technology-related companies around the world. The fund is managed by the same team as PCT with a similar process; POLGTIU is less benchmark-aware, typically resulting in a slightly lower weighting in mega-cap stocks and a higher weighting in mid-caps.

#### iShares Global Tech (IXN.N)

IXN is a US-listed, passive, open-ended exchange traded fund (ETF) which invests in information technology companies from the S&P Global 1200 index of mega cap and large cap companies from predominantly developed markets (excluding China). Stocks are weighted by market capitalisation. It has large weights in the biggest IT stocks (Apple and Microsoft). IXN does not invest in stocks that are sometimes casually referred to as "tech" but which formally belong to other sectors like communications (e.g. Alphabet and Facebook), consumer (e.g. Amazon), industrials (e.g. Rockwell Automation) and healthcare (e.g. Intuitive Surgical). The ETF is run by BlackRock.

#### iShares Expanded Technology (IGM.N)

IGM is a US-listed, passive, open-ended, exchange traded fund (ETF) which invests in large, medium and small-cap US companies that are in the information technology sector or in the internet and direct marketing retail, interactive home entertainment or interactive media and services sub-industries. The stocks are weighted by free float market cap, with caps on weights of the largest stocks. It does not invest in US-listed Chinese companies, or in companies listed outside the US. The ETF is run by BlackRock.

### Innovation funds

#### ARK Innovation (ARKK.K)

ARKK is an actively managed, open-ended, US exchange traded fund. It is managed by ARK Invest. Launched in 2014, it invests in US-listed shares of companies that enable, develop or use technologically-related new products or services. By combining top-down and bottom-up research, the manager aims to identify companies which offer the best risk-reward from among ARK Invest's four disruptive innovation themes of: "Genomic Revolution" (DNA-based technologies), "Industrial Innovation" (automation and robotics), "Next Generation Internet" (cloud, infrastructure and services) and "Fintech Innovation" (financial industry technologies). The

manager believes innovation is key to the growth of these companies, and that other investors often underestimate the ultimate size of the market opportunity and consequently misprice the stocks. The manager is assisted by a team of 10 young analysts.

#### Scottish Mortgage (SMT.L)

SMT was established by the Baillie Gifford partnership in Edinburgh in 1909 to lend money for rubber plantations in Asia. The UK-listed, closed-end, global investment company continues to be managed by Baillie Gifford but has long since shifted its focus to investing in listed and unlisted equities with high growth potential over 5–10+ years. Speaking to academics, scientists and companies, the team sets out to identify trends, technologies and business models that look poised to undergo big changes. They search for firms that are trying to transform industries, like Amazon or Tesla, with the expectation that some (but not all) will generate exceptional returns for shareholders over the long-term. This philosophy is based on the observation that the best returns come from a small number of exceptional companies. A quarter of the trust's portfolio is invested in unlisted companies, most of which have proven technologies and business models and a lot of growth potential. (Because no consensus estimates are available for unlisted companies, they are not included in this report's aggregate portfolio statistics for SMT).

#### Invesco QQQ (QQQ.O)

QQQ is a US-listed, passive, open-ended exchange traded fund (ETF) which invests in the companies that make up the Nasdaq 100 index. The index tracks the performance of the 100 largest non-financial-sector companies listed on the US Nasdaq exchange, including some non-US companies. These happen to be mainly innovative, technology-related companies, but unlike sector-specific ETFs, QQQ is not limited to investing only in information technology sector stocks – it also includes stocks from the communications, consumer discretionary, biotech and other sectors except financials. Companies are included mainly based on market cap.

## Robotics & artificial intelligence funds

#### Polar Capital Automation & Artificial Intelligence (PLAIIUA/LP68443139)

**Because this is an unlisted wholesale fund it is available only to PPM or wholesale clients.** PLAIIUA was established in 2017 as an Irish-domiciled, unlisted, open-ended fund. It is managed by the same team that has run Polar Capital's technology funds since 2003. It invests in 50–80 attractively valued companies that are embracing new industrial, hardware and service technologies to boost their profitability, such as:

- Industrial automation to enable highly flexible production (e.g. cyber-physical systems, internet of things)
- Robotics to augment labour and undertake previously impossible tasks (e.g. advanced components, warehouse automation, medical robots, autonomous driving, service robots)
- Advanced materials to enable higher value systems (e.g. semiconductors, displays, chemicals, electronic materials)
- Artificial intelligence to better harness data and solve new problems (e.g. machine learning, computer vision, natural language, autonomous vehicles, smart robotics, virtual agents).

#### ARK Autonomous Technology & Robotics (ARKQ.K)

ARKQ is an actively managed, open-ended, US exchange traded fund. It is run by ARK Invest. It provides exposure to US-listed shares of companies in the autonomous mobility, EV, energy storage, robotics, automation, 3D printing, and space exploration sectors.

#### iShares Automation & Robotics (RBOT.L)

RBOT is a UK-listed ETF which tracks an index of companies from developed markets and a few emerging markets which generate more than half of their revenues from sectors associated with the development of automatic and robotic technology. It avoids investing in companies involved in weapons, tobacco, nuclear power, thermal coal, oil & gas, and companies involved in severe ESG controversies. Stocks in the fund are rebalanced to equal weightings once a year in June.

## Global benchmark

#### iShares MSCI ACWI (ACWI.O)

To provide a broader context in which to compare these tech-related funds, we also show data on the iShares MSCI ACWI ETF, which passively invests in over 2,000 large, medium and small-cap companies in developed and emerging markets.

## IV. Investment Views

### Technology funds

**ATT has been a strong performer recently, and we like the manager's bias away from the biggest companies, but it has historically provided a more volatile ride than peers. In the current heady environment our preferred technology fund is POLGTIU, or PCT when it is trading at a discount to NAV of more than c.4%.**

#### Allianz Technology Trust (ATT.L)

For truly long-term, risk tolerant investors, we would normally favour ATT among the tech funds for its benchmark-agnostic style and tilt to mid-cap and higher-growth companies. The team is highly experienced and is located in San Francisco, near the Silicon Valley epicentre of the global tech sector. Those factors, together with the team's access to an in-house primary research service, Grassroots Research, may give ATT an advantage in understanding expected demand for an investee company's products. ATT's bias to growth companies, together with discount swings, likely contribute to its higher volatility than POLGTIU. The risk for ATT in the current environment is that valuations of its higher-growth, higher-momentum companies could revert to lower levels, for example in a broader market rotation from momentum towards value stocks. On the other hand, this risk may be offset by ATT's relatively modest positions (24%) in the mega-cap tech platforms, which face political/regulatory risks and which also appear fully valued. The co-managers' long tenures suggest personnel changes could be a risk in the years ahead. While the trust comes with some discount risk, the board's support of a -7% discount target limits the downside.

#### Polar Capital Technology (PCT.L)

We see PCT as a close substitute for POLGTIU. Its portfolio differs from POLGTIU (and ATT) in that PCT is managed in a more benchmark-aware style in order to limit the extent to which its performance deviates from the benchmark; we do not see lower tracking error as a big advantage for satellite funds like this, especially if it comes at the expense of long-term returns. Despite the benchmark-aware approach, PCT's portfolio has performed broadly in line with or slightly below POLGTIU over most time periods. But PCT's shares have been more volatile than POLGTIU because of changes in PCT's discount, which its board does not actively manage through share buybacks. For this reason we believe PCT needs to be priced at a low/mid-single-digit discount to NAV to justify the discount risk associated with buying it over POLGTIU.

#### Polar Capital Global Technology UCITS (POLGTIU)

For investors who prefer a less aggressive investment style and lower volatility than ATT, POLGTIU appears to provide a slightly more cautiously positioned, lower-beta portfolio than ATT. POLGTIU's allocation to mega-cap tech platforms (27%) is similar to ATT's 24%, suggesting it faces similar political/regulatory risks, but less than PCT (41%). It currently holds 7% cash – a headwind to returns but also a volatility dampener – more than ATT (4%) but less than PCT (11%). Unlike ATT and PCT, investors in POLGTIU do not face discount risk, since POLGTIU units are created/redeemed at NAV. Polar Capital's large and long-tenured team should allow for management continuity in the event of a personnel change.

#### Passive ETFs: iShares Global Tech & iShares Expanded Tech

While the passive funds (run by iShares/BlackRock and Invesco) hold a large number of stocks, their portfolios are dominated by mega caps to a larger degree than most of the actively managed funds (PCT and SMT have similarly high weightings). Among the two passive tech-related ETFs that we've included in this report as quasi-benchmarks against which to compare the active funds, we prefer IGM because it provides broader sub-sector exposures and greater stock diversification than IXN (and most other IT sector ETFs), which invests only in the Information Technology GICS sector (as do most other tech sector ETFs). IGM's downside compared to IXN is that it invests only in US-listed companies, but this is a tolerable compromise given that the US currently dominates the sector globally.

### Innovation funds

**Helped by the recent quadrupling in major holding Tesla, the innovation funds have performed even better than the tech funds over the past year, and the valuations of the stocks they invest in are high. In this environment we believe it is judicious to trim holdings in such funds to target weights.**

While ARKK has a strong track record since launch in 2014, we are more comfortable with SMT's management and believe the trust's unlisted holdings provide a point of differentiation to portfolios for long-term, risk-tolerant investors.

#### **ARK Innovation (ARKK.K)**

ARK's top-down thematic investing approach seems to have worked exceptionally well for it in the investing environment of the last half decade, despite its limited universe (it invests only in US-listed securities, including American Depositary Receipts [ADRs] of foreign companies). Similar to SMT, ARKK's manager focusses on the long-term, probability-adjusted return potential of investee companies, which differentiates these funds from conventional funds that focus on short-term earnings trajectories, current valuations and stock volatility. It is plausible that ARKK's manager's greater willingness to aggressively trim holdings in the face of excessive valuations may give ARKK a performance edge over SMT, perhaps offset by its much narrower universe (US-only, no unquoted) and the need to manage potential outflows. As an open-ended fund with a big retail following, ARKK is more exposed than SMT to the vagaries of investor sentiment, making management of portfolio liquidity important. With a single manager supported by a team of young analysts, key person risk is significant, but it is partly mitigated by the manager's majority ownership of the management company.

#### **Scottish Mortgage (SMT.L)**

SMT has a long, strong track record of investing in companies with promising outlooks over 5–10+ year horizons. Its portfolio includes the mega-cap winners it backed as earlier-stage companies like Amazon (bought in 2005) and Alibaba (bought pre-IPO). A key point of differentiation is SMT's investment in promising unlisted companies such as Ant Group, Airbnb and SpaceX. SMT's fees and expenses are very low compared to other actively managed funds and particularly compared to private equity managers. The fund's large size is a double-edged sword: It allows diversified access to unlisted investments and permits reasonably tight management of the discount in normal market conditions, but could be a headwind to returns if the fund outgrows the new investment opportunities the manager can find and access. That said, the fund's global universe, permanent capital base and the manager's buy-and-hold style and low portfolio turnover mean being oversized is less likely to be a problem than in a higher-turnover, open-ended fund with a smaller universe.

#### **Invesco QQQ (QQQ.O)**

QQQ only invests in innovative growth companies by virtue of the composition of the NASDAQ exchange, not by any explicit targeting of such companies. It cannot invest in attractive stocks listed on other exchanges. This limited universe is a downside, and its high weightings in the largest companies on the exchange, based on their market cap alone (rather than based on fundamentals), could make it prone to momentum-driven bubbles. Its fees are low relative to sector ETFs, but not a lot lower in absolute terms than SMT's.

### **Robotics funds**

Compared to technology and innovation funds, the robotics and artificial intelligence funds tend to have higher weightings in industrial equipment stocks than the tech funds do. ARKQ has a very strong performance record (helped by a large holding in Tesla), but in the current environment of high valuations for the highest-growth stocks, we currently prefer the more sedate PLAIUA.

#### **ARK Autonomous Technology & Robotics (ARKQ.K)**

ARKQ's higher conviction portfolio and lower fees than PLAIUA might help it outperform. But its lower diversification (fewer stocks, narrower regional universe and lower sector diversification) could expose it more to stock-specific disappointments and style rotations than the more diversified PLAIUA.

#### **Polar Capital Automation & Artificial Intelligence (PLAIUA)**

PLAIUA's portfolio looks to be invested in established, quality-growth companies in a broader range of sectors than ARKQ.

#### **iShares Automation & Robotics (RBOT.L)**

RBOT's basic ESG screen, which excludes companies involved in certain controversial products, may appeal to some investors. Its equal-weighting scheme effectively down-weights the largest companies and up-weights small and mid-sized companies.

## V. Key Attributes

Some of the key attributes of the funds are outlined in the table below.

**Closed vs open-ended.** A few are listed closed-end trusts (ATT, PCT and SMT). The advantage of the closed-ended structure is that the permanent capital base allows the managers to invest in less liquid investments and for the longer term, without the risk of having to sell investments to pay redemptions at the worst times in the investment cycle. Being listed, investors can still exit at any time. The disadvantage is that these trusts can trade at discounts or premiums to their net asset values (NAV), which some boards (SMT) manage in a narrower range than others (PCT).

The listed ETFs trade close to NAV. They face pro-cyclical inflows and outflows (IXN, IGM, ARKK, QQQ, ARKQ and RBOT).

The rest (POLGTIU and PLAIUUA) are unlisted and open-ended and always trade at NAV. The downside of this structure is that the managers could theoretically suspend redemptions, but that is extremely unlikely given they invest in liquid stocks.

**Global vs US.** Some of the funds invest globally (ATT, PCT, POLGTIU, IXN, SMT, PLAIUUA and RBOT), while the others (IGM, ARKK, QQQ and ARKQ) only invest in the US. With the US dominating the world economy generally and innovation in the IT and biotech sectors in particular, being limited to the US has not been a significant barrier to performance. As more innovative companies emerge in other markets like China, global funds could have an advantage in the longer term.

**Active vs passive.** Some of the funds are actively managed (ATT, PCT, POLGTIU, ARKK, SMT, PLAIUUA and ARKQ), the others passively track an index (IXN, IGM, QQQ, RBOT).

**Track records.** Most of the active funds have track records of over 10 years except PLAIUUA (2017), ARKK and ARKQ (2014).

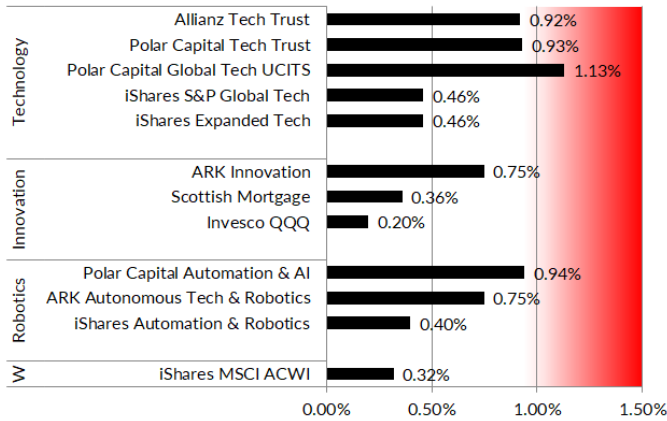
Figure 2. Fund overview

Sector Fund	Technology					Innovation			Robotics			World
	Allianz Tech Trust	Polar Capital Tech Trust	Polar Capital Global Tech UCITS	iShares S&P Global Tech	iShares Expanded Tech	ARK Innovation	Scottish Mortgage	Invesco QQQ	ARK Autono- mous Tech & Robotics	Polar Capital Automa- tion & AI	iShares Automa- tion & Robotics	iShares MSCI ACWI
Fund code	ATT	PCT	POLGTIU	IXN	IGM	ARKK	SMT	QQQ	ARKQ	PLAIUUA	RBOT	ACWI
Listing or domicile	LSE	LSE	Ireland	USA	USA	USA	LSE	USA	USA	Ireland	LSE	USA
Fund inception date	1995	1996	2001	2001	2001	2014	1909	1999	2014	2017	2016	2008
Fund structure	UK LIC	UK LIC	OEIC	ETF	ETF	ETF	UK LIC	ETF	ETF	OEIC	ETF	ETF
Universe	Global	Global	Global	Global	US	US	Global	US	US	Global	Global	Global
Benchmark	Dow Jones World Tech	Dow Jones Global Tech	Dow Jones Global Tech	S&P Global 1200 IT	S&P North American Expanded Tech	MSCI World	FTSE All World	Nasdaq 100	MSCI World	MSCI ACWI	Stoxx Global Automa- tion & Robotics	MSCI ACWI
Management style	Active	Active	Active	Passive	Passive	Active	Active	Passive	Active	Active	Passive	Passive
Management Management company	Allianz	Polar Capital	Polar Capital	BlackRock	BlackRock	Ark Invest	Baillie Gifford	Invesco	Ark Invest	Polar Capital	BlackRock	BlackRock
Lead manager	Walter Price	Ben Rogoff	Nick Evans	n.a.	n.a.	Catherine Wood	James Anderson	n.a.	Catherine Wood	Xuesong Zhao	n.a.	n.a.
Lead manager start date	2007	2006	2007	n.a.	n.a.	2014	2000	n.a.	2014	2017	n.a.	n.a.
Deputy/co-managers (#)	1	4	4	n.a.	n.a.	0	1	n.a.	0	4	n.a.	n.a.
Analysts (#)	2	4	4	n.a.	n.a.	10	n.d.	n.a.	3	4	n.a.	n.a.
Price currency	GBP	GBP	USD	USD	USD	USD	GBP	USD	USD	USD	USD	USD
Currency hedging	None	None	None	None	None	None	None	None	None	None	None	None
Net cash/(gearing)	1.5%	6.0%	8.5%	0.3%	0.1%	0.6%	-5.0%	0.8%	0.2%	4.5%	0.1%	0.1%
<b>Size &amp; liquidity</b>												
FUM or market cap (NZ\$b)	2.2	5.8	10.9	6.7	4.3	19.1	30.2	208.1	1.6	0.9	4.7	20.3
Average daily value traded (NZ\$m)	7.9	11.6	n.a.	26.7	16.4	437	80	14,687	36	n.a.	9.0	545
12-month trailing dividend yield	-	-	-	1.1%	0.5%	0.0%	0.3%	0.5%	0.0%	-	-	1.8%

Source: Forsyth Barr analysis, Refinitiv, fund managers

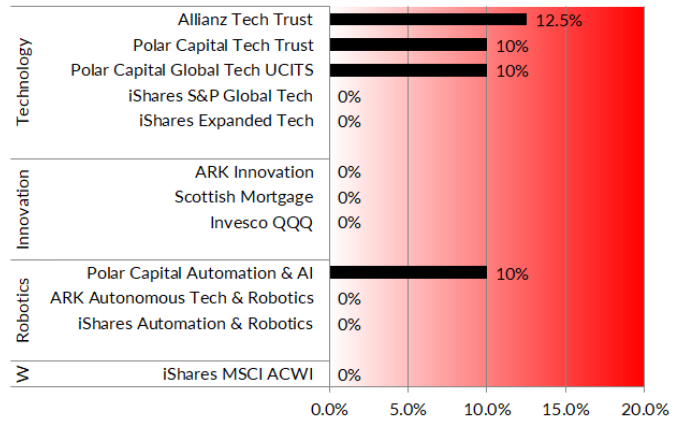
**Expenses.** Most of the actively managed funds' ongoing charges ratios are between 0.75% and 1.13% pa, with ATT, PCT, POLGTIU and PLAIUA additionally charging performance fees of 10%-12.5%. SMT stands out among active funds for its exceptionally low fee of 0.36% pa and no performance fee, which is less than the top end of the 0.20%–0.46% range of the passive ETFs.

**Figure 3. Ongoing charges (% pa)**



Source: Forsyth Barr analysis, fund managers

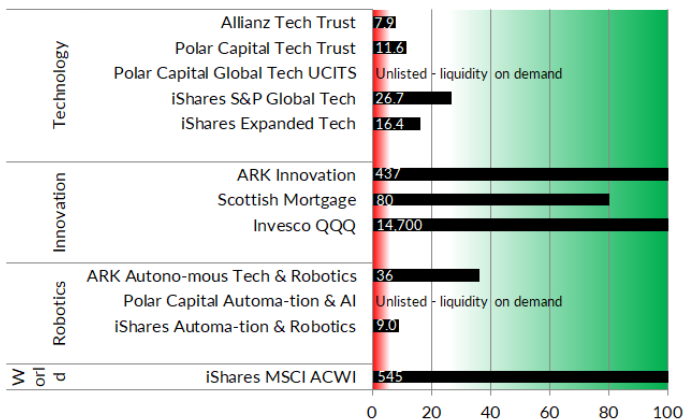
**Figure 4. Performance fees (% of outperformance)**



Source: Forsyth Barr analysis, fund managers

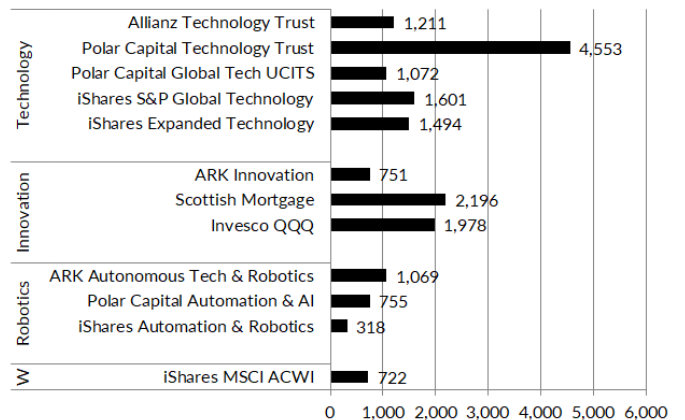
**Liquidity.** The left chart below shows all the funds usually have adequate liquidity (trading over NZ\$5m/day) and apart from allocations to small caps and SMT's unlisted investments, their underlying portfolios appear highly liquid on average (right chart).

**Figure 5. Average daily value traded of fund (NZ\$m per day)**



Source: Forsyth Barr analysis, Refinitiv

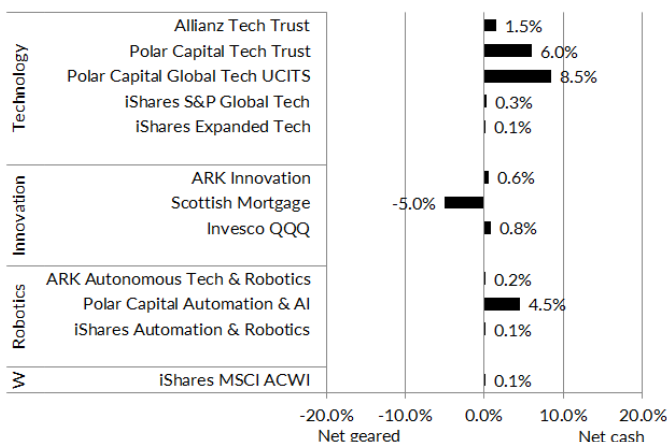
**Figure 6. Average daily liquidity of portfolio stocks (NZ\$m)**



Source: Forsyth Barr analysis, Refinitiv

**Cash vs gearing.** Most of the actively managed funds (ATT, PCT, POLGTIU, PLAIUA) hold some cash (which is a headwind to returns but also dampens volatility). The passive ETFs are close to fully invested. Only SMT usually has structural gearing, which should act as a tailwind to long-term returns, but at the expense of higher volatility.

**Figure 7. Net cash/(gearing)**



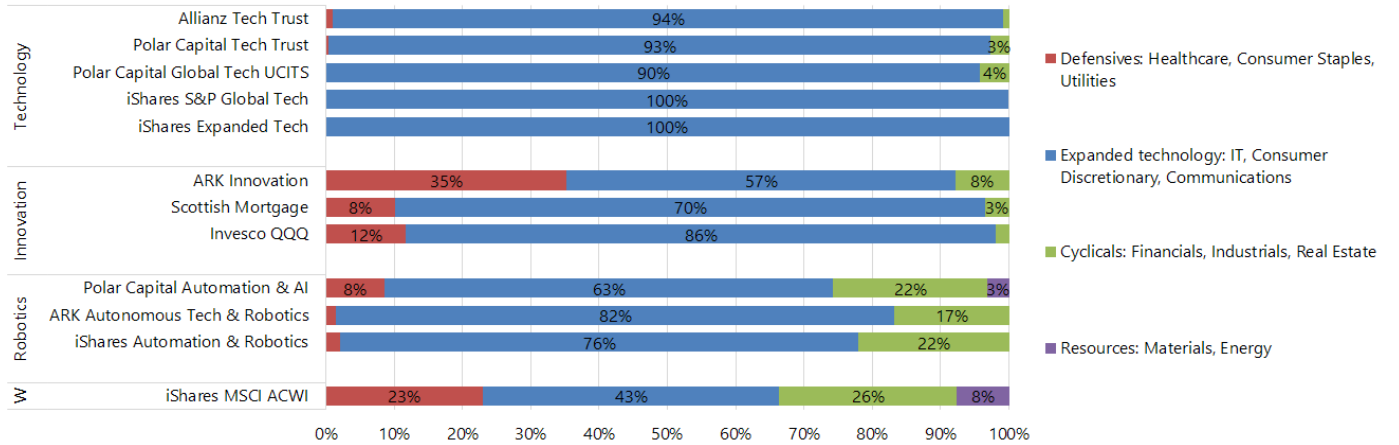
Source: Forsyth Barr analysis

## VI. Portfolio Characteristics

### Sector exposures

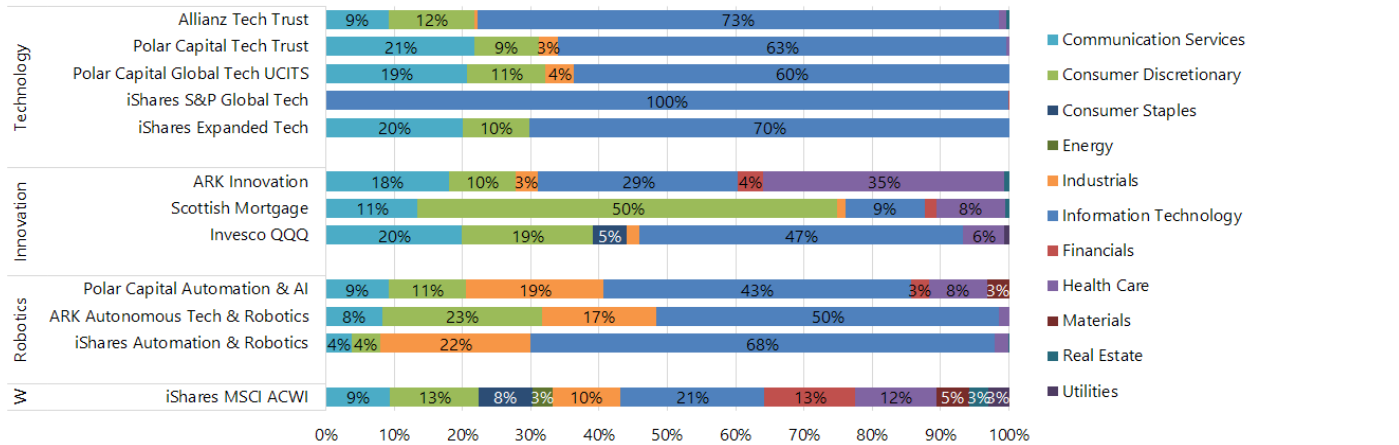
The technology funds are unsurprisingly concentrated in the IT, ecommerce and online media sectors. The innovation funds have the greatest flexibility to invest across sectors and have higher allocations to biotech (especially ARKK), ecommerce and EV makers. The robotics funds are dominated by IT but also have notable exposure to capital equipment makers in the industrials sector.

**Figure 8. Sector-style exposures**



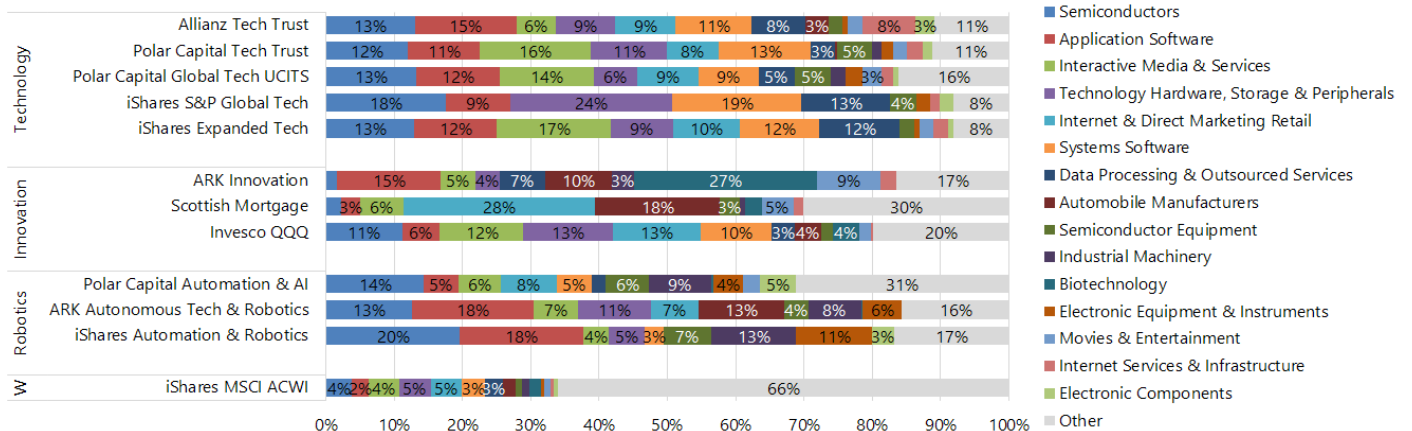
As with all charts on portfolio characteristics in this report, the data for SMT excludes the trust's unlisted holdings. Source: Forsyth Barr analysis, Refinitiv

**Figure 9. GICS sector exposures**



Source: Forsyth Barr analysis, Refinitiv

**Figure 10. Common sub-industry exposures**

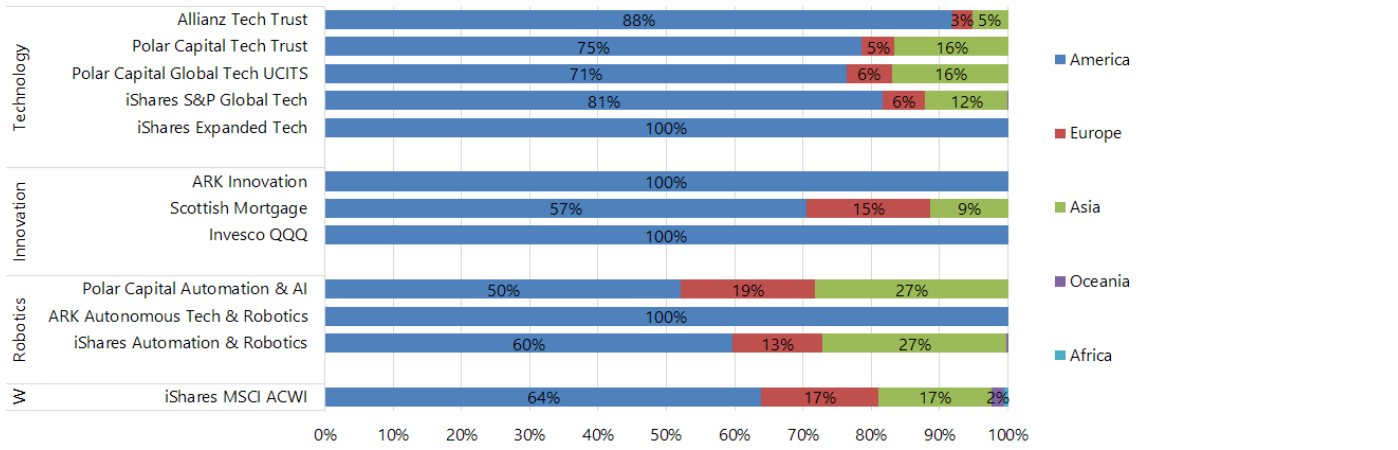


Source: Forsyth Barr analysis, Refinitiv

**Regional exposures**

US stocks dominate all the portfolios, reflecting the tech universe. SMT, PLAIUUA and RBOT have the greatest regional diversification.

**Figure 11. Regional weightings of funds' stock holdings**

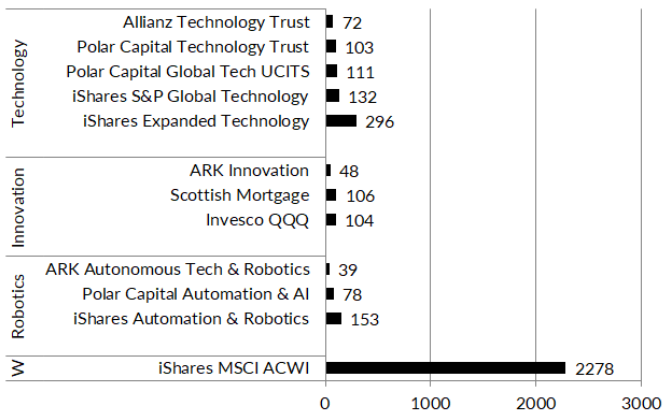


Source: Forsyth Barr analysis

**Portfolio structure**

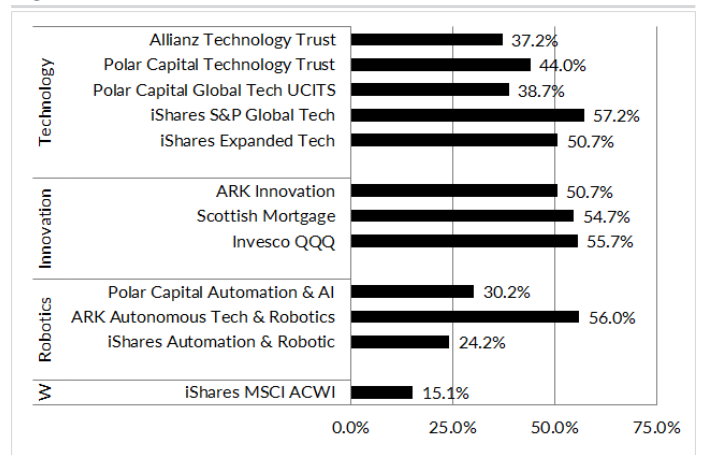
All the funds have adequate stock diversification. ARKK and ARKQ stand out for their reasonably concentrated portfolios. Most portfolios are dominated by mega/large caps; ARKK and RBOT are tilted towards smaller companies than the other funds.

**Figure 12. Number of portfolio holdings**



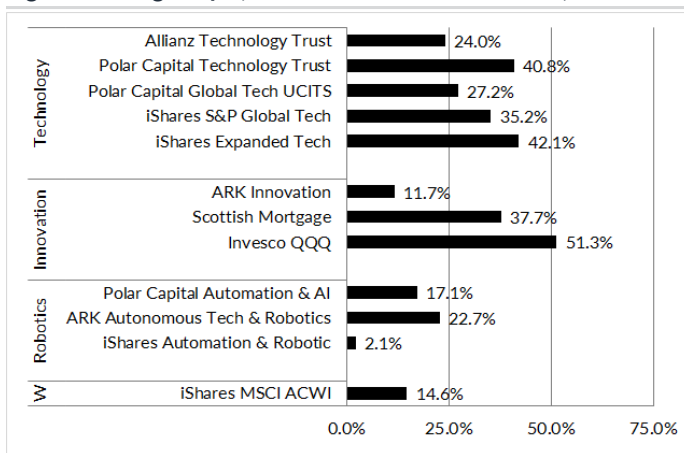
Source: Forsyth Barr analysis, Refinitiv

**Figure 13. Portfolio concentration (% of assets in top 10 stocks)**



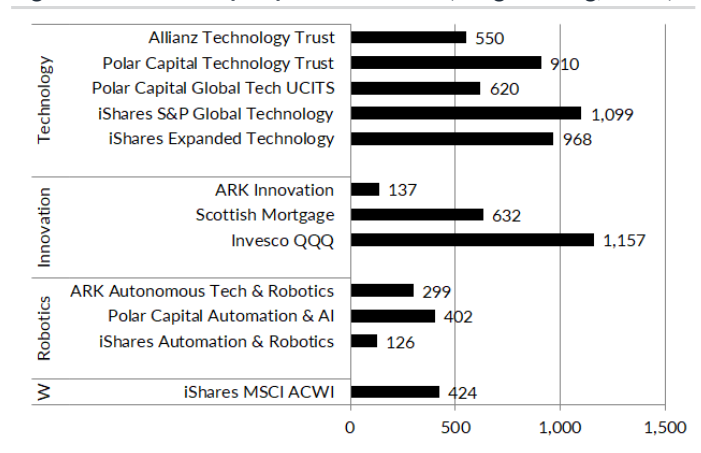
Source: Forsyth Barr analysis, Refinitiv

**Figure 14. Mega-caps (% of assets in AFATBATMAN\*)**



\*AFATBATMAN stocks: Alphabet, Facebook, Amazon, Tesla, Baidu, Alibaba, Tencent, Microsoft, Apple, Netflix. Source: Forsyth Barr analysis, Refinitiv

**Figure 15. Market cap of portfolio stocks (weighted avg, NZ\$b)**



Source: Forsyth Barr analysis, Refinitiv

**ESG (Environmental, Social & Governance)**

**Controversial product involvement**

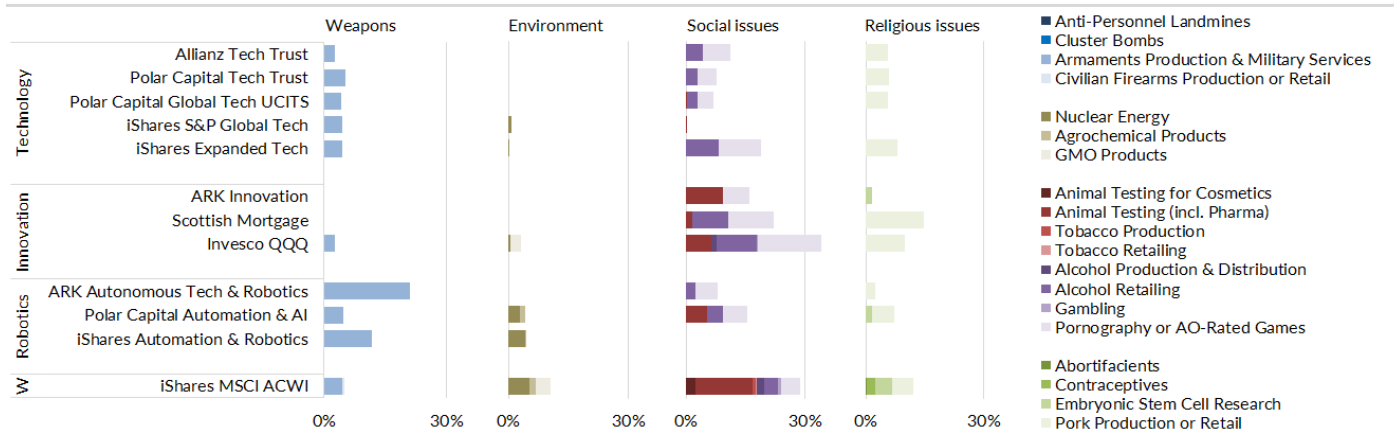
Apart from RBOT, the funds do not have explicit ESG exclusion criteria. RBOT does not invest in companies involved in weapons, tobacco, nuclear power, thermal coal, oil & gas, and companies involved in severe ESG controversies.

The chart below shows the funds' cumulative weighted exposures to companies that are involved in any way in the controversial product/service shown; holdings that are involved in multiple controversial products are counted multiple times. The full portfolio weight of a company is included even if only a very small proportion of that company's revenues are related to the controversial area.

The screen for "Armaments Production & Military Services" tends to capture a lot of semiconductor companies. "Alcohol Retailing" captures ecommerce-related companies like Amazon. "Pornography or AO-Rated Games" screens capture companies that sell games or books like Amazon and Netflix.

Where investors have specific ESG concerns, a closer inspection of portfolio holdings lists is required to assess holdings on a case-by-case basis.

**Figure 16. Proportion of portfolio stocks involved in controversial products\***



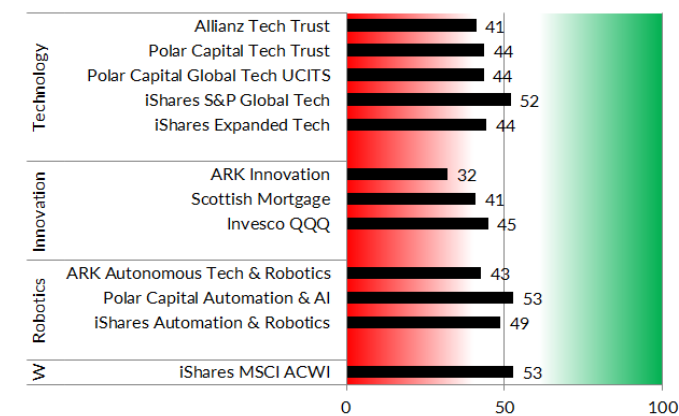
\*Proportions shown are based on stocks' full weightings in portfolios, irrespective of how little of a company's operations relate to a controversial product. Companies involved in more than one controversial product are double-counted.  
Source: Forsyth Barr analysis, Refinitiv

**ESG ratings and carbon intensity**

Most of the fund portfolios have below-average ESG Combined Scores from Refinitiv. This reflects their high weightings in large tech companies, which have been involved in numerous controversies.

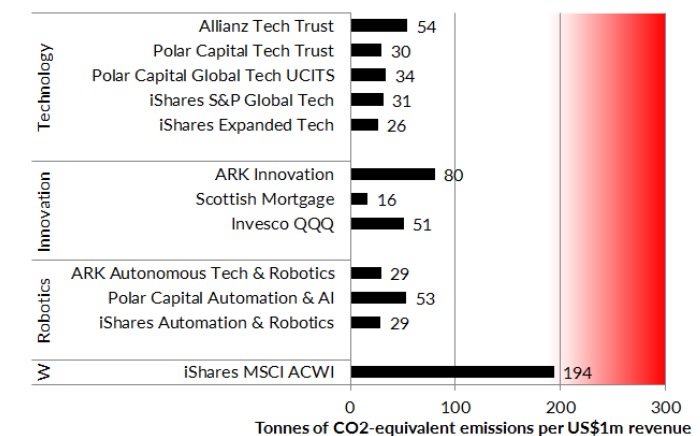
The funds have significantly below-average carbon intensity.

**Figure 17. Refinitiv ESG Combined Score (scores/100)**



Source: Forsyth Barr analysis, Refinitiv

**Figure 18. CO2-equivalent emissions (t per US\$1m revenue)**

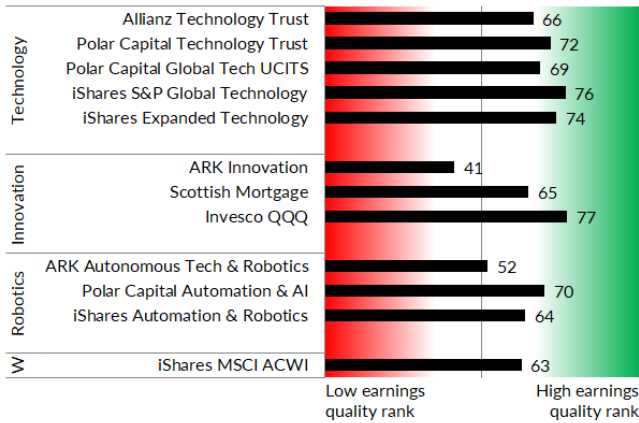


Source: Forsyth Barr analysis, Refinitiv

**Quality**

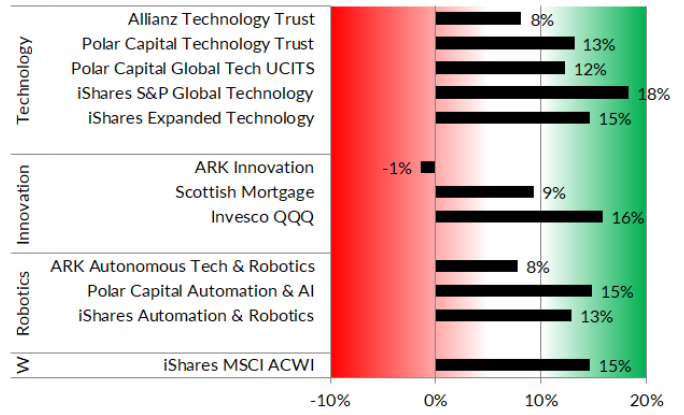
The lower earnings quality and EBIT margin metrics of ARKK, ARKQ, SMT and ATT likely reflect their tilts to early-stage companies.

**Figure 19. Earnings quality of portfolio (avg global rank/100)**



Source: Forsyth Barr analysis, Refinitiv

**Figure 20. EBIT margin of portfolio stocks**

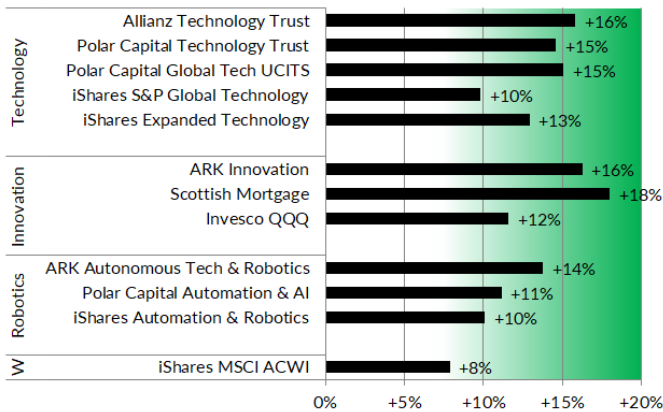


Source: Forsyth Barr analysis, Refinitiv

**Growth**

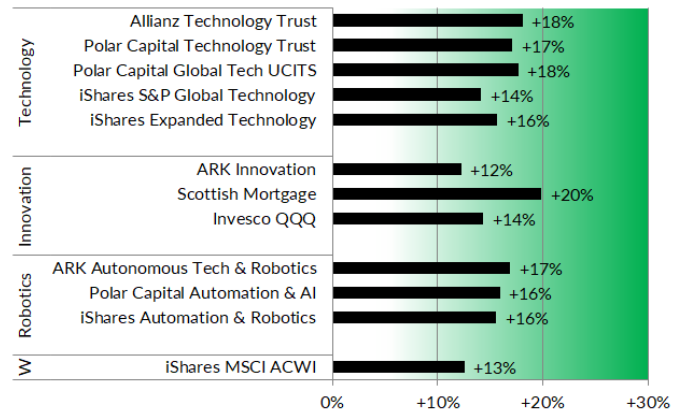
Consensus growth expectations for the stocks owned by the actively managed funds, particularly SMT and ATT, are slightly higher than passive peers. ARKK's portfolios include earlier-stage companies that are not yet profitable, whose future earnings growth prospects may not be well reflected in consensus data. 17% of SMT's portfolio is in unlisted companies, for which no data is available.

**Figure 21. Revenue growth of portfolio stocks (12m fwd)**



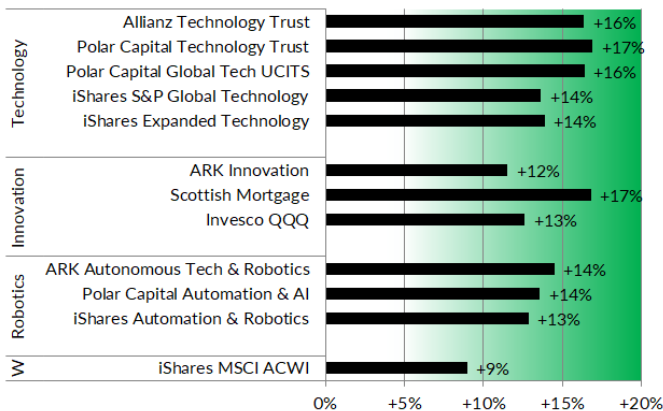
Source: Forsyth Barr analysis, Refinitiv

**Figure 22. EPS growth of portfolio stocks (12m fwd)**



Source: Forsyth Barr analysis, Refinitiv

**Figure 23. Long-term EPS growth outlook (3-5yrs fwd)**

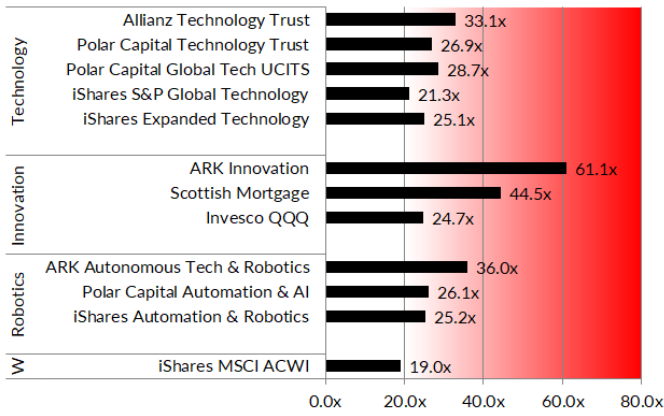


Source: Forsyth Barr analysis, Refinitiv

**Valuation**

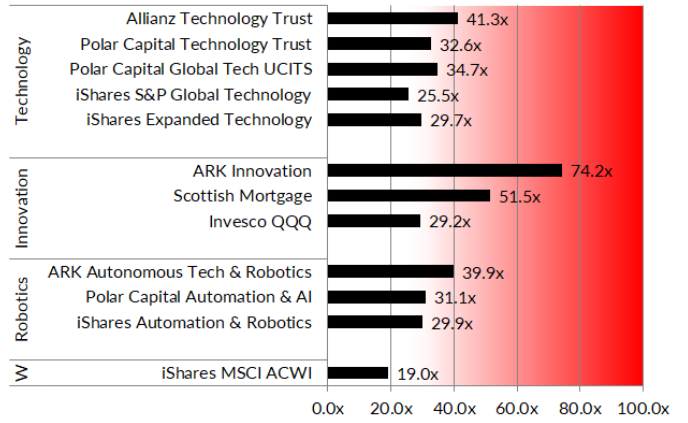
The higher growth outlooks of the actively managed funds are reflected in higher valuation multiples and lower yields. ARKK, SMT, ARKQ and ATT stand out for having higher valuations than their peers.

**Figure 24. EV/EBIT of portfolio stocks (12m fwd)**



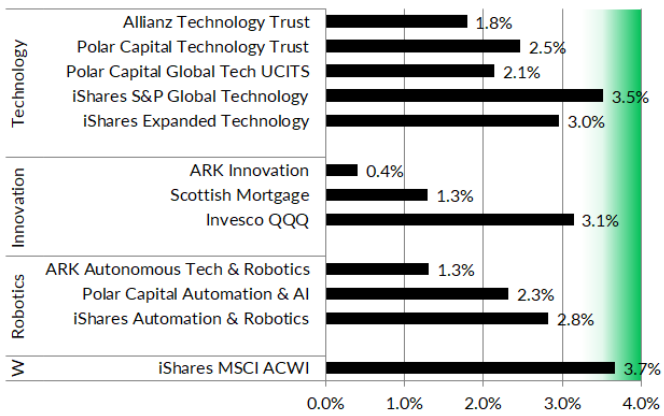
Source: Forsyth Barr analysis, Refinitiv

**Figure 25. Price/Earnings of portfolio stocks (12m fwd)**



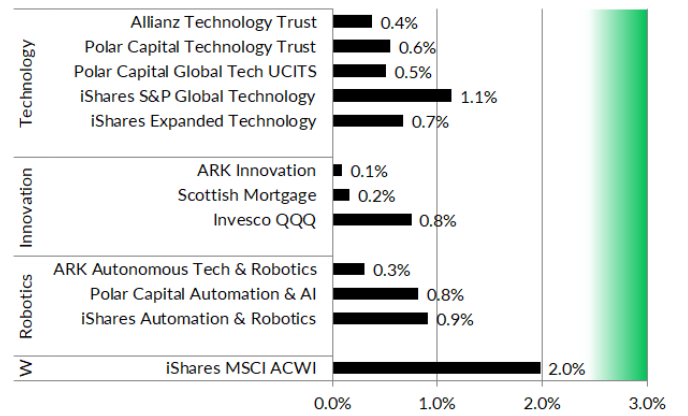
Source: Forsyth Barr analysis, Refinitiv

**Figure 26. Free cashflow yield of portfolio stocks (current FY)**



Source: Forsyth Barr analysis, Refinitiv

**Figure 27. Dividend yield of portfolio stocks (current FY)**

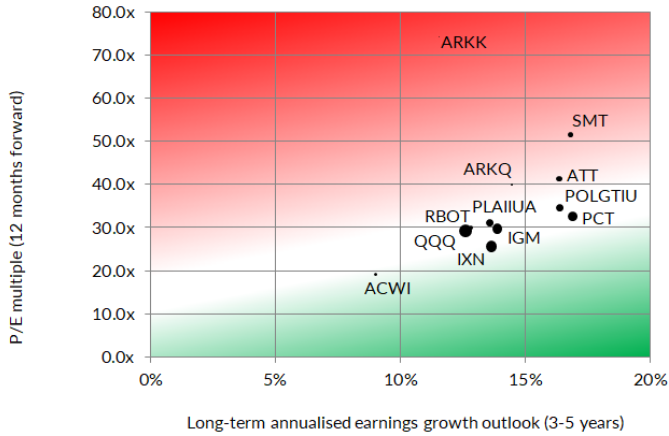


Source: Forsyth Barr analysis, Refinitiv

**Valuation vs Growth**

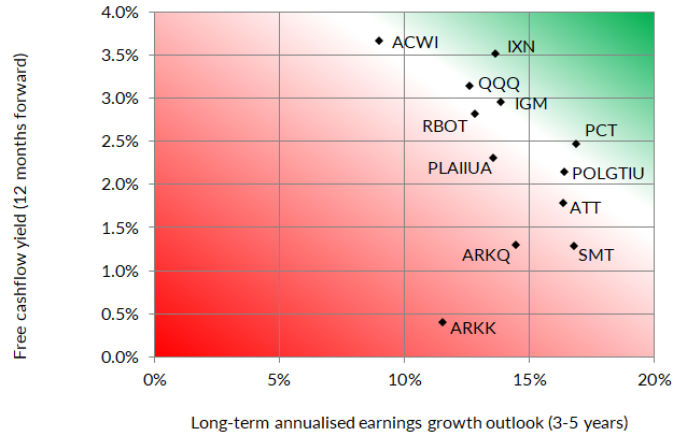
Comparing earnings valuations to analysts' estimates of long-term earnings growth rates, ARKK and SMT look particularly expensive. Given their managers' long investment horizons (5+ years), these high valuations might be justified by a longer growth runway than at the more mature companies that comprise their peers' portfolios (particularly the passive funds).

**Figure 28. P/E & long-term growth & earnings quality (bubble)**



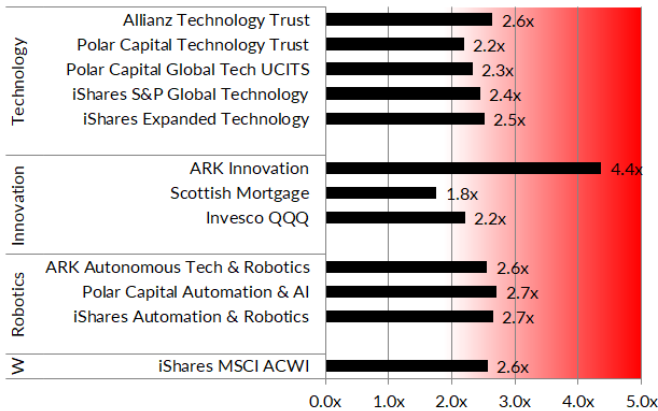
Source: Forsyth Barr analysis, Refinitiv

**Figure 29. Free cashflow yield & long-term growth outlook**



Source: Forsyth Barr analysis, Refinitiv

**Figure 30. PEG ratio (P/E : EPS Growth)**

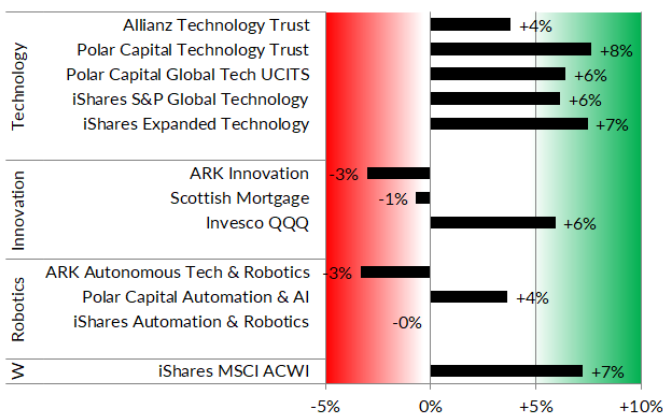


Source: Forsyth Barr analysis, Refinitiv

**Sentiment**

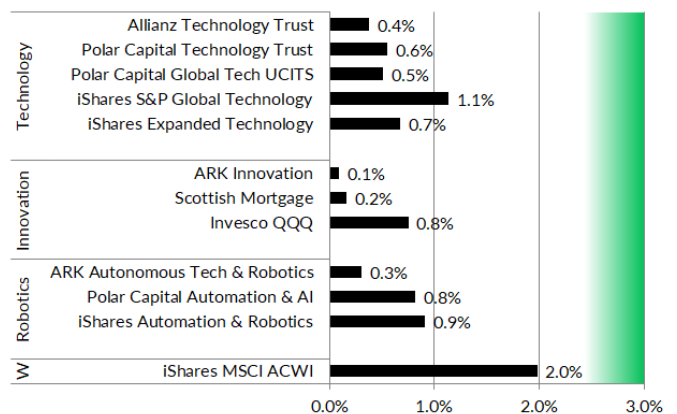
Average analyst sentiment and capital return expectations for the stocks held by the funds are generally positive.

**Figure 31. Consensus capital return expectations for stocks**



Source: Forsyth Barr analysis, Refinitiv

**Figure 32. Forecast portfolio div yield for current fiscal year**

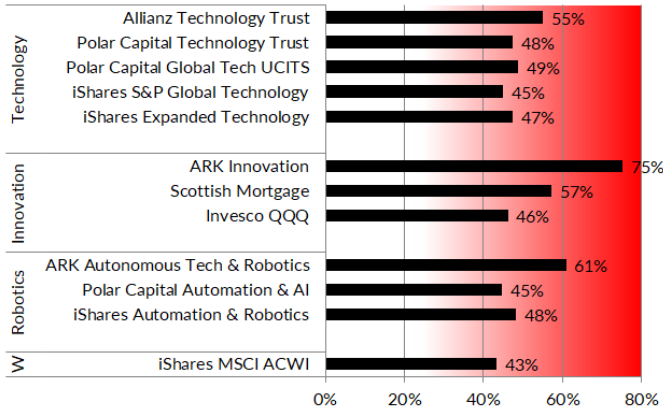


Source: Forsyth Barr analysis, Refinitiv

**Volatility & risk**

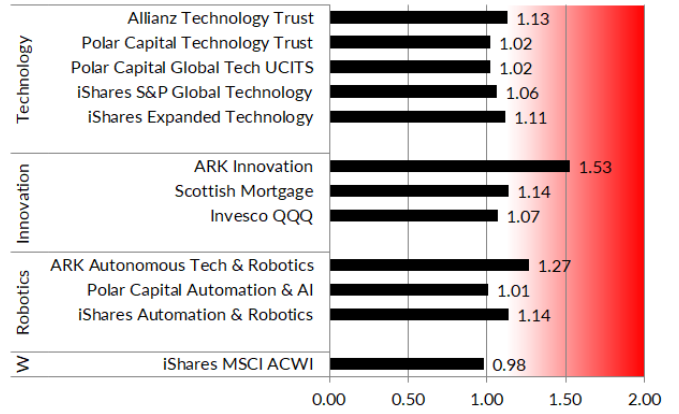
The portfolios of ARKK, ARKQ, SMT and ATT have more volatile stocks than peers, although average betas for SMT and ATT are in the middle of the pack. Debt metrics are shown for completeness but are of limited relevance in the tech/innovation sectors.

**Figure 33. Share price volatility (average standard deviation pa)**



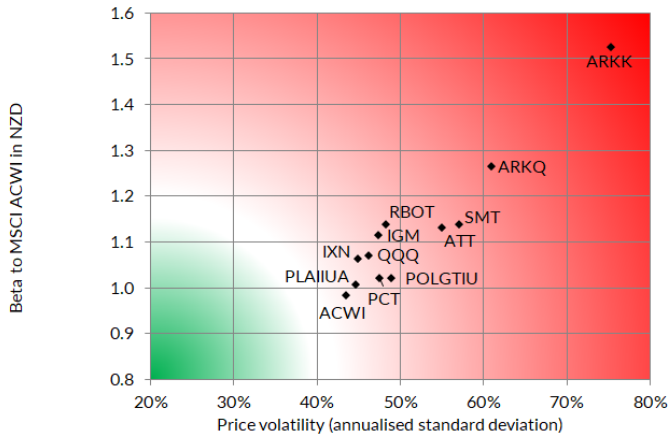
Source: Forsyth Barr analysis, Refinitiv

**Figure 34. Stock betas to MSCI ACWI in NZD (weighted avg)**



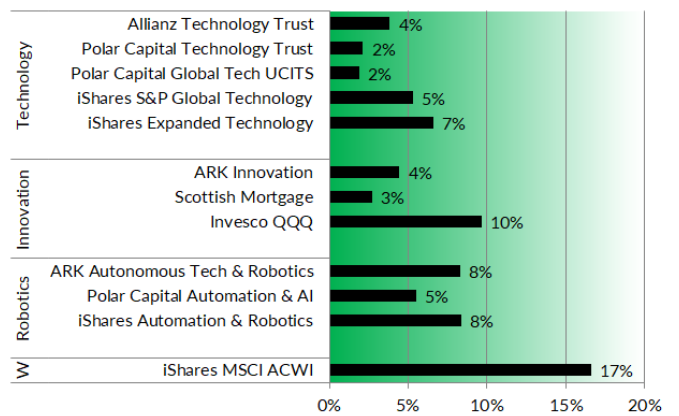
Source: Forsyth Barr analysis, Refinitiv

**Figure 35. Price volatility & beta of portfolio stocks**



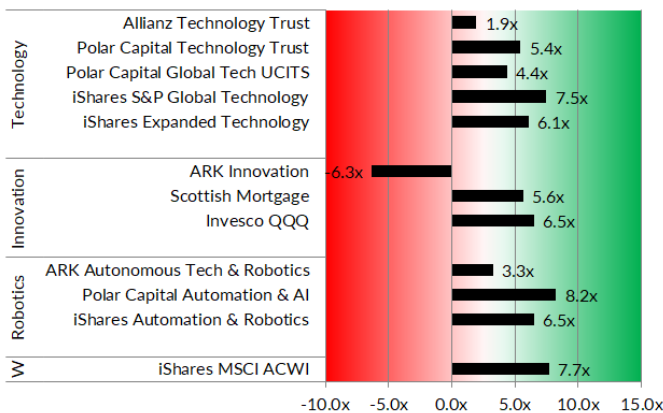
Source: Forsyth Barr analysis, Refinitiv

**Figure 36. Net debt to enterprise value (portfolio weighted avg)**



Source: Forsyth Barr analysis, Refinitiv

**Figure 37. EBIT interest cover ratio (portfolio weighted average)**



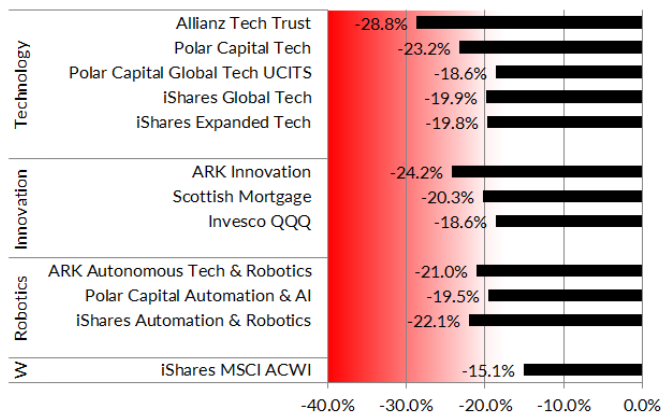
Source: Forsyth Barr analysis, Refinitiv

## VII. Risk & Return

### Historical volatility

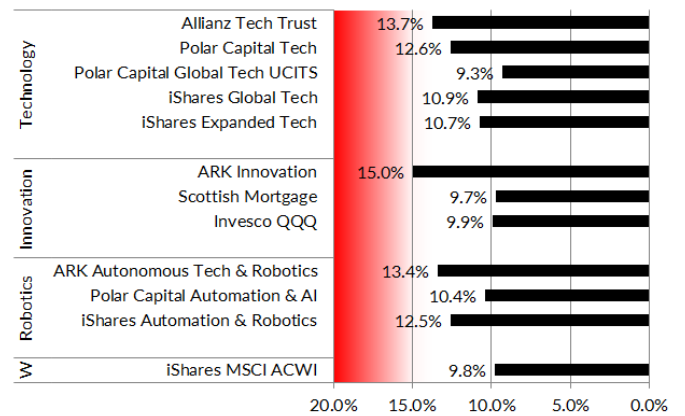
While the volatility metrics above showed the averages of the individual stocks held in each fund's portfolio, the metrics below show the actual volatility of the fund prices over the last three years. Unlike the metrics above, these numbers take into account correlations between portfolio stocks, impacts from changes in portfolio holdings, cash, gearing and discount swings. ARKK and ATT stand out for having had deeper drawdowns and more volatile prices than peers. Due to discount swings, PCT has been more volatile than its sister fund POLGTIU.

**Figure 38. Maximum drawdown in reference period (last 3yrs)**



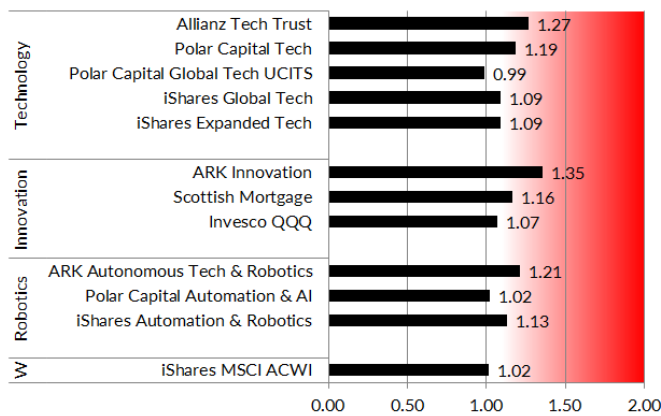
Source: Forsyth Barr analysis, Bloomberg

**Figure 39. Downside deviation\* (annualised, last 3yrs)**



\* Standard deviation of monthly returns below 5% pa. Source: Forsyth Barr analysis

**Figure 40. Beta of fund price to MSCI ACWI**



Source: Forsyth Barr analysis, Bloomberg

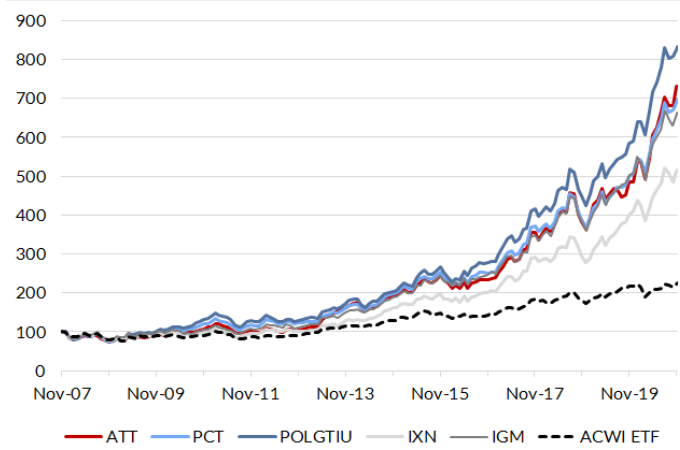
## Historical returns

To isolate the performance of the fund managers in managing their portfolios (which may be repeatable) from the performance of the trusts' boards in managing their discounts (whose narrowing over the past decade is not repeatable), we show the funds' historical NAV returns, rather than their price returns. This shows that the portfolios of the actively managed funds have generally performed as well as or better than their passive peers.

### Technology funds

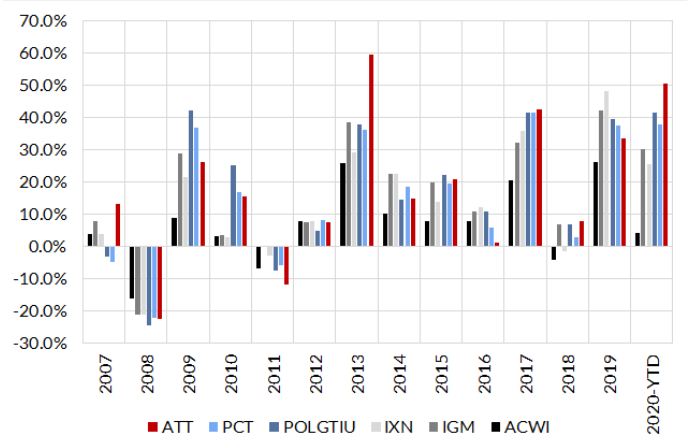
POLGTIU and ATT have been the top performers in our Technology peer group. PCT has slightly lagged behind its POLGTIU sister fund due to higher average cash weightings.

**Figure 41. Cumulative NAV total returns (NZD, 2007–2020)**



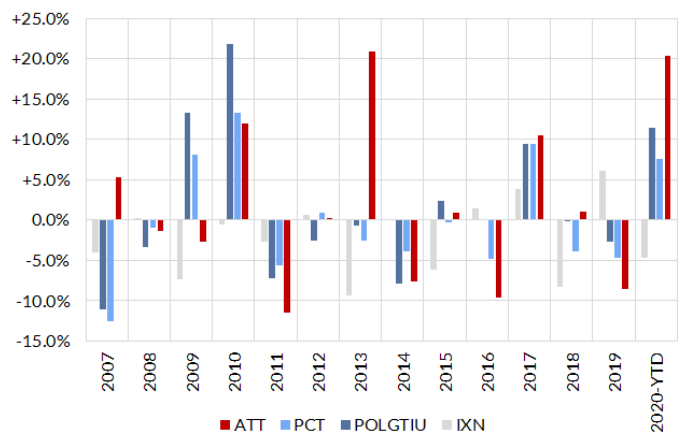
POLGTIU shows composite return series, using POCFGTU share class prior to October 2009.  
Source: Forsyth Barr analysis, Bloomberg

**Figure 42. Annual NAV total returns (NZD, 2007–2020)**



Source: Forsyth Barr analysis, Bloomberg

**Figure 43. NAV outperformance vs iShares Extended Tech**

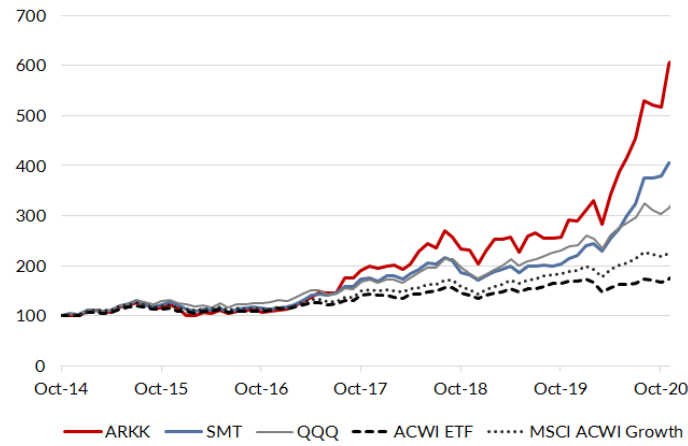


Source: Forsyth Barr analysis, Bloomberg

**Innovation funds**

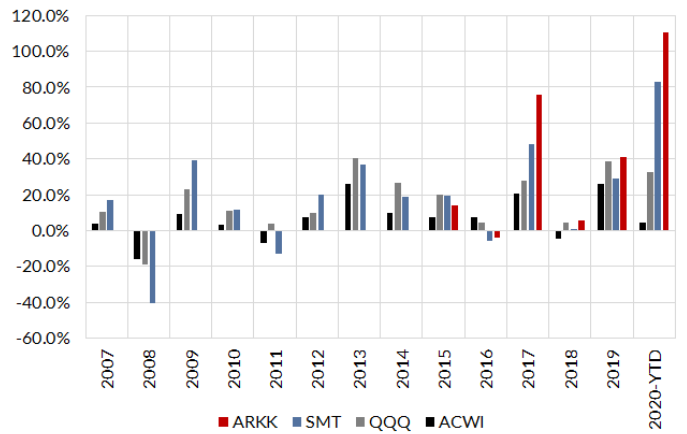
Since its inception in 2014, ARKK has outperformed SMT in every calendar year, with particularly strong runs in 2017 and 2020, when SMT also had strong years compared to QQQ. All three have outperformed compared to the MSCI ACWI Growth index, which in turn has outperformed against the broader MSCI ACWI.

**Figure 44. Cumulative NAV total returns (NZD, 2014-2020)**



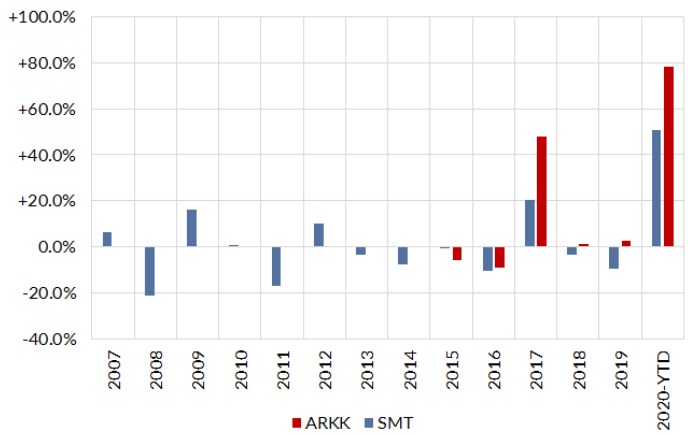
Source: Forsyth Barr analysis, Bloomberg

**Figure 45. Annual NAV total returns (NZD, 2007-2020)**



Source: Forsyth Barr analysis, Bloomberg

**Figure 46. NAV outperformance vs Invesco QQQ**

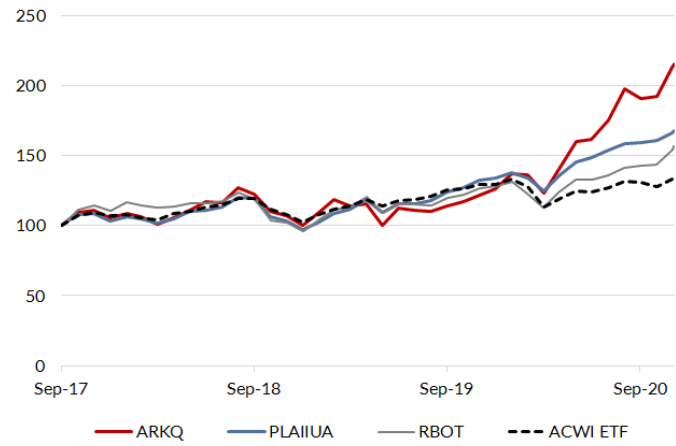


Source: Forsyth Barr analysis, Bloomberg

**Robotics & Artificial Intelligence funds**

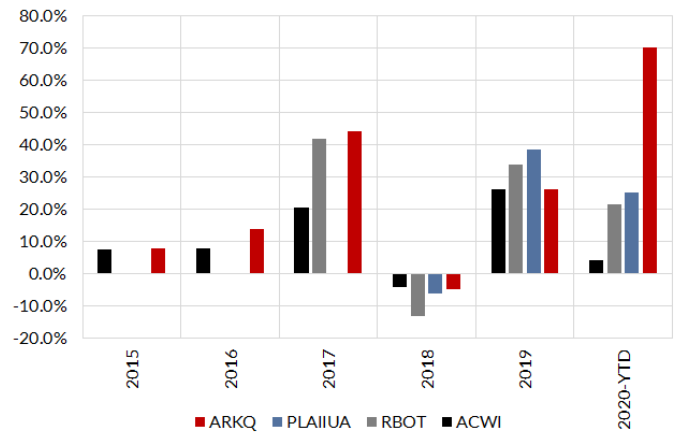
It is difficult to read much into the short performance histories of PLAIUA and RBOT, but for what it's worth the robotics funds performed broadly similarly from 2015 until 2019 and 2020, when PLAIUA and ARKQ respectively had strong years.

**Figure 47. Cumulative NAV total returns (NZD, 2017–2020)**



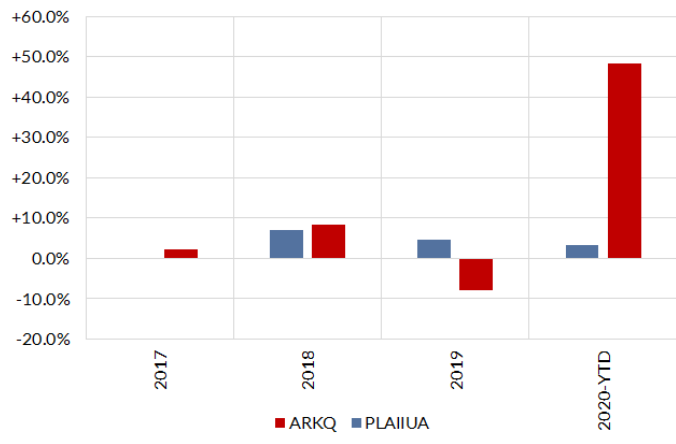
Source: Forsyth Barr analysis, Bloomberg

**Figure 48. Annual NAV total returns (NZD, 2015–2020)**



Source: Forsyth Barr analysis, Bloomberg

**Figure 49. NAV outperformance vs iShares Autom. & Robotics**



Source: Forsyth Barr analysis, Bloomberg

## VIII. Discounts to Net Asset Value

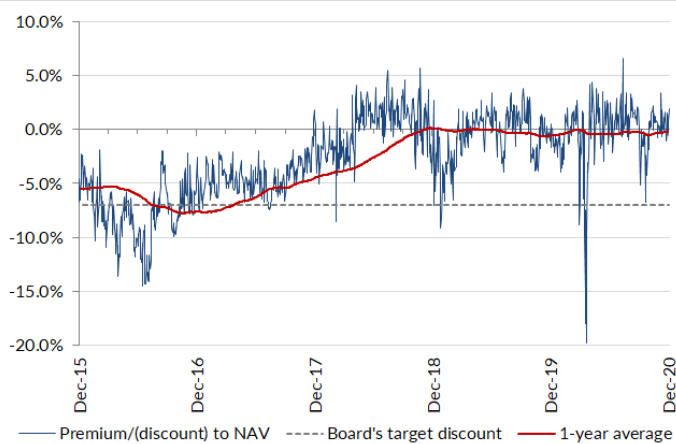
POLGTIU and PLAIUA are bought and sold at NAV. Arbitrage activity by market makers ensures that the passive ETFs usually trade close to NAV during normal market conditions (exceptions can arise during periods of extreme volatility).

The prices of the listed, closed-end funds depend on the balance between the demand for and supply of their shares, which seems to be determined by factors like strength of past performance and dividend yield. As a result, they can trade at discounts or premiums to their NAVs. Some trusts' boards manage these discounts and premiums more actively than others do; buying back shares at a discount and selling at a premium is usually value accretive to remaining shareholders.

- ATT's board has defended an explicit discount target of -7%.
- PCT's board has not communicated any discount target and has not used buybacks to manage the discount. Changes in the discount add to the volatility of the fund, offsetting the manager's efforts to provide a relatively conservative portfolio (by tech fund standards).
- SMT's board has not communicated an explicit discount target, but the large fund size allows the board to keep the discount in a narrow band around NAV in normal market conditions, through share buybacks when the discount exceeds a few percent and share issuance at a premium.

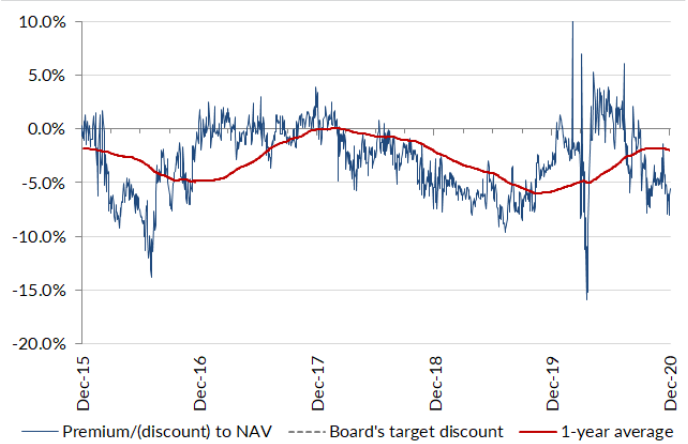
Except during the most volatile period in March 2020, ATT and SMT have faced little pressure on their discounts in recent years. This was likely helped by their very strong performances. Their boards have used periods of strong demand to issue shares at a premium, which is value-accretive to existing shareholders and helps spread fixed fund costs across a bigger asset base, and a bigger asset base helps the boards to pressure the managers to reduce their fees.

Figure 50. Allianz Technology Trust



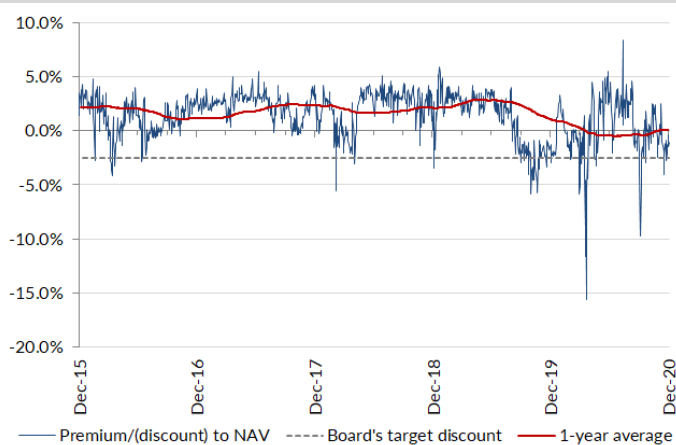
Source: Forsyth Barr analysis, Refinitiv

Figure 51. Polar Capital Technology



PCT does not have a discount target. Source: Forsyth Barr analysis, Refinitiv

Figure 52. Scottish Mortgage



Supported discount level is not explicit. Source: Forsyth Barr analysis, Refinitiv

## Appendix A – Data Tables

### Fund expenses

Figure 53. Management costs & discounts to net asset value

Sector	Technology					Innovation			Robotics			World
	Allianz Tech Trust	Polar Capital Tech Trust	Polar Capital Global Tech UCITS	iShares S&P Global Tech	iShares Expanded Tech	ARK Innovation	Scottish Mortgage	Invesco QQQ	ARK Autonomous Tech & Robotics	Polar Capital Automation & AI	iShares Automation & Robotics	iShares MSCI ACWI
Fund	ATT	PCT	POLGTIU	IXN	IGM	ARKK	SMT	QQQ	ARKQ	PLAIUA	RBOT	ACWI
<b>Fees</b>												
Ongoing charges figure p.a.	0.92%	0.93%	1.13%	0.46%	0.46%	0.75%	0.36%	0.20%	0.75%	0.94%	0.40%	0.32%
Performance fee	12.5%	10%	10%	0%	0%	0%	0%	0%	0%	10%	0%	0%
Performance fee hurdle	DJ World Tech	DJ Global Tech	DJ Global Tech	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	MSCI ACWI	n.a.	n.a.
<b>Premium/(discount) to NAV</b>												
Current - reported	+1.9%	-5.5%	0%	+0.0%	-0.0%	+0.1%	-1.0%	+0.1%	+0.0%	0%	+0.6%	-0.1%
Current - estimated	+2.3%	-5.1%	0%	+0.0%	-0.0%	+0.1%	-1.0%	+0.1%	+0.0%	0%	+0.6%	-0.1%
3-month average	-0.2%	-4.2%	0%	-0.1%	+0.0%	+0.1%	-0.8%	+0.0%	+0.1%	0%	+0.1%	+0.0%
12-month average	-0.3%	-1.9%	0%	-0.0%	+0.1%	+0.1%	+0.1%	-0.0%	+0.1%	0%	-0.0%	-0.0%
3-year average	-0.2%	-3.2%	0%	+0.0%	+0.0%	+0.1%	+1.1%	-0.0%	+0.0%	0%	-0.0%	+0.0%
Board's discount support level	-7%	None	n.a.	n.a.	n.a.	n.a.	c.-2-4%	n.a.	n.a.	n.a.	n.a.	n.a.

Source: Forsyth Barr analysis, Refinitiv

### Sector & regional exposures

Figure 54. Sector & regional weightings in fund portfolios

Sector	Technology					Innovation			Robotics			World
	Allianz Tech Trust	Polar Capital Tech Trust	Polar Capital Global Tech UCITS	iShares S&P Global Tech	iShares Expanded Tech	ARK Innovation	Scottish Mortgage	Invesco QQQ	ARK Autonomous Tech & Robotics	Polar Capital Automation & AI	iShares Automation & Robotics	iShares MSCI ACWI
Fund	ATT	PCT	POLGTIU	IXN	IGM	ARKK	SMT	QQQ	ARKQ	PLAIUA	RBOT	ACWI
<b>Sectors</b>												
Information Technology	73%	63%	60%	100%	70%	29%	9%	47%	50%	43%	68%	21%
Consumer Discretionary	12%	9%	11%	0%	10%	10%	50%	19%	23%	11%	4%	13%
Financials	0%	0%	0%	0%	0%	4%	1%	0%	0%	3%	0%	13%
Health Care	1%	0%	0%	0%	0%	35%	8%	6%	1%	8%	2%	12%
Industrials	0%	3%	4%	0%	0%	3%	1%	2%	17%	19%	22%	10%
Communication Services	9%	21%	19%	0%	20%	18%	11%	20%	8%	9%	4%	9%
Consumer Staples	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%	8%
Materials	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	5%
Energy	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%
Real Estate	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%	3%
Utilities	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	3%
Other e.g. unlisted, cash	4%	4%	6%	0%	0%	0%	19%	0%	0%	4%	0%	1%
<b>Sector styles</b>												
Defensives: H'care, Staples, Utilities	1%	0%	0%	0%	0%	35%	8%	12%	1%	8%	2%	23%
Expanded tech: IT, Discr., Comm's	94%	93%	90%	100%	100%	57%	70%	86%	82%	63%	76%	43%
Cyclicals: Fin's, Industrials, REITs	1%	3%	4%	0%	0%	8%	3%	2%	17%	22%	22%	26%
Resources: Materials, Energy	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	8%
Other e.g. unlisted, cash	4%	4%	6%	0%	0%	0%	19%	0%	0%	4%	0%	1%
<b>Regions</b>												
America	88%	75%	71%	81%	100%	100%	57%	100%	100%	50%	60%	64%
Europe	3%	5%	6%	6%	0%	0%	15%	0%	0%	19%	13%	17%
Asia	5%	16%	16%	12%	0%	0%	9%	0%	0%	27%	27%	17%
Oceania	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%
Africa	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other e.g. unlisted, cash	4%	4%	6%	0%	0%	0%	19%	0%	0%	4%	0%	0%

Source: Forsyth Barr analysis, Refinitiv

## ESG characteristics

### Negative ESG screens

Figure 55. Portfolio exposure to companies involved in controversial product & services (weighted % of portfolio)

Sector Fund	Technology					Innovation			Robotics			World
	Allianz Tech Trust	Polar Capital Tech Trust	Polar Capital Global Tech UCITS	iShares S&P Global Tech	iShares Expanded Tech	ARK Innovation	Scottish Mortgage	Invesco QQQ	ARK Autono- mous Tech & Robotics	Polar Capital Automa- tion & AI	iShares Automa- tion & Robotics	iShares MSCI ACWI
Fund code	ATT	PCT	POLGTIU	IXN	IGM	ARKK	SMT	QQQ	ARKQ	PLAIUUA	RBOT	ACWI
<b>Weapons</b>												
Anti-Personnel Landmines	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Cluster Bombs	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Armaments / Military Services	3%	5%	4%	4%	4%	0%	0%	3%	21%	5%	12%	4%
Civilian Firearms Production or Retail	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>Environmental controversies</b>												
Nuclear Energy	0%	0%	0%	1%	0%	0%	0%	1%	0%	3%	4%	5%
Agrochemical Products	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	2%
GMO Products	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	4%
<b>Social controversies</b>												
Animal Testing for Cosmetics	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%
Animal Testing (incl. Pharma)	0%	0%	0%	0%	0%	9%	2%	6%	0%	5%	0%	14%
Tobacco Production	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
Tobacco Retailing	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Alcohol Production & Distribution	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	2%
Alcohol Retailing	4%	3%	3%	0%	8%	0%	9%	10%	2%	4%	0%	4%
Gambling	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
Pornography or AO-Rated Games	7%	5%	4%	0%	11%	7%	11%	16%	5%	6%	0%	5%
<b>Religious controversies</b>												
Abortifacients	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Contraceptives	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%
Embryonic Stem Cell Research	0%	0%	0%	0%	0%	2%	0%	0%	0%	2%	0%	4%
Pork Production or Retail	6%	6%	6%	0%	8%	0%	15%	10%	2%	6%	0%	5%
<b>Total % of portfolio</b>	<b>20%</b>	<b>19%</b>	<b>17%</b>	<b>5%</b>	<b>32%</b>	<b>18%</b>	<b>37%</b>	<b>50%</b>	<b>31%</b>	<b>32%</b>	<b>16%</b>	<b>56%</b>

Full company weight shown, even if controversial product/service involvement is only a very small part of company activity and revenue.

No ESG data is included for private companies, funds, derivatives and cash; small caps and recent listings are often excluded from coverage.

Source: Refinitiv, Forsyth Barr analysis

### Positive ESG screens

Figure 56. Portfolio exposure to companies with certain positive ESG policies/characteristics (weighted % of portfolio)

Sector Fund	Technology					Innovation			Robotics			World
	Allianz Tech Trust	Polar Capital Tech Trust	Polar Capital Global Tech UCITS	iShares S&P Global Tech	iShares Expanded Tech	ARK Innovation	Scottish Mortgage	Invesco QQQ	ARK Autono- mous Tech & Robotics	Polar Capital Automa- tion & AI	iShares Automa- tion & Robotics	iShares MSCI ACWI
Fund code	ATT	PCT	POLGTIU	IXN	IGM	ARKK	SMT	QQQ	ARKQ	PLAIUUA	RBOT	ACWI
<b>Health</b>												
Healthy Products	11%	6%	7%	4%	11%	10%	38%	23%	28%	13%	7%	18%
Organic Products Initiatives	5%	4%	4%	0%	8%	0%	17%	16%	5%	6%	0%	10%
Obesity Risk Reduction	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	3%
<b>Environment</b>												
Environmental Products	45%	48%	57%	85%	67%	15%	45%	72%	56%	68%	71%	68%
Renewable / Clean Energy Products	12%	6%	7%	13%	8%	13%	14%	10%	20%	16%	25%	22%
Water Technologies	1%	1%	1%	1%	1%	0%	1%	1%	5%	9%	9%	9%
Hybrid Vehicles	8%	2%	3%	5%	4%	10%	18%	6%	21%	10%	12%	6%
Sustainable Building Products	2%	0%	1%	5%	4%	0%	0%	3%	3%	6%	6%	6%
Real Estate Sustainability Certification	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%
Fossil Fuel Divestment Policy	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
<b>Social</b>												
Animal Testing Reduction	0%	0%	0%	0%	0%	0%	0%	4%	0%	4%	0%	12%
<b>Religious</b>												
Shariah Compliant	13%	16%	13%	16%	14%	18%	23%	16%	40%	19%	26%	20%
<b>Total % of portfolio</b>	<b>96%</b>	<b>82%</b>	<b>93%</b>	<b>130%</b>	<b>117%</b>	<b>65%</b>	<b>155%</b>	<b>153%</b>	<b>178%</b>	<b>150%</b>	<b>157%</b>	<b>181%</b>

Full company weight shown, even if controversial product/service involvement is only a very small part of company activity and revenue (e.g. Organic Products Initiatives includes the full portfolio weightings of Amazon and Inditex, which derive only a small proportion of revenues from organic products).

No ESG data is included for private companies, funds, derivatives and cash; small caps and recent listings are often excluded from coverage.

Source: Refinitiv, Forsyth Barr analysis

**ESG ratings**
**Figure 57. Refinitiv ESG Scores (scores 0–100; higher scores are better)**

Sector Fund	Technology					Innovation			Robotics			World
	Allianz Tech Trust	Polar Capital Tech Trust	Polar Capital Global Tech UCITS	iShares S&P Global Tech	iShares Expanded Tech	ARK Innovation	Scottish Mortgage	Invesco QQQ	ARK Autono- mous Tech & Robotics	Polar Capital Automa- tion & AI	iShares Automa- tion & Robotics	iShares MSCI ACWI
Fund code	ATT	PCT	POLGTIU	IXN	IGM	ARKK	SMT	QQQ	ARKQ	PLAIUA	RBOT	ACWI
Portfolio ESG coverage	* 95%	88%	94%	100%	100%	89%	80%	100%	94%	94%	96%	99%
<b>Overall ESG scores</b>												
ESG Combined Score	** 41	44	44	52	44	32	41	45	43	53	49	53
ESG Controversies Score	<sup>^</sup> 64	55	47	44	41	82	46	32	70	73	86	57
ESG Score	<sup>^*</sup> 52	56	60	72	63	35	55	67	51	60	52	66
1-year change in ESG Score	<sup>^^</sup> +3.3	+1.9	+1.7	+0.3	+1.4	+3.6	+4.7	+2.1	+3.3	+2.7	+4.1	+1.7
<b>Environment factors</b>												
Environment Pillar Score	40	45	50	64	56	17	49	61	41	56	45	63
Resource Use Score	51	61	67	84	74	22	59	77	51	69	49	74
Emissions Score	46	55	60	78	69	16	54	71	43	63	49	70
Environmental Innovation Score	27	29	33	45	37	13	37	43	31	40	40	44
<b>Social factors</b>												
Social Pillar Score	56	62	64	77	69	41	59	70	51	64	55	70
Workforce Score	60	68	72	83	79	40	60	77	48	72	58	75
Human Rights Score	42	50	54	73	62	16	39	64	39	56	47	60
Community Score	66	70	72	84	79	57	70	80	68	66	63	76
Product Responsibility Score	48	53	56	64	53	38	62	59	51	62	50	64
<b>Governance factors</b>												
Governance Pillar Score	53	56	60	72	62	40	53	68	58	57	53	64
Management Score	56	59	65	75	66	46	55	73	64	60	57	67
Shareholders Score	48	51	51	65	51	37	53	56	56	51	51	55
CSR Strategy Score	41	44	50	70	59	16	43	63	35	53	38	64
Diversity inclusion in workplace	55	53	54	60	56	49	56	55	53	56	54	58
CO2 emitted (t) per US\$1m revenue	54	30	34	31	26	80	16	51	29	53	29	194

\* No ESG data is included for unlisted investments, funds, derivatives and cash; small caps and recent listings are often excluded from coverage

\*\* ESG Combined Score is the ESG Score adjusted for the ESG Controversies Score

<sup>^</sup> ESG Controversies Score: Higher score = fewer controversies

<sup>^\*</sup> ESG Score: Combination of the Environmental Pillar Score, Social Pillar Score and Governance Pillar Score

<sup>^^</sup> Average change in the ESG Score of recent portfolio stocks compared to a year ago

Source: Forsyth Barr analysis, Refinitiv

## Portfolio fundamentals

Figure 58. Fundamental characteristics of portfolio stocks (weighted averages of portfolio stocks; Refinitiv consensus)

Sector Fund	Technology					Innovation			Robotics			World
	Allianz Tech Trust	Polar Capital Tech Trust	Polar Capital Global Tech	iShares S&P Global Tech	iShares Expanded Tech	ARK Innovation	Scottish Mortgage	Invesco QQQ	ARK Autonom- ous Tech &	Polar Capital Auto- mation & Robotics	iShares Auto- mation & Robotics	iShares MSCI ACWI
Fund code	ATT	PCT	POLGTIU	IXN	IGM	ARKK	SMT	QQQ	ARKQ	PLAIUUA	RBOT	ACWI
<b>Composition</b>												
Number of holdings reported	72	103	111	132	296	48	106	104	39	78	153	2278
Market cap NZ\$m	550	910	620	1,099	968	137	632	1,157	299	402	126	424
Average daily value traded NZ\$m	1,211	4,553	1,072	1,601	1,494	751	2,196	1,978	1,069	755	318	722
Analyst coverage	96%	96%	94%	100%	100%	100%	81%	100%	101%	96%	99%	99%
<b>Growth</b>												
Revenue growth rate 12m fwd	+16%	+15%	+15%	+10%	+13%	+16%	+18%	+12%	+14%	+11%	+10%	+8%
EPS growth rate 12m fwd	+18%	+17%	+18%	+14%	+16%	+12%	+20%	+14%	+17%	+16%	+16%	+13%
Long term growth outlook	+16%	+17%	+16%	+14%	+14%	+12%	+17%	+13%	+14%	+14%	+13%	+9%
Forecast 5yr EPS growth (StarMine)	+14%	+13%	+13%	+10%	+11%	+10%	+13%	+11%	+11%	+12%	+10%	+7%
Forecast 10yr EPS growth (StarMine)	+12%	+11%	+11%	+9%	+10%	+10%	+12%	+10%	+10%	+10%	+9%	+8%
<b>Quality</b>												
Earnings Quality region rank/100	66	72	69	76	74	41	65	77	52	70	64	63
Return on equity	11%	14%	13%	16%	17%	-3%	14%	18%	9%	15%	12%	12%
Return on assets	8%	12%	10%	16%	13%	-1%	6%	13%	8%	11%	9%	8%
EBIT margin	8%	13%	12%	18%	15%	-1%	9%	16%	8%	15%	13%	15%
<b>Value</b>												
Value-Momentum global rank/100	45	46	42	49	45	29	37	49	38	44	42	52
Price to Intrinsic Value global rank/100	17	21	19	27	21	10	11	23	20	22	22	40
Relative Value global rank/100 (Trailing)	18	23	21	29	26	7	13	28	19	24	26	45
Price / Book	8.5x	6.6x	7.6x	5.9x	8.2x	8.3x	8.8x	7.0x	3.8x	5.9x	4.9x	2.5x
EV to EBIT 12m trailing	38.4x	32.1x	33.0x	27.1x	31.3x	75.4x	63.5x	30.8x	45.4x	31.2x	31.2x	22.7x
P/E 5yr trailing	24.8x	27.5x	29.3x	23.6x	30.4x	36.2x	39.7x	27.8x	28.5x	25.9x	26.2x	19.8x
P/E 12m trailing	50.3x	39.4x	41.2x	34.4x	39.1x	89.7x	59.1x	38.6x	44.7x	41.3x	38.5x	24.9x
<b>(Forward-looking)</b>												
Forward net dividend yield	0.4%	0.6%	0.5%	1.1%	0.7%	0.1%	0.2%	0.8%	0.3%	0.8%	0.9%	2.0%
Forward free cashflow yield	1.8%	2.5%	2.1%	3.5%	3.0%	0.4%	1.3%	3.1%	1.3%	2.3%	2.8%	3.7%
EV to EBIT 12m fwd	33.1x	26.9x	28.7x	21.3x	25.1x	61.1x	44.5x	24.7x	36.0x	26.1x	25.2x	19.0x
P/E:Growth ratio	2.6x	2.2x	2.3x	2.4x	2.5x	4.4x	1.8x	2.2x	2.6x	2.7x	2.7x	2.6x
P/E 12m fwd	41.3x	32.6x	34.7x	25.5x	29.7x	74.2x	51.5x	29.2x	39.9x	31.1x	29.9x	19.0x
<b>Investor sentiment</b>												
Average analyst rating	BUY	BUY	BUY	BUY	BUY	BUY	BUY	BUY	BUY	BUY	BUY	BUY
Average analyst rating (score)	2.1	2.0	2.0	2.0	2.0	2.3	2.2	2.1	2.4	2.2	2.3	2.2
Analyst ratings momentum	0.5	0.4	0.2	0.7	0.6	0.4	-0.1	0.7	0.1	0.2	0.3	0.3
Average expected capital return	+4%	+8%	+6%	+6%	+7%	-3%	-1%	+6%	-3%	+4%	-0%	+7%
Combined Alpha Model (regional rank /100)	50	59	53	67	61	24	46	64	38	55	47	58
Fit with fund manager preferences (global rank /100)	58	63	60	68	65	36	50	67	44	63	56	60
<b>Momentum</b>												
Last 12-month total return (local FX)	+143%	+77%	+77%	+55%	+63%	+200%	+260%	+88%	+144%	+59%	+56%	+35%
Last 3-month price change (local FX)	+17%	+10%	+13%	+7%	+7%	+31%	+18%	+7%	+20%	+14%	+19%	+9%
Price momentum. Global rank /100	92	88	87	84	84	89	89	86	83	86	81	65
Analyst revisions. Global rank/100	70	66	62	62	63	58	64	68	59	62	60	57
% of analysts revising EPS estimates ↑	37%	23%	27%	19%	22%	36%	28%	20%	29%	26%	28%	23%
% of analysts revising EPS estimates ↓	4%	4%	5%	5%	4%	17%	7%	4%	9%	7%	7%	9%
<b>Risk</b>												
Price volatility, annualised	55%	48%	49%	45%	47%	75%	57%	46%	61%	45%	48%	43%
Beta to index in down months	1.43	1.10	1.08	1.08	1.13	1.52	1.03	0.99	1.26	1.05	1.37	1.00
Beta to MSCI ACWI in NZD	1.13	1.02	1.02	1.06	1.11	1.53	1.14	1.07	1.27	1.01	1.14	0.98
Probability of default in next 12m	0.08%	0.06%	0.06%	0.05%	0.06%	0.15%	0.09%	0.07%	0.10%	0.06%	0.08%	0.13%
Balance sheet liquidity (Quick Ratio)	2.5x	2.5x	2.5x	2.0x	2.3x	3.3x	2.0x	2.0x	2.4x	2.5x	2.3x	1.5x
EBIT/interest coverage ratio	1.9x	5.4x	4.4x	7.5x	6.1x	-6.3x	5.6x	6.5x	3.3x	8.2x	6.5x	7.7x
Net debt / enterprise value	4%	2%	2%	5%	7%	4%	3%	10%	8%	5%	8%	17%

Source: Forsyth Barr analysis, Refinitiv

## Historical volatility

Figure 59. Fund risk metrics in NZD (for period since 30 September 2017; risk metrics calculated on price-based total returns)

Fund	Technology					Innovation			Robotics			World
	Allianz Tech Trust	Polar Capital Tech	Polar Capital Global Tech UCITS	iShares Global Tech	iShares Expanded Tech	ARK Innovation	Scottish Mortgage	Invesco QQQ	ARK Autonomous Tech & Robotics	Polar Capital Automation & AI	iShares Automation & Robotics	iShares MSCI ACWI
Fund code	ATT	PCT	POLGTIU	IXN	IGM	ARKK	SMT	QQQ	ARKQ	PLAIUA	RBOT	ACWI
<b>NAV returns &amp; outperformance</b>												
Compound annualised total return	30.5%pa	26.4%pa	29.2%pa	24.5%pa	27.7%pa	47.6%pa	34.2%pa	25.8%pa	26.9%pa	17.4%pa	14.6%pa	9.5%pa
Alpha vs MSCI ACWI, annualised	+21.0%pa	+16.9%pa	+19.7%pa	+15.0%pa	+18.2%pa	+38.1%pa	+24.7%pa	+16.3%pa	+17.4%pa	+7.9%pa	+5.1%pa	+0.1%pa
Highest 12-month rolling return	+52.6%	+46.5%	+52.5%	+51.2%	+45.7%	+110.6%	+89.2%	+48.2%	+79.6%	+38.3%	+33.8%	+26.2%
Lowest 12-month rolling return	-1.6%	+2.9%	+4.7%	-1.4%	+4.7%	-5.6%	-6.2%	+2.5%	-13.4%	-6.2%	-13.2%	-4.3%
Frequency of rolling "up" quarters	81%	83%	83%	72%	81%	75%	83%	83%	67%	69%	72%	72%
Frequency of rolling quarterly outperf.	78%	78%	78%	83%	86%	81%	69%	83%	58%	75%	58%	58%
<b>Risk</b>												
Maximum drawdown from prior high	-28.8%	-23.2%	-18.6%	-19.9%	-19.8%	-24.2%	-20.3%	-18.6%	-21.0%	-19.5%	-22.1%	-15.1%
Average recovery from max drawdown	1.2 years	1.0 years	0.7 years	0.9 years	0.8 years	0.6 years	0.7 years	0.8 years	0.9 years	1.2 years	2.4 years	2.1 years
Calmar ratio	1.15	0.96	1.57	1.23	1.40	1.97	1.71	1.39	1.28	0.89	0.66	0.63
Ulcer index	8.8%	7.9%	5.1%	6.1%	5.7%	7.1%	8.3%	5.5%	8.3%	6.0%	7.4%	5.3%
Sortino ratio	0.56	0.40	0.70	0.50	0.58	0.75	0.80	0.57	0.47	0.34	0.24	0.15
Sharpe ratio	1.14	0.84	1.28	1.03	1.13	1.30	1.43	1.14	0.92	0.79	0.56	0.38
Downside deviation, monthly, annual.	13.7%	12.6%	9.3%	10.9%	10.7%	15.0%	9.7%	9.9%	13.4%	10.4%	12.5%	9.8%
Total volatility, monthly, annualised	23.5%	20.8%	17.5%	18.2%	19.1%	29.9%	18.8%	17.2%	23.7%	15.6%	18.6%	13.3%
<b>Relationship between fund and index</b>												
Correlation of returns to MSCI ACWI	0.72	0.66	0.82	0.91	0.91	0.77	0.70	0.91	0.83	0.89	0.88	1.00
Beta to MSCI ACWI in NZD	1.27	1.19	0.99	1.09	1.09	1.35	1.16	1.07	1.21	1.02	1.13	1.02
Tracking error, annualised	16.6%	15.6%	10.0%	8.2%	9.0%	21.5%	13.4%	7.5%	14.6%	7.1%	9.2%	1.3%
Information ratio, annualised	1.43	0.83	1.99	1.84	2.04	1.78	1.88	2.19	1.21	1.13	0.57	0.11

### Return metrics:

Frequency of rolling "up" quarters: Proportion of 3-month periods where the total return was positive. Higher is better.

Frequency of rolling quarterly outperformance: Proportion of 3-month periods where the fund outperformed the MSCI ACWI index. Higher is better.

Maximum drawdown from prior high: Difference between peak price and subsequent lowest price. Smaller loss is better

Average time to recover from maximum drawdown: Maximum drawdown / average 12-month rolling return. Lower is better.

### Risk metrics:

Calmar ratio: Compound annualised growth rate / maximum drawdown. Higher is better.

Ulcer ratio: Depth of drawdowns x time required to recover. Lower is better.

Sortino ratio: Average return less minimum acceptable return (5% pa) / downside volatility. Higher is better.

Sharpe ratio: Average return less minimum acceptable return (5% pa) / total volatility. Higher is better.

Downside deviation: Standard deviation of returns below the minimum acceptable return (5% pa). Measures undesirable volatility. Lower is better

Total volatility: Standard deviation. Measures both downward and upward price moves as "risk".

### Relationship metrics:

Correlation of monthly returns: Degree of similarity in direction of monthly price moves between fund and MSCI ACWI index. Lower means more different.

Beta to MSCI ACWI in NZD: Sensitivity of the fund (in NZD) to a change in the MSCI ACWI index (in NZD). Beta=1 means the fund moves in step with the market; beta >1 means the fund moves further in same direction as market; positive beta <1 means the fund moves less far in same direction as market; beta <0 means the fund moves in opposite direction to market.

Tracking error: Indicator of how closely portfolio tracks benchmark. Higher means more different.

Information ratio: Fund outperformance / tracking error. Higher is better.

Source: Forsyth Barr analysis, Bloomberg

## Historical returns

Figure 60. Historical total returns based on net asset values, in NZD

Fund	Technology					Innovation			Robotics			World
	Allianz Tech Trust	Polar Capital Tech	Polar Capital Global Tech UCITS	iShares Global Tech	iShares Expanded Tech	ARK Innovation	Scottish Mortgage	Invesco QQQ	ARK Autonomous Tech & Robotics	Polar Capital Automation & AI	iShares Automation & Robotics	iShares MSCI ACWI
Fund code	ATT	PCT	POLGTIU	IXN	IGM	ARKK	SMT	QQQ	ARKQ	PLAIUA	RBOT	ACWI
<b>Cumulative annualised fund NAV total returns (NZD)</b>												
1 year	50.5%	38.1%	41.5%	27.9%	31.0%	105.8%	88.9%	32.8%	74.5%	25.8%	21.4%	3.4%
3 years	27.2%	22.9%	25.7%	20.8%	23.9%	44.6%	32.0%	22.7%	24.1%	15.3%	10.3%	6.8%
5 years	24.3%	22.2%	25.3%	21.0%	22.1%	37.7%	25.7%	19.2%	25.6%	n.a.	n.a.	8.7%
7 years	24.0%	23.0%	25.1%	21.8%	23.5%	n.a.	25.6%	21.7%	n.a.	n.a.	n.a.	10.0%
10 years	21.1%	19.2%	20.1%	18.2%	20.2%	n.a.	21.2%	20.0%	n.a.	n.a.	n.a.	9.5%
13 years	16.5%	16.0%	17.6%	13.4%	15.6%	n.a.	15.2%	15.9%	n.a.	n.a.	n.a.	6.4%
15 years	15.9%	14.6%	16.0%	12.5%	14.4%	n.a.	16.1%	14.9%	n.a.	n.a.	n.a.	7.4%
17 years	13.1%	13.6%	13.0%	10.9%	12.5%	n.a.	16.0%	13.4%	n.a.	n.a.	n.a.	7.6%
19 years	9.0%	10.5%	9.7%	6.6%	8.3%	n.a.	12.5%	9.1%	n.a.	n.a.	n.a.	4.7%
<b>Annual fund NAV total returns (NZD)</b>												
2020-YTD	50.5%	37.7%	41.5%	25.5%	30.1%	110.6%	83.0%	32.5%	70.0%	25.0%	21.6%	4.1%
2019	33.5%	37.3%	39.3%	48.2%	42.0%	41.3%	29.1%	38.8%	26.1%	38.3%	33.8%	26.2%
2018	7.9%	2.9%	6.7%	-1.4%	6.8%	5.5%	0.9%	4.4%	-4.8%	-6.2%	-13.2%	-4.3%
2017	42.6%	41.5%	41.5%	35.9%	32.1%	75.6%	47.9%	27.7%	44.0%	n.a.	41.9%	20.6%
2016	1.0%	5.9%	10.7%	12.0%	10.7%	-4.2%	-5.7%	4.6%	13.7%	n.a.	n.a.	7.6%
2015	20.7%	19.5%	22.1%	13.7%	19.8%	13.9%	19.6%	19.9%	7.8%	n.a.	n.a.	7.6%
2014	14.9%	18.6%	14.6%	22.5%	22.4%	n.a.	19.1%	26.8%	n.a.	n.a.	n.a.	10.0%
2013	59.4%	36.0%	37.8%	29.2%	38.5%	n.a.	37.0%	40.6%	n.a.	n.a.	n.a.	25.7%
2012	7.6%	8.3%	4.8%	7.9%	7.3%	n.a.	19.9%	10.0%	n.a.	n.a.	n.a.	7.7%
2011	-11.8%	-5.8%	-7.5%	-2.9%	-0.3%	n.a.	-13.1%	4.0%	n.a.	n.a.	n.a.	-7.0%
2010	15.3%	16.6%	25.3%	2.8%	3.4%	n.a.	11.9%	11.1%	n.a.	n.a.	n.a.	3.3%
2009	26.1%	36.8%	42.1%	21.3%	28.7%	n.a.	39.0%	22.7%	n.a.	n.a.	n.a.	8.9%
2008	-22.7%	-22.3%	-24.7%	-21.1%	-21.4%	n.a.	-40.5%	-19.1%	n.a.	n.a.	n.a.	-16.1%
2007	13.1%	-4.7%	-3.2%	3.7%	7.8%	n.a.	17.2%	10.7%	n.a.	n.a.	n.a.	3.8%
2006	5.0%	8.5%	7.8%	6.0%	5.8%	n.a.	19.3%	5.1%	n.a.	n.a.	n.a.	17.7%
2005	-2.1%	15.7%	7.1%	9.8%	6.7%	n.a.	28.4%	6.7%	n.a.	n.a.	n.a.	16.5%
2004	-4.9%	4.9%	-10.3%	-4.6%	-5.7%	n.a.	8.9%	0.9%	n.a.	n.a.	n.a.	4.5%
2003	34.7%	22.6%	52.6%	12.0%	19.6%	n.a.	7.9%	16.7%	n.a.	n.a.	n.a.	5.4%
2002	-55.3%	-38.8%	-55.5%	-45.7%	-48.5%	n.a.	-31.3%	-47.0%	n.a.	n.a.	n.a.	-33.9%
<b>Annual fund NAV outperformance vs MSCI ACWI index (NZD)</b>												
2020-YTD	+46.1%	+33.3%	+37.1%	+21.1%	+25.7%	+106.1%	+78.6%	+28.1%	+65.6%	+20.5%	+17.1%	-0.3%
2019	+7.8%	+11.7%	+13.7%	+22.6%	+16.4%	+15.7%	+3.5%	+13.1%	+0.4%	+12.7%	+8.2%	+0.6%
2018	+12.4%	+7.5%	+11.2%	+3.1%	+11.4%	+10.0%	+5.5%	+8.9%	-0.3%	-1.6%	-8.6%	+0.3%
2017	+21.5%	+20.5%	+20.5%	+14.9%	+11.1%	+54.5%	+26.9%	+6.7%	+23.0%	n.a.	+20.8%	-0.4%
2016	-5.8%	-0.9%	+3.9%	+5.2%	+3.8%	-11.0%	-12.5%	-2.2%	+6.8%	n.a.	n.a.	+0.8%
2015	+12.0%	+10.8%	+13.4%	+4.9%	+11.1%	+5.2%	+10.9%	+11.1%	-0.9%	n.a.	n.a.	-1.1%
2014	+3.6%	+7.3%	+3.3%	+11.2%	+11.1%	n.a.	+7.8%	+15.5%	n.a.	n.a.	n.a.	-1.3%
2013	+33.1%	+9.7%	+11.5%	+2.9%	+12.2%	n.a.	+10.7%	+14.3%	n.a.	n.a.	n.a.	-0.6%
2012	-0.1%	+0.5%	-2.9%	+0.2%	-0.4%	n.a.	+12.2%	+2.3%	n.a.	n.a.	n.a.	-0.1%
2011	-4.5%	+1.4%	-0.3%	+4.3%	+7.0%	n.a.	-5.8%	+11.2%	n.a.	n.a.	n.a.	+0.3%
2010	+12.1%	+13.4%	+22.0%	-0.5%	+0.1%	n.a.	+8.6%	+7.9%	n.a.	n.a.	n.a.	-0.0%
2009	+14.2%	+24.9%	+30.2%	+9.5%	+16.9%	n.a.	+27.1%	+10.9%	n.a.	n.a.	n.a.	-3.0%
2008	-2.2%	-1.8%	-4.2%	-0.6%	-0.9%	n.a.	-20.0%	+1.3%	n.a.	n.a.	n.a.	+4.3%
2007	+9.3%	-8.5%	-7.0%	-0.1%	+4.0%	n.a.	+13.4%	+6.9%	n.a.	n.a.	n.a.	0.0%
2006	-12.8%	-9.3%	-9.9%	-11.8%	-11.9%	n.a.	+1.6%	-12.7%	n.a.	n.a.	n.a.	0.0%
2005	-18.5%	-0.8%	-9.4%	-6.7%	-9.8%	n.a.	+11.9%	-9.7%	n.a.	n.a.	n.a.	0.0%
<b>Annual fund NAV outperformance vs comparable passive ETF (NZD)</b>												
2020-YTD	+20.4%	+7.6%	+11.4%	-4.6%	0.0%	+78.0%	+50.5%	0.0%	+48.4%	+3.4%	0.0%	
2019	-8.5%	-4.7%	-2.7%	+6.2%	0.0%	+2.5%	-9.7%	0.0%	-7.8%	+4.5%	0.0%	
2018	+1.0%	-3.9%	-0.2%	-8.3%	0.0%	+1.1%	-3.4%	0.0%	+8.3%	+7.0%	0.0%	
2017	+10.5%	+9.4%	+9.4%	+3.8%	0.0%	+47.8%	+20.2%	0.0%	+2.1%	n.a.	0.0%	
2016	-9.7%	-4.8%	+0.0%	+1.4%	0.0%	-8.8%	-10.3%	0.0%	n.a.	n.a.	n.a.	
2015	+0.9%	-0.3%	+2.3%	-6.1%	0.0%	-6.0%	-0.3%	0.0%	n.a.	n.a.	n.a.	
2014	-7.6%	-3.9%	-7.8%	+0.0%	0.0%	n.a.	-7.7%	0.0%	n.a.	n.a.	n.a.	
2013	+20.9%	-2.5%	-0.7%	-9.3%	0.0%	n.a.	-3.6%	0.0%	n.a.	n.a.	n.a.	
2012	+0.2%	+0.9%	-2.5%	+0.6%	0.0%	n.a.	+10.0%	0.0%	n.a.	n.a.	n.a.	
2011	-11.5%	-5.6%	-7.2%	-2.7%	0.0%	n.a.	-17.1%	0.0%	n.a.	n.a.	n.a.	
2010	+12.0%	+13.3%	+21.9%	-0.6%	0.0%	n.a.	+0.7%	0.0%	n.a.	n.a.	n.a.	
2009	-2.7%	+8.1%	+13.3%	-7.4%	0.0%	n.a.	+16.3%	0.0%	n.a.	n.a.	n.a.	
2008	-1.3%	-0.9%	-3.3%	+0.2%	0.0%	n.a.	-21.4%	0.0%	n.a.	n.a.	n.a.	
2007	+5.4%	-12.5%	-11.0%	-4.1%	0.0%	n.a.	+6.6%	0.0%	n.a.	n.a.	n.a.	
2006	-0.9%	+2.6%	+2.0%	+0.1%	0.0%	n.a.	+14.2%	0.0%	n.a.	n.a.	n.a.	
2005	-8.7%	+9.0%	+0.4%	+3.1%	0.0%	n.a.	+21.6%	0.0%	n.a.	n.a.	n.a.	

Source: Forsyth Barr analysis, Bloomberg

## Appendix B – Top Portfolio Holdings

### Technology funds

**Figure 61. Allianz Technology Trust: Top 15 portfolio holdings**

Company	Industry	Weight	P/E	LT EPS g	PEG
Apple Inc Ord	Technology Hardware, Storage & Periphera	6.2%	30.4x	12.6%	2.2x
Usd Cash		4.6%	-	-	-
Amazon.Com Inc Ord	Internet & Direct Marketing Retail	4.2%	69.4x	36.4%	2.3x
Zoom Video Communications Inc Ord	Application Software	3.5%	136.1x	130.8%	0.5x
CrowdStrike Holdings Inc Ord	Systems Software	3.4%	498.6x	-	7.5x
Tesla Inc Ord	Automobile Manufacturers	3.4%	142.6x	353.9%	0.1x
Facebook Inc Ord	Interactive Media & Services	3.2%	26.6x	16.6%	1.2x
Zscaler Inc Ord	Systems Software	3.0%	382.8x	40.6%	8.8x
Paycom Software Inc Ord	Application Software	2.9%	101.3x	13.7%	10.0x
Square Inc Ord	Data Processing & Outsourced Services	2.9%	183.1x	38.0%	9.9x
Samsung Electronics Co Ltd Ord	Technology Hardware, Storage & Periphera	2.6%	12.9x	24.7%	0.5x
Twilio Inc Ord	Internet Services & Infrastructure	2.4%	2954.9x	-	-
Paypal Holdings Inc Ord	Data Processing & Outsourced Services	2.3%	47.7x	23.0%	2.7x
Advanced Micro Devices Inc Ord	Semiconductors	2.2%	50.3x	38.2%	1.3x
Nvidia Corp Ord	Semiconductors	2.2%	46.3x	21.5%	1.5x

Source: Forsyth Barr analysis, Refinitiv

**Figure 63. Polar Capital Technology Trust: Top 15 portfolio holdings**

Company	Industry	Weight	P/E	LT EPS g	PEG
Apple Inc	Technology Hardware, Storage & Periphera	9.6%	30.4x	12.6%	2.2x
Microsoft Corp	Systems Software	9.1%	29.8x	14.5%	2.2x
Facebook Inc	Interactive Media & Services	4.4%	26.6x	16.6%	1.2x
Tencent Holdings Ltd	Interactive Media & Services	3.6%	30.8x	26.6%	1.2x
Alibaba Group Holding Ltd	Internet & Direct Marketing Retail	3.3%	22.4x	25.1%	0.9x
Alphabet Inc	Interactive Media & Services	2.9%	29.5x	16.5%	2.6x
Alphabet Inc	Interactive Media & Services	2.9%	29.5x	16.5%	2.5x
Amazon.Com Inc	Internet & Direct Marketing Retail	2.8%	69.4x	36.4%	2.3x
Samsung Electronics Co Ltd	Technology Hardware, Storage & Periphera	2.8%	12.9x	24.7%	0.5x
Advanced Micro Devices Inc	Semiconductors	2.6%	50.3x	38.2%	1.3x
Taiwan Semiconductor Manufacturing	Semiconductors	2.3%	23.4x	20.7%	0.9x
Paypal Holdings Inc	Data Processing & Outsourced Services	2.1%	47.7x	23.0%	2.7x
Adobe Inc	Application Software	2.1%	42.8x	17.4%	2.6x
Nvidia Corp	Semiconductors	1.9%	46.3x	21.5%	1.5x
Netflix Inc	Movies & Entertainment	1.5%	54.8x	40.9%	1.7x

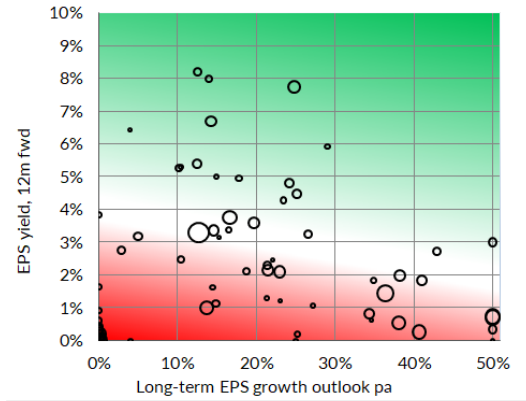
Source: Forsyth Barr analysis, Refinitiv

**Figure 65. Polar Capital Global Technology UCITS: Top 15 portfolio holdings**

Company	Industry	Weight	P/E	LT EPS g	PEG
Usd Cash		9.8%	-	-	-
Microsoft Corp Ord	Systems Software	4.6%	29.8x	14.5%	2.2x
Apple Inc Ord	Technology Hardware, Storage & Periphera	4.5%	30.4x	12.6%	2.2x
Paypal Holdings Inc Ord	Data Processing & Outsourced Services	3.0%	47.7x	23.0%	2.7x
Advanced Micro Devices Inc Ord	Semiconductors	3.0%	50.3x	38.2%	1.3x
Amazon.Com Inc Ord	Internet & Direct Marketing Retail	2.9%	69.4x	36.4%	2.3x
Tencent Holdings Ltd Ord	Interactive Media & Services	2.9%	30.8x	26.6%	1.2x
Alibaba Group Holding Ltd Dr	Internet & Direct Marketing Retail	2.8%	22.4x	25.1%	0.9x
Facebook Inc Ord	Interactive Media & Services	2.8%	26.6x	16.6%	1.2x
Alphabet Inc Ord	Interactive Media & Services	2.3%	29.5x	16.5%	2.6x
Alphabet Inc Ord	Interactive Media & Services	2.3%	29.5x	16.5%	2.5x
Adobe Inc Ord	Application Software	2.3%	42.8x	17.4%	2.6x
Servicenow Inc Ord	Systems Software	1.9%	94.0x	27.1%	4.0x
Asml Holding Nv Ord	Semiconductor Equipment	1.9%	37.9x	21.4%	1.7x
Nvidia Corp Ord	Semiconductors	1.8%	46.3x	21.5%	1.5x

Source: Forsyth Barr analysis, Refinitiv

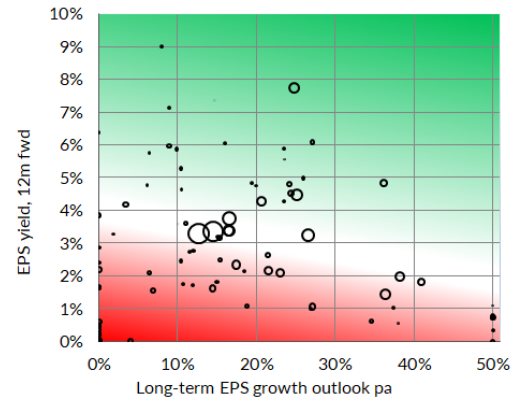
**Figure 62. ATT: EPS growth, EPS yield & weight\***



\* Each bubble represents a top 100 portfolio holding, with bubble size denoting its weight in portfolio. Negative EPS yield shown as 0%.

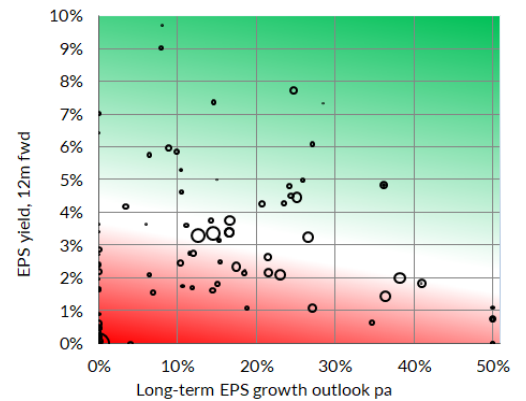
Source: Forsyth Barr analysis, Refinitiv

**Figure 64. PCT: EPS growth, EPS yield & weight**



Source: Forsyth Barr analysis, Refinitiv

**Figure 66. POLGTIU: EPS growth, yield, weight**



Top 100 stocks only. Source: Forsyth Barr analysis, Refinitiv

**Figure 67. iShares Global Technology: Top 15 portfolio holdings**

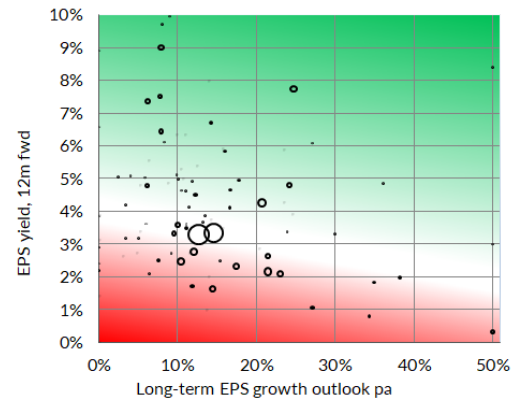
Company	Industry	Weight	P/E	LT EPS g	PEG
Apple Inc Ord	Technology Hardware, Storage & Periphera	18.8%	30.4x	12.6%	2.2x
Microsoft Corp Ord	Systems Software	16.4%	29.8x	14.5%	2.2x
Nvidia Corp Ord	Semiconductors	3.3%	46.3x	21.5%	1.5x
Visa Inc Ord	Data Processing & Outsourced Services	3.3%	36.1x	12.0%	2.6x
Taiwan Semiconductor Manufacturing	Semiconductors	3.1%	23.4x	20.7%	0.9x
Samsung Electronics Co Ltd Ord	Technology Hardware, Storage & Periphera	2.7%	12.9x	24.7%	0.5x
Mastercard Inc Ord	Data Processing & Outsourced Services	2.7%	40.5x	10.4%	7.1x
Paypal Holdings Inc Ord	Data Processing & Outsourced Services	2.3%	47.7x	23.0%	2.7x
Adobe Inc Ord	Application Software	2.3%	42.8x	17.4%	2.6x
Salesforce.Com Inc Ord	Application Software	2.3%	61.7x	14.5%	3.2x
Intel Corp Ord	Semiconductors	2.0%	11.1x	7.9%	10.0x
Asml Holding Nv Ord	Semiconductor Equipment	1.7%	37.9x	21.4%	1.7x
Cisco Systems Inc Ord	Communications Equipment	1.6%	13.6x	6.1%	3.7x
Broadcom Inc Ord	Semiconductors	1.5%	15.6x	7.9%	2.0x
Qualcomm Inc Ord	Semiconductors	1.5%	20.8x	24.2%	0.6x

Source: Forsyth Barr analysis, Refinitiv

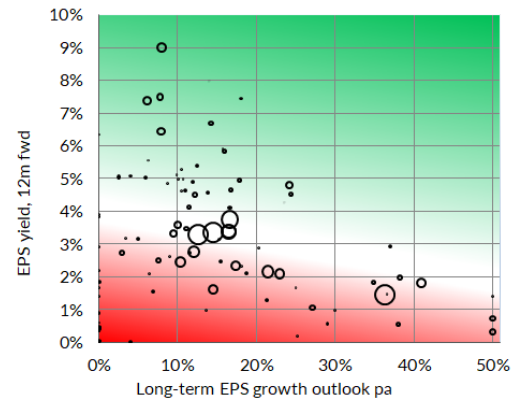
**Figure 69. iShares Expanded Technology: Top 15 portfolio holdings**

Company	Industry	Weight	P/E	LT EPS g	PEG
Microsoft Corp Ord	Systems Software	8.4%	29.8x	14.5%	2.2x
Apple Inc Ord	Technology Hardware, Storage & Periphera	8.2%	30.4x	12.6%	2.2x
Amazon.Com Inc Ord	Internet & Direct Marketing Retail	8.2%	69.4x	36.4%	2.3x
Facebook Inc Ord	Interactive Media & Services	6.2%	26.6x	16.6%	1.2x
Alphabet Inc Ord	Interactive Media & Services	4.6%	29.5x	16.5%	2.6x
Alphabet Inc Ord	Interactive Media & Services	4.5%	29.5x	16.5%	2.5x
Nvidia Corp Ord	Semiconductors	3.0%	46.3x	21.5%	1.5x
Visa Inc Ord	Data Processing & Outsourced Services	3.0%	36.1x	12.0%	2.6x
Mastercard Inc Ord	Data Processing & Outsourced Services	2.5%	40.5x	10.4%	7.1x
Paypal Holdings Inc Ord	Data Processing & Outsourced Services	2.1%	47.7x	23.0%	2.7x
Adobe Inc Ord	Application Software	2.1%	42.8x	17.4%	2.6x
Salesforce.Com Inc Ord	Application Software	2.1%	61.7x	14.5%	3.2x
Netflix Inc Ord	Movies & Entertainment	2.1%	54.8x	40.9%	1.7x
Intel Corp Ord	Semiconductors	1.8%	11.1x	7.9%	10.0x
Cisco Systems Inc Ord	Communications Equipment	1.5%	13.6x	6.1%	3.7x

Source: Forsyth Barr analysis, Refinitiv

**Figure 68. IXN: EPS growth, yield, weight**


Top 100 stocks only. Source: Forsyth Barr analysis, Refinitiv

**Figure 70. IGM: EPS growth, yield, weight**


Top 100 stocks only. Source: Forsyth Barr analysis, Refinitiv

## Innovation funds

Figure 71. ARK Innovation: Top 15 portfolio holdings

Company	Industry	Weight	P/E	LT EPS g	PEG
Tesla Ord	Automobile Manufacturers	10.2%	142.6x	353.9%	0.1x
Invitae Corp	Biotechnology	7.6%	-	-	-
Square Ord Shs Class A	Data Processing & Outsourced Services	6.4%	183.1x	38.0%	9.9x
Roku Inc Ord	Movies & Entertainment	5.8%	-	-	-
Crispr Therapeutics Ord Shs	Biotechnology	5.4%	-	-	-
Lendingtree Inc	Consumer Finance	3.1%	80.3x	12.5%	4.7x
Slack Technologies Inc Ord	Application Software	3.1%	-	-	-
Proto Labs Ord	Industrial Machinery	3.1%	52.3x	25.0%	9.6x
Teladoc Health Inc Ord	Health Care Technology	3.0%	-	-	-
2U Ord Shs	Application Software	3.0%	-	-	-
Zillow Group Inc	Interactive Media & Services	3.0%	254.8x	-21.0%	6.7x
Pure Storage Ord Shs Class A	Technology Hardware, Storage & Periphera	2.7%	75.0x	24.5%	6.5x
Seres Therapeutics Ord Shs	Biotechnology	2.5%	-	-	-
Spotify Technology Sa Ord	Movies & Entertainment	2.3%	-	120.5%	-
Editas Medicine Ord Shs	Biotechnology	2.3%	-	-	-

Source: Forsyth Barr analysis, Refinitiv

Figure 73. Scottish Mortgage: Top 15 portfolio holdings

Company	Industry	Weight	P/E	LT EPS g	PEG
Tesla Inc Ord	Automobile Manufacturers	14.3%	142.6x	353.9%	0.1x
Amazon.Com Inc Ord	Internet & Direct Marketing Retail	9.1%	69.4x	36.4%	2.3x
Alibaba Group Holding Ltd Dr	Internet & Direct Marketing Retail	5.8%	22.4x	25.1%	0.9x
Tencent Holdings Ltd Ord	Interactive Media & Services	5.0%	30.8x	26.6%	1.2x
Illumina Inc Ord	Life Sciences Tools & Services	4.9%	54.0x	6.3%	10.0x
Usd Cash		4.2%	-	-	-
Meituan Ord	Internet & Direct Marketing Retail	3.7%	91.3x	87.1%	2.6x
Asml Holding Nv Ord	Semiconductor Equipment	3.0%	37.9x	21.4%	1.7x
Delivery Hero Se Ord	Internet & Direct Marketing Retail	2.4%	-	-	-
Netflix Inc Ord	Movies & Entertainment	2.4%	54.8x	40.9%	1.7x
Spotify Technology Sa Ord	Movies & Entertainment	2.3%	-	120.5%	-
Nvidia Corp Ord	Semiconductors	2.3%	46.3x	21.5%	1.5x
Nio Inc Dr	Automobile Manufacturers	2.1%	-	-	-
Kering Sa Ord	Apparel, Accessories & Luxury Goods	2.0%	25.8x	2.5%	6.3x
Ferrari Nv Ord	Automobile Manufacturers	1.9%	44.7x	-	5.7x

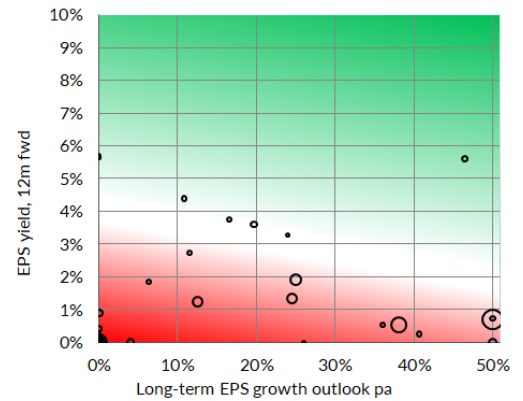
Source: Forsyth Barr analysis, Refinitiv

Figure 75. Invesco QQQ: Top 15 portfolio holdings

Company	Industry	Weight	P/E	LT EPS g	PEG
Apple Ord	Technology Hardware, Storage & Periphera	13.1%	30.4x	12.6%	2.2x
Microsoft-T Ord	Systems Software	10.4%	29.8x	14.5%	2.2x
Amazon.Com Inc Ord	Internet & Direct Marketing Retail	10.1%	69.4x	36.4%	2.3x
Facebook Cl A Ord	Interactive Media & Services	4.2%	26.6x	16.6%	1.2x
Alphabet Inc-CI A Ord	Interactive Media & Services	3.9%	29.5x	16.5%	2.6x
Alphabet Inc-CI C Ord	Interactive Media & Services	3.8%	29.5x	16.5%	2.5x
Tesla Ord	Automobile Manufacturers	3.8%	142.6x	353.9%	0.1x
Nvidia Ord	Semiconductors	2.7%	46.3x	21.5%	1.5x
Comcast Ord	Cable & Satellite	1.9%	17.8x	5.8%	10.0x
Paypal Holdings Ord Shs When Issued	Data Processing & Outsourced Services	1.8%	47.7x	23.0%	2.7x
Adobe Inc Ord	Application Software	1.8%	42.8x	17.4%	2.6x
Netflix Ord	Movies & Entertainment	1.8%	54.8x	40.9%	1.7x
Pepsico U Ord	Soft Drinks	1.6%	23.8x	5.9%	5.1x
Intel-T Ord	Semiconductors	1.6%	11.1x	7.9%	10.0x
Cisco-T Ord	Communications Equipment	1.4%	13.6x	6.1%	3.7x

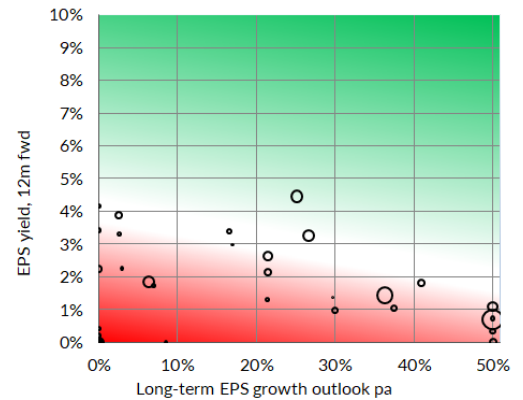
Source: Forsyth Barr analysis, Refinitiv

Figure 72. ARKK: EPS growth, EPS yield, weights



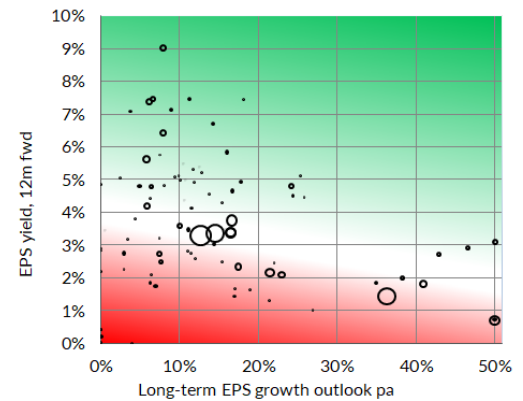
Source: Forsyth Barr analysis, Refinitiv

Figure 74. SMT: EPS growth, EPS yield, weights



Listed stocks only. Source: Forsyth Barr analysis, Refinitiv

Figure 76. QQQ: EPS growth, EPS yield, weights



Source: Forsyth Barr analysis, Refinitiv

**Robotics & AI funds**

**Figure 77. ARK Autonomous Tech & Robotics: Top 15 portfolio holdings**

Company	Industry	Weight	P/E	LT EPS g	PEG
Komatsu ADR	Construction Machinery & Heavy Trucks	1.4%	18.8x	-	2.2x
Nvidia Ord	Semiconductors	4.9%	46.3x	21.5%	1.5x
Nano Dimension Sponsored ADR Repre	Technology Hardware, Storage & Periphera	0.1%	-	-	-
Rakuten Sponsored ADR Representing	Internet & Direct Marketing Retail	1.5%	-	-	-
Iridium Communications Ord	Alternative Carriers	1.7%	-	-	-
Aptiv Plc Ord	Auto Parts & Equipment	4.0%	30.3x	-0.1%	3.1x
Xilinx Ord	Semiconductors	4.6%	45.6x	-	10.0x
Baidu Com ADR	Interactive Media & Services	3.5%	14.0x	8.9%	1.0x
Jd.Com ADR Representing 2 Ord Shs	Internet & Direct Marketing Retail	3.0%	36.7x	42.9%	1.1x
Flir Systems Ord	Electronic Equipment & Instruments	1.4%	17.4x	6.4%	4.8x
Tencent Holdings ADR Rep 1 Cl B Ord	Interactive Media & Services	1.9%	30.5x	24.0%	1.3x
Proto Labs Ord	Industrial Machinery	5.8%	52.3x	25.0%	9.6x
Cognex Ord	Electronic Equipment & Instruments	1.8%	60.9x	-	3.1x
Stratasys Ltd	Technology Hardware, Storage & Periphera	8.3%	184.4x	36.0%	-
Splunk Ord	Application Software	3.3%	-	4.0%	-

Source: Forsyth Barr analysis, Refinitiv

**Figure 79. Polar Capital Automation & AI: Top 15 portfolio holdings**

Company	Industry	Weight	P/E	LT EPS g	PEG
Microsoft Corp Ord	Systems Software	5.1%	29.8x	14.5%	2.2x
Usd Cash		4.5%	-	-	-
Amazon.Com Inc Ord	Internet & Direct Marketing Retail	4.2%	69.4x	36.4%	2.3x
Nvidia Corp Ord	Semiconductors	2.7%	46.3x	21.5%	1.5x
Alphabet Inc Ord	Interactive Media & Services	2.6%	29.5x	16.5%	2.6x
Rockwell Automation Inc Ord	Electrical Components & Equipment	2.5%	27.6x	8.6%	2.7x
Schneider Electric Se Ord	Electrical Components & Equipment	2.4%	21.9x	5.4%	4.7x
Atlas Copco Ab Ord	Industrial Machinery	2.3%	30.3x	2.6%	5.9x
Paypal Holdings Inc Ord	Data Processing & Outsourced Services	2.1%	47.7x	23.0%	2.7x
Tokyo Electron Ltd Ord	Semiconductor Equipment	2.0%	23.9x	3.4%	1.9x
Advanced Micro Devices Inc Ord	Semiconductors	2.0%	50.3x	38.2%	1.3x
Facebook Inc Ord	Interactive Media & Services	1.9%	26.6x	16.6%	1.2x
S&P Global Inc Ord	Financial Exchanges & Data	1.9%	27.4x	11.8%	2.4x
Mediatek Inc Ord	Semiconductors	1.8%	20.7x	36.2%	0.6x
Taiwan Semiconductor Manufacturing	Semiconductors	1.8%	23.4x	20.7%	0.9x

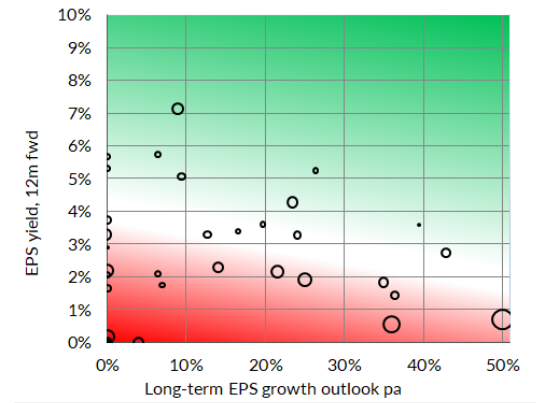
Source: Forsyth Barr analysis, Refinitiv

**Figure 81. iShares Automation & Robotics: Top 15 portfolio holdings**

Company	Industry	Weight	P/E	LT EPS g	PEG
Snap Inc Ord	Interactive Media & Services	3.3%	209.2x	-	-
Xiaomi Corp Ord	Technology Hardware, Storage & Periphera	2.8%	30.3x	29.9%	1.5x
Nidec Corporation Ord	Electrical Components & Equipment	2.6%	54.9x	33.6%	1.3x
Qualcomm Ord	Semiconductors	2.4%	20.8x	24.2%	0.6x
Nvidia Ord	Semiconductors	2.4%	46.3x	21.5%	1.5x
Advanced Micro Devices Ord	Semiconductors	2.3%	50.3x	38.2%	1.3x
Xilinx Ord	Semiconductors	2.2%	45.6x	-	10.0x
Hexagon Ord	Electronic Equipment & Instruments	2.2%	29.4x	5.2%	3.7x
Apple Ord	Technology Hardware, Storage & Periphera	2.1%	30.4x	12.6%	2.2x
Servicenow Ord	Systems Software	2.0%	94.0x	27.1%	4.0x
Teradyne Ord	Semiconductor Equipment	2.0%	23.4x	23.5%	0.9x
Intuitive Surgical Ord	Health Care Equipment	2.0%	57.1x	6.9%	10.0x
Rockwell Automat Ord	Electrical Components & Equipment	2.0%	27.6x	8.6%	2.7x
Garmin Ord	Consumer Electronics	1.9%	23.6x	5.6%	4.0x
Ametek Ord	Electrical Components & Equipment	1.9%	26.8x	-	10.0x

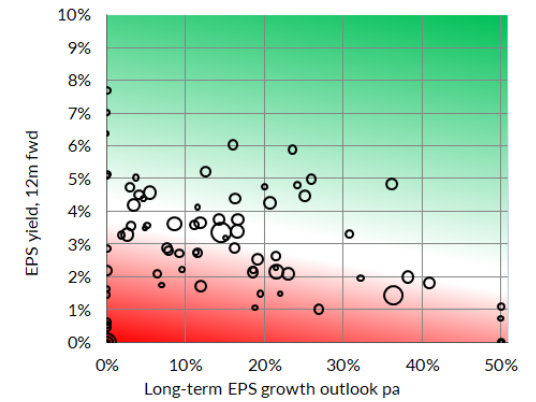
Source: Forsyth Barr analysis, Refinitiv

**Figure 78. ARKQ: EPS growth, EPS yield, weight**



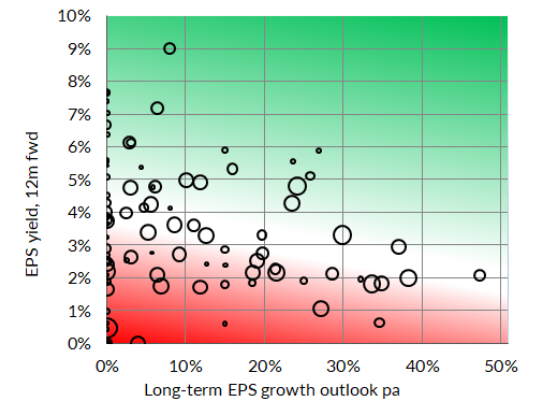
Source: Forsyth Barr analysis, Refinitiv

**Figure 80. PLAIUA EPS growth, EPS yield, weight**



Source: Forsyth Barr analysis, Refinitiv

**Figure 82. RBOT EPS growth, EPS yield, weight**



Top 100 stocks only. Source: Forsyth Barr analysis, Refinitiv

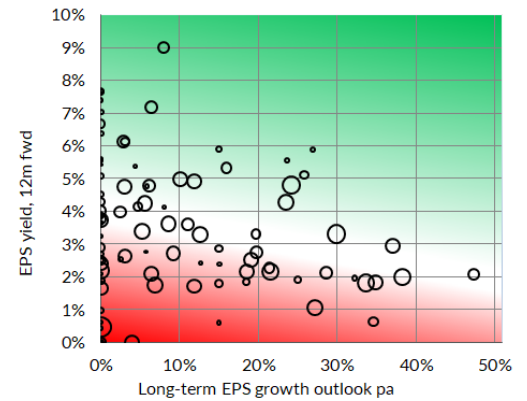
## Global benchmark

Figure 83. iShares MSCI ACWI: Top 15 portfolio holdings

Company	Industry	Weight	P/E	LT EPS g	PEG
Apple Ord	Technology Hardware, Storage & Periphera	3.7%	30.4x	12.6%	2.2x
Microsoft-T Ord	Systems Software	2.7%	29.8x	14.5%	2.2x
Amazon.Com Inc Ord	Internet & Direct Marketing Retail	2.4%	69.4x	36.4%	2.3x
Facebook CIA Ord	Interactive Media & Services	1.2%	26.6x	16.6%	1.2x
Alphabet Inc-CI C Ord	Interactive Media & Services	1.0%	29.5x	16.5%	2.5x
Alphabet Inc-CI A Ord	Interactive Media & Services	0.9%	29.5x	16.5%	2.6x
Alibaba Group Holding Adr Representi	Internet & Direct Marketing Retail	0.9%	22.4x	25.1%	0.9x
Ishares Msci India Index Fund(Inda)	NULL	0.9%	-	-	-
Tencent Holdings Ord Shs	Interactive Media & Services	0.8%	30.8x	26.6%	1.2x
Twn Semicon Man Ord	Semiconductors	0.8%	23.4x	20.7%	0.9x
Johnson&Johnson Ord	Pharmaceuticals	0.7%	16.6x	4.4%	6.2x
Tesla Ord	Automobile Manufacturers	0.7%	142.6x	353.9%	0.1x
Jpmorgan Chase Ord	Diversified Banks	0.6%	13.2x	-1.1%	-
Visa Incorporation Ord	Data Processing & Outsourced Services	0.6%	36.1x	12.0%	2.6x
Procter & Gamble Ord	Household Products	0.6%	23.8x	8.5%	3.1x

Source: Forsyth Barr analysis, Refinitiv

Figure 84. ACWI EPS growth, EPS yield, weight



Top 100 stocks only. Source: Forsyth Barr analysis, Refinitiv

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