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The Performance of the Australian Equity ETFs

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ABSTRACT

The performance of the equity Australian Exchange Traded Funds (ETFs) over the five-year period 2019-2023 is examined in this study. The empirical results show that, on average, the return of the examined ETFs has been positive over the study period. In addition, the ETFs has beaten, in raw return terms, the S&P/ASX 200 Index, which is a proxy for the entire stock market in Australia, in three out of five years during the study period. However, these ETFs have not achieved any statistically significant alpha against the market benchmark. Moreover, the results of a cross-sectional regression model show that performance is negatively related to the age of ETFs but positively to their size. Finally, when it comes to persistence, the empirical findings indicate that in most of the cases performance reverts from one year to another.

KEYWORDS

ETFs; Performance; Risk-Adjusted Return; Australian Stock Market

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1. Introduction

The market of Exchange Traded Funds (ETFs) in Australia is the subject of the current study. The Australian ETF market has experienced a vigorous growth over the last few years. The Australian ETF industry grew by 33% in 2023 reaching A$177 billion in assets under management, while the net inflows of the year amounted to A$15 billion. Assets under management are expected to increase further in 2024 and reach A$200 billion by the end of the year.[1] At the current moment, 230 ETFs are traded on the Australian stock market, which are classified into seven categories including 156 equity funds, 6 property funds, 3 currency funds, 45 fixed income funds, 4 cash funds, 7 commodity funds, and 10 mixed assets funds. Many of the available ETFs are quite young, as 98 of them have been launched in 2019 or later.

About 98% of the Australian ETFs apply passive management by being written on specific indexes from equity, fixed income and commodities markets. Furthermore, there is only one long (leveraged) and one short (inverse leveraged) ETFs. The anemic growth in actively managed and leveraged ETFs might indicate a conservativeness on behalf of Australian investors, who frequently consider ETFs as alternative sources of income with controlled risk, as evidenced by the fact that 45 or 20% of the available ETFs on the Australian Stock Exchange are fixed income funds.

When it comes to trading flexibility, in comparison to the United States and other developed markets, there are fewer free trading platforms available to investors. Investors in Australia have to pay an amount per each trade they want to execute (typically $5 to $8) or invest via a financial adviser. On the other hand, various commission-free platforms for ETFs are available in the US. In addition, the activity of institutional investors in Australia is weaker than the respective activity in the US as institutional investors prefer to invest a small sum and watch performance develops before investing larger amounts of assets.

The recent growth of the ETF industry in Australia has been driven by several factors including the unprecedented rise in the interest rates by the Reserve Bank of Australia (RBA), which contributes to money reserves being channeled to cash and fixed-income ETFs. The prospects about an uprising movement in the local and international equity markets also boost the growth of the Australian ETF market.

It is worth noticing that the boom in the Australian ETF industry has been mainly fueled by retail investors, whose number has increased by 230% since 2020 reaching 2 million.[2] According to a report by Vanguard, the composition of investors in Australia differs from that in the United States, Canada and Europe, where the share of institutional investors is much larger than that of retail investors.[3] These compositional differences are attributed to ETFs in North America and Europe being originally targeted to institutional investors, while ETFs in Australia are more focused on retail investors. The attractive features of ETFs for retail investors in Australia are the low management fees, the cost-effective portfolio diversification achieved via investing in ETF products, the access to markets that have traditionally been available to institutional investors, the continuous trading throughout the day, and the daily publication of ETFs' holdings which enables market transparency.

In this study, we examine the performance of 42 equity ETFs during the five-year period 2019-2023. Raw and risk-adjusted returns are computed, as well as alphas from a single-factor regression model of ETFs' return on the return of the S&P/ASX 200 Index, which is used as a proxy for the entire Australian equity market. The results indicate that the average raw monthly and annual return of the examined ETFs has been positive during the study period. Positive average raw returns have been provided in four out of five years over the period under investigation. When compared to the S&P/ASX 200 Index, the examined ETFs have outperformed the market index

[1] Source: www.afr.com/markets/equity-markets/etf-industry-hits-record-as-rba-boosts-bonds-appeal-20240114-p5ex2p
[2] Source: https://www.ft.com/content/0e16dfcd-b0af-49f9-882f-f9598ae9018f
[3] Source: Vanguard, "ETF use Matures for Australian Investors', 18 May 2016, available at: https://www.vanguardinvestments.com.au/au/portal/articles/insights/pressroom/ETF-use-matures-for-Australian-investors.jsp

in three out of five years, while at the cumulative level, ETFs have beaten the market over the period under study. However, this outperformance of ETFs is not verified by the simple regression analysis of performance as no significant alphas have been obtained.

Furthermore, the average risk-adjusted return of the Australian equity ETFs has been negative when the Sharpe and Information Ratio are considered. The opposite is the case when risk-adjusted return is computed with the Modigliani-Modigliani ratio. Furthermore, the results of a cross-sectional regression model reveal a significantly negative relationship between ETFs' performance and age and a significantly positive relation of performance with the size of ETFs. This model considers the expense ratio of ETFs too as an explanatory variable and a significantly negative estimate is estimated only when alpha is used as a proxy for performance. On the question about performance persistence, the results show that persistence is not strong over the study period. In fact, in several cases, the return of ETFs tends to reverse from one year to another.

The Australian ETF market is the subject of a study by Gallagher and Segara (2002), who examine the ability of four passively managed ETFs to replicate the return of their benchmarks. The results show that the ETFs closely track the performance of their benchmarks. Another study of Australian ETFs is that by Sun and Small (2022) who assessed the impact of sustainability on the financial performance of 244 ETFs in Australia during the period of COVID-19. The results show that ETFs with lower carbon risk and fossil fuel exposure tend to outperform, while ETFs with higher social risk deliver higher returns. The results also indicate that ETFs with high environmental risk, governance risk, carbon risk and fossil fuel exposure are more volatile.

Besides the articles above, we are not aware of another article focusing on the Australian ETF industry. Thus, our study has been motivated by the increasing growth of ETFs in Australia and the lack of an updated study on the performance of these ETFs. By fulfilling this gap, we deem that we provide empirical insights that can be useful to investors, practitioners, analysts and researchers. Notably, the fact that the examined equity ETFs have beaten the main benchmark index of the Australian stock market in three out of five years, at least in raw return terms, indicates that these products can be quite prosperous to investors seeking to enhance their equity portfolios with alternative products of low cost and high trading flexibility.

The remainder of this article is structured as follows: Section 2 provides a review of some representative studies on the performance of ETFs. Section 3 describes the sample of the study and develops the research methodology that will be applied. Empirical findings are discussed in Section 4 and conclusions are provided in Section 5.

2. Literature Review

In this section, we discuss the findings of some representative recent studies in the literature that concern the performance and performance persistence of ETFs traded on various stock exchanges.

Blitz and Vidojevic (2021) evaluate the performance of a comprehensive, survivorship-bias-free sample of US equity ETFs finding that ETFs have collectively lagged the market by an amount similar to the widely documented underperformance of the actively managed mutual funds. Based on their findings, the authors conclude that the allure of ETFs is not supported empirically by the data and, consequently, ETFs have yet to prove that they can perform better than conventional active open-ended funds.

Wu et al. (2021) use data from the Chinese market to compare the performance of ETFs and traditional index funds. In particular, the sample includes 106 ETFs and 285 traditional index funds, and the study period spans from February 2005 to December 2018. The results show that, on average, ETFs outperform the underlying indexes, while index funds slightly underperform. Similar results are provided by Elton et al. (2019). On the other hand, the studies by Sharifzadeh and Hojat (2012) and Nansy (2014) reveal no statistically significant differences in various measures of risk-adjusted return between ETFs and index funds.

Nguyen (2023) also compares the return of ETFs to market return by focusing on ninety-six ESG ETFs during the COVID-19 market stress. The results show that the ESG ETFs examined outperformed the market during the pandemic, suggesting they were more immune to the health crisis than other investment tools. In addition, the ESG ETFs are found to be quite capable of tracking their indexes before the COVID-19 crisis and after the recovery from the crisis. However, during the crisis of Covid-19, the tracking efficiency of ETFs was dampened.

The tracking ability of ETFs is also the subject of a study conducted by Zawadzki (2020). This study assesses the performance of eighteen ETFs that are invested in stock indexes from the Americas, Asia and Europe during the period from January 2013 to December 2019. The results indicate that the return of ETFs is not absolutely in line with the return of the underlying indexes. In fact, the calculated tracking errors are often significantly negative. Furthermore, differences in ETFs' tracking errors are found based on geographical dependence and the degree of the underlying market's development.

The study of Tripathi and Sethi (2021) also examines the tracking ability of ETFs using data from the Indian market. The authors do so by using the Capital Asset Pricing Model, a cointegration-Vector Error Correction Model, and tracking error. The findings show that the exposure of ETFs to the underlying indexes is not what is supposed to be and, consequently, the tracking error for the majority of the ETFs examined is large and non-trivial. Similar results on Indian ETFs are reported by Sing and Kaur (2017).

Tsalikis and Papadopoulos (2019) focus on the tracking ability of ETFs too by comparing five American and ten European ETFs tracking broad market indexes. The results show that the tracking error records of the American ETFs are lower than those of the European ETFs. Osterhoff and Kaserer (2016) also reveal material tracking errors for German ETFs, the magnitude of which depends on the liquidity of underlying stocks. On the other hand, Feder-Sempach and Miziołek (2022) report that the tracking error of a sample of fourteen ETFs listed on European exchanges is quite low.

Chen et al. (2017) use regression methods and cointegration analysis to examine the tracking efficiency of ETFs in New Zealand by considering daily and monthly return frequencies. The results on daily returns show that the ETFs have substantially different exposure to their tracking indexes from what they should have. At the monthly frequency, tracking efficiency improves but still significant differences in returns between ETFs and the underlying indexes are observed. The authors conclude that the tracking efficiency of the examined ETFs depends on the characteristics of ETFs, as well as the constituents and volatility of the tracking indexes.

Adamo et al. (2023) investigate the performance of forty-six ETFs from the Emerging European market during the period 2005-2022. According to the results of the study, ETFs present a continuous positive performance. Rompotis (2023) also focuses on Europe by assessing the performance and performance persistence of forty-three US-listed ETFs that are exposed to the European capital markets. The results reveal that, on average, the examined ETFs cannot beat the S&P 500 Index and STOXX Europe 600 Index, which are used as proxies for the US and European stock markets, respectively. In addition, the results show that the performance of these ETFs does not persist through time.

3. Data and Methodology

3.1. Data and Statistics

The sample of our study includes forty-two equity ETFs that trade on the Australian stock exchange. The main selection criterion applied concerns full data availability over the study period 2019-2023. The examined ETFs are presented in Table 1. The ticker of ETFs is provided along with their names, inception dates, age as at 31 December 2023, average daily assets under management during the study period, and the expense ratio. The examined ETFs

are managed by three different companies, namely Global X Management Co (seven ETFs), BlackRock (twenty-four iShares), and State Street Global Advisors (eleven ETFs).

This table presents the profiles of ETFs, which include their ticker, name, inception date, age as at 31/12/2023, average daily assets (in Australian dollars) during the period 2019-2023, and the expense ratio.

Table 1. Sample.

Ticker	Name	Inception	Age	Average Assets (AUD)	Expense Ratio
ACDC	Global X Battery Tech & Lithium ETF	3/9/2018	5.33	285,391,815	0.69%
ESTX	Global X EURO STOXX 50 ETF	21/7/2016	7.45	64,427,816	0.35%
TECH	Global X Morningstar Global Technology ETF	11/4/2017	6.73	237,913,726	0.45%
ROBO	Global X ROBO Global Robotics & Automation ETF	14/9/2017	6.30	191,395,165	0.69%
ZYUS	Global X S&P 500 High Yield Low Volatility ETF	12/6/2015	8.56	72,323,157	0.35%
CURE	Global X S&P Biotech ETF	12/11/2018	5.14	31,288,791	0.45%
ZYAU	Global X S&P/ASX 200 High Dividend ETF	12/6/2015	8.56	94,206,926	0.24%
IJR	iShares S&P Small-Cap ETF	10/10/2007	16.24	316,495,871	0.09%
IHOO	iShares Global 100 AUD Hedged ETF	18/12/2014	9.04	145,861,911	0.43%
IXJ	iShares S&P Global Healthcare ETF	11/3/2009	14.82	927,460,300	0.40%
IOO	iShares S&P Global 100 ETF	10/10/2007	16.24	2,204,585,243	0.40%
IVE	iShares MSCI EAFE ETF	10/10/2007	16.24	388,076,921	0.31%
IJP	iShares MSCI Japan ETF	10/10/2007	16.24	373,242,649	0.50%
IKO	iShares MSCI South Korea Capped Index ETF	15/11/2007	16.14	85,289,608	0.57%
IXI	iShares Global Consumer Staples ETF	12/9/2006	17.31	166,452,594	0.41%
IAA	iShares S&P Asia 50 ETF	10/9/2008	15.32	665,449,475	0.51%
IEU	iShares S&P Europe ETF	10/10/2007	16.24	723,220,357	0.58%
IEM	iShares MSCI Emerging Markets ETF	10/10/2007	16.24	810,899,141	0.69%
IWLD	iShares Core MSCI World ex Australia ESG ETF	28/4/2016	7.68	305,734,914	0.10%
IHWL	iShares Core MSCI World ex Australia ESG (AUD Hedged) ETF	28/4/2016	7.68	196,128,617	0.13%
IHVV	iShares S&P 500 AUD Hedged ETF	18/12/2014	9.04	617,496,927	0.10%
IJH	iShares S&P Midcap ETF	10/10/2007	16.24	185,627,539	0.09%
WDMF	iShares Edge MSCI World Multifactor ETF	14/10/2016	7.22	184,461,461	0.35%
WVOL	iShares Edge MSCI World Minimum Volatility ETF	14/10/2016	7.22	183,452,931	0.30%
IZZ	iShares FTSE China Large-Cap ETF	15/11/2007	16.14	185,753,085	0.77%
AUMF	iShares Edge MSCI Australia Multifactor ETF	14/10/2016	7.22	34,607,193	0.30%
MVOL	iShares Edge MSCI Australia Minimum Volatility ETF	14/10/2016	7.22	34,491,084	0.30%
IOZ	iShares Core S&P/ASX 200 ETF	9/12/2010	13.07	3,242,253,915	0.05%
ILC	iShares S&P/ASX 20 ETF	9/12/2010	13.07	406,458,908	0.24%
IHD	iShares S&P/ASX High Dividend Yield ETF	9/12/2010	13.07	276,499,953	0.30%
ISO	iShares S&P/ASX Small Ordinaries ETF	9/12/2010	13.07	119,622,601	0.55%
SYI	SPDR MSCI Australia Select High Dividend Yield Fund	29/9/2010	13.26	250,908,206	0.20%
QMIX	SPDR MSCI World Quality Mix Fund	14/9/2015	8.30	27,152,743	0.18%
WEMG	SPDR S&P Emerging Markets Carbon Control Fund	4/11/2013	10.16	19,656,155	0.65%
WDIV	SPDR S&P Global Dividend Fund	4/11/2013	10.16	307,262,107	0.35%
WXOZ	SPDR S&P World ex Australia Carbon Control Fund	19/3/2013	10.79	250,523,258	0.30%
OZF	SPDR S&P/ASX 200 Financials ex A-REITs Fund	13/4/2011	12.73	106,157,039	0.40%
OZR	SPDR S&P/ASX 200 Resource Fund	13/4/2011	12.73	112,129,017	0.40%
STW	SPDR S&P/ASX 200	27/8/2001	22.36	4,269,612,604	0.05%
SFY	SPDR S&P/ASX 50	27/8/2001	22.36	703,589,685	0.29%
SSO	SPDR S&P/ASX Small Ordinaries Fund	13/4/2011	12.73	25,748,024	0.50%
WXHG	SPDR World ex Australia Carbon Control (Hedged) Fund	9/7/2013	10.48	135,044,806	0.35%
Average			11.95	475,341,768	0.37%
Min			5.14	19,656,155	0.05%
Max			22.36	4,269,612,604	0.77%

The average ETFs in the sample is about twelve years old. The youngest ETF in the sample is five years old and the oldest one is about 22 years old. Ages indicate that the examined ETFs can be considered to be quite mature. If getting older comes with accumulating knowledge and improving managerial skills, a positive relation between age and performance could possibly be established.

In regard to the size of ETFs, as measured by their assets under management, Table 1 reports an average assets figure of A$475 million. The smallest ETF in the sample is the SPDR S&P Emerging Markets Carbon Control Fund (WEMG), with average assets of A$19.7 million, and the biggest one is the SPDR S&P/ASX 200, which held average assets of A$4.3 billion over the study period.

When it comes to the managerial cost of the ETFs examined, Table 1 presents an average expense ratio of 37 basis points (bps). The range between extreme expense ratios in the sample is quite large at 72 bps (i.e., the minimum and maximum expense ratios are equal to 5 bps and 77 bps, respectively). By examining expense ratios

in Table 1 a little further, we can see that the highest ratios are presented by ETFs with an international focus (i.e., Europe, Japan, emerging markets, and so on) or by ETFs that are targeted to specialized sectors (e.g., solactive battery value chain industry). On the other hand, the lowest expenses are charged by ETFs investing in local broad market indexes (e.g., the S&P/ASX 200 Index).

Table 2 presents the return and risk of ETFs on an annual basis during the study period. Returns are computed as average monthly returns with Net Asset Values (NAVs) that have been manually collected from the website of ETFs' managing companies. Total (cumulative) returns are calculated too. Risk is computed as the standard deviation of monthly returns. As shown in Table 2, both the average monthly and total return of ETFs over the entire period under study have been positive (i.e., 54 bps and 2,381 bps, respectively). At the fund level, the majority of the examined ETFs present positive monthly and cumulative returns. At the annual level, the best year was 2019 and the worst was 2022, which is the only year with negative average monthly and total returns.

This table presents the returns and risk of ETFs on an annual basis during the period 2019-2023. Returns are presented in average monthly and total raw terms. Risk is the standard deviation of monthly returns.

Table 2. Return and Risk.

	Average Monthly Raw Return						Total Raw Return						Risk					
Ticker	2019	2020	2021	2022	2023	19-23	2019	2020	2021	2022	2023	19-23	2019	2020	2021	2022	2023	19-23
ACDC	1.217	4.260	1.107	-0.640	0.435	1.276	14.615	59.836	13.829	-9.358	3.747	96.098	3.970	7.926	2.168	6.156	5.249	5.517
ESTX	1.733	-0.323	1.529	-0.960	1.634	0.723	22.286	-6.022	19.422	-12.808	20.468	44.157	3.058	6.572	2.931	6.212	3.945	4.775
TECH	2.144	1.931	0.560	-3.057	2.852	0.886	26.891	22.614	6.232	-32.339	37.707	54.000	5.513	6.950	3.448	5.607	5.770	5.786
ROBO	2.325	2.368	0.992	-3.165	1.861	0.876	29.077	30.479	11.962	-34.056	22.530	52.364	6.143	5.284	3.185	7.276	5.786	5.886
ZYUS	0.878	-2.026	2.105	0.421	-0.592	0.157	10.478	-23.567	27.641	3.918	-7.207	3.933	3.123	6.211	3.383	4.713	2.525	4.295
CURE	2.395	1.784	-2.074	-1.604	0.787	0.258	29.129	20.415	-23.521	-20.627	6.778	0.787	7.443	7.066	5.498	8.062	7.316	7.116
ZYAU	0.986	-1.002	0.929	-1.613	0.201	-0.100	12.122	-16.236	11.226	-19.077	1.674	-14.053	2.506	9.415	2.906	5.360	3.690	5.317
IJR	1.671	0.256	2.394	-0.858	1.199	0.932	20.649	-0.149	32.282	-11.385	14.023	61.017	4.539	7.423	2.803	5.715	4.682	5.202
IHOO	1.955	0.918	0.723	-1.464	1.766	0.779	25.342	8.868	7.291	-17.650	22.536	47.736	3.458	6.715	5.261	5.521	3.584	5.038
IXJ	1.582	0.132	1.944	0.120	0.187	0.793	20.288	1.077	25.283	0.656	1.823	56.119	2.641	3.039	3.228	3.815	2.833	3.135
IOO	2.005	0.564	2.334	-1.001	1.912	1.163	26.302	6.159	31.441	-12.271	25.008	93.276	2.973	3.755	2.566	4.292	2.765	3.454
IVE	1.366	-0.271	1.147	-0.849	1.199	0.518	17.212	-4.301	14.486	-10.687	14.951	31.843	2.720	4.526	1.731	4.435	2.616	3.395
IJP	1.294	0.392	0.456	-1.058	1.416	0.500	16.246	3.882	5.126	-12.658	18.121	30.973	2.642	4.036	2.880	3.746	2.011	3.170
IKO	0.649	2.015	-0.172	-1.842	1.436	0.417	6.683	24.900	-2.666	-22.372	16.899	17.693	4.834	5.642	3.367	7.334	5.300	5.433
IXI	1.514	-0.345	1.438	-0.043	0.058	0.524	19.283	-4.467	17.861	-1.322	0.103	32.671	2.717	2.755	3.618	3.857	3.306	3.267
IAA	1.415	1.614	-0.521	-1.582	0.342	0.253	17.346	20.500	-6.842	-20.556	2.888	7.672	3.955	3.235	3.855	8.572	4.817	5.208
IEU	1.533	-0.484	1.598	-0.820	1.306	0.626	19.463	-7.031	20.586	-10.745	16.200	38.901	2.958	5.146	2.355	5.208	3.206	3.963
IEM	1.110	0.478	0.046	-1.423	0.609	0.164	13.600	4.891	0.107	-16.884	7.069	6.153	2.997	4.056	2.820	4.844	2.912	3.597
IWLD	1.766	0.213	1.578	-1.463	1.956	0.810	22.774	1.471	19.490	-17.125	25.659	55.025	3.001	4.428	4.192	4.465	2.746	3.928
IHWL	1.940	0.846	1.426	-1.938	1.825	0.820	25.198	7.423	17.299	-22.618	23.152	50.339	3.292	7.249	4.322	6.186	4.067	5.254
IHVV	2.213	1.085	0.577	-1.350	1.698	0.844	29.094	10.397	4.832	-92.193	21.271	-85.855	3.680	7.423	6.105	6.486	4.154	5.687
IJH	1.878	0.356	2.281	-0.013	1.176	1.136	23.811	1.786	30.684	-90.836	14.199	-82.765	4.245	6.568	2.396	4.971	3.719	4.520
WDMF	1.613	0.003	1.604	-1.373	0.918	0.553	20.460	-1.024	20.553	-16.085	11.383	34.342	3.315	4.335	2.738	4.173	1.836	3.482
WVOL	1.583	-0.662	1.516	-0.520	0.378	0.459	20.458	-8.293	19.226	-6.454	4.385	28.610	2.107	3.502	2.960	2.754	2.102	2.815
IZZ	0.919	-0.190	-1.374	-0.785	-1.107	-0.507	10.721	-3.125	-16.325	-16.629	-14.283	-35.861	3.792	4.039	4.615	12.783	6.121	6.915
AUMF	1.249	0.272	0.705	-0.475	0.397	0.430	15.658	-0.546	8.443	-7.027	4.182	20.823	2.550	8.015	2.480	5.281	3.474	4.702
MVOL	1.247	-0.192	1.157	-0.579	0.479	0.423	15.755	-5.559	14.520	-8.171	5.423	21.198	2.140	7.519	2.142	5.252	2.908	4.416
IOZ	1.369	0.214	1.048	-0.479	0.702	0.571	17.332	-1.317	13.144	-7.027	7.896	31.417	2.509	8.073	1.718	5.230	3.829	4.705
ILC	1.138	0.106	0.994	-0.202	0.751	0.557	14.067	-1.956	12.358	-3.759	8.513	31.228	2.786	7.388	2.017	5.043	3.867	4.493
IHD	1.383	-0.191	0.451	-0.506	0.788	0.385	17.218	-5.917	4.945	-7.108	8.928	17.108	3.350	7.990	3.242	4.870	4.001	4.881
ISO	0.969	0.927	0.717	-2.095	0.400	0.184	11.761	5.621	8.444	-24.437	3.836	0.439	2.887	9.810	2.903	6.698	4.351	5.858
SYI	1.082	0.183	0.629	-0.670	0.326	0.310	13.261	-2.760	7.269	-10.636	3.197	8.950	2.952	9.099	3.013	7.319	3.738	5.629
QMIX	1.879	-0.325	1.868	-0.904	1.216	0.747	24.602	-4.836	24.464	-11.155	15.350	51.249	2.527	4.339	2.450	4.096	2.008	3.324
WEMG	1.334	0.192	0.183	-1.333	0.415	0.158	16.814	1.220	1.848	-15.712	4.788	6.363	2.582	4.330	2.547	4.238	2.311	3.323
WDIV	1.142	-1.887	1.301	-0.405	0.211	0.072	14.280	-22.680	16.430	-5.251	2.188	-0.391	2.259	6.864	2.379	3.068	2.558	3.891
WXOZ	1.806	0.391	2.011	-2.234	1.568	0.708	23.454	3.721	26.675	-25.365	20.075	45.365	2.743	4.326	2.164	6.020	2.633	4.042
OZF	0.731	-0.155	1.599	0.020	0.595	0.558	8.227	-8.245	20.130	-2.800	6.489	23.479	3.951	10.432	3.570	7.474	3.915	6.264
OZR	1.610	0.785	0.375	0.737	0.516	0.805	19.889	4.378	3.052	4.323	5.429	41.835	4.374	9.530	5.180	8.884	4.061	6.594
STW	1.384	0.255	1.022	-0.495	0.657	0.565	17.492	-1.195	12.785	-7.736	7.343	29.671	2.636	8.432	1.785	6.087	3.796	5.017
SFY	1.428	-0.102	0.973	-0.240	0.720	0.556	18.108	-5.102	12.103	-4.565	8.203	29.748	2.626	8.185	1.902	5.653	3.662	4.829
SSO	1.385	1.100	0.701	-2.305	0.457	0.267	17.273	8.035	8.414	-28.253	4.511	2.994	3.262	9.642	2.357	9.257	4.418	6.462
WXHG	1.605	0.687	1.534	-3.215	1.360	0.395	20.396	5.466	19.562	-35.887	16.698	13.586	3.182	7.233	2.746	9.058	3.812	5.871
Average	1.486	0.385	0.986	-1.054	0.881	0.537	18.693	2.829	12.431	-17.208	10.575	23.815	3.356	6.393	3.093	5.859	3.724	4.773
Min	0.649	-2.026	-2.074	-3.215	-1.107	-0.507	6.683	-23.567	-23.521	-92.193	-14.283	-85.855	2.107	2.755	1.718	2.754	1.836	2.815
Max	2.395	4.260	2.394	0.737	2.852	1.276	29.129	59.836	32.282	4.323	37.707	96.098	7.443	10.432	6.105	12.783	7.316	7.116

On the other hand, the sample's risk is not trivial, as evidenced both by the average risk figure over the entire study period (i.e., 477 bps) and the extreme risk scores during the same period (i.e., 281 and 711 bps at a minimum and a maximum level, respectively). The most turbulent year was 2020 (i.e., the COVID-19 year) and the most calm year was 2021, that is, the year that followed the COVID-19 year.

Table 3 reports the excess average monthly return, the excess total return and the excess risk of the examined ETFs over the S&P/ASX 200 Index.[4] The results in Table 3 are quite promising. In particular, the average ETF in the sample achieved a positive excess total return during the study period amounting to 196 bps. The respective average excess monthly return is slightly negative at minus 8 bps. At the annual level, ETFs beat the market in three out of five years, namely, in 2019, 2020 and 2023. This outperformance concerns both average monthly and annual cumulative returns. On the other hand, ETFs have been more volatile than the market in three years during the study period, that is, 2019, 2020 and 2022. Interestingly enough, ETFs were less volatile than the market index during the Covid-19 crisis in 2020. ETFs outperformed the market index in this year too. The latter evidence is in agreement with the findings of Nguyen (2023) who reported that the (ESG) ETFs outperformed the market during the pandemic of Covid-19.

This table presents the excess returns and risk of ETFs on an annual basis during the period 2019-2023 over the S&P/ASX 200 Index. Excess returns are presented in average monthly and total raw terms. Risk is the standard deviation of monthly returns.

Table 3. Excess Return and Risk.

	Average Monthly Raw Return						Total Raw Return						Risk					
Ticker	2019	2020	2021	2022	2023	19-23	2019	2020	2021	2022	2023	19-23	2019	2020	2021	2022	2023	19-23
ACDC	-0.228	4.033	0.069	-0.318	-0.264	0.659	-3.762	61.287	0.810	-3.905	-4.097	91.902	1.475	-0.423	0.484	0.574	1.372	0.650
ESTX	0.289	-0.549	0.491	-0.638	0.935	0.106	3.908	-4.571	6.404	-7.355	12.623	39.961	0.563	-1.777	1.247	0.629	0.068	-0.092
TECH	0.700	1.705	-0.478	-2.735	2.153	0.269	8.513	24.065	-6.786	-26.886	29.863	49.804	3.018	-1.399	1.764	0.025	1.893	0.919
ROBO	0.880	2.142	-0.046	-2.843	1.162	0.259	10.699	31.930	-1.056	-28.603	14.686	48.168	3.648	-3.065	1.501	1.694	1.909	1.019
ZYUS	-0.566	-2.252	1.067	0.743	-1.291	-0.460	-7.899	-22.116	14.622	9.371	-15.051	-0.264	0.628	-2.138	1.698	-0.870	-1.352	-0.572
CURE	0.951	1.558	-3.112	-1.281	0.088	-0.359	10.751	21.866	-36.540	-15.174	-1.066	-3.410	4.948	-1.283	3.813	2.480	3.439	2.250
ZYAU	-0.458	-1.228	-0.109	-1.291	-0.499	-0.717	-6.256	-14.785	-1.793	-13.624	-6.170	-18.249	0.012	1.066	1.222	-0.222	-0.186	0.450
IJR	0.227	0.029	1.356	-0.536	0.500	0.315	2.271	1.302	19.263	-5.932	6.178	56.821	2.044	-0.926	1.119	0.133	0.806	0.335
IHOO	0.511	0.692	-0.315	-1.142	1.067	0.162	6.964	10.318	-5.727	-12.197	14.691	43.540	0.964	-1.634	3.576	-0.061	-0.293	0.171
IXJ	0.138	-0.095	0.906	0.442	-0.512	0.176	1.911	2.528	12.265	6.109	-6.021	51.922	0.146	-5.310	1.544	-1.767	-1.044	-1.732
IOO	0.561	0.337	1.296	-0.679	1.213	0.546	7.924	7.610	18.422	-6.818	17.164	89.079	0.478	-4.594	0.882	-1.290	-1.112	-1.413
IVE	-0.078	-0.498	0.109	-0.526	0.500	-0.099	-1.166	-2.851	1.467	-5.234	7.107	27.647	0.225	-3.823	0.046	-1.147	-1.261	-1.471
IJP	-0.150	0.166	-0.582	-0.736	0.717	-0.117	-2.132	5.333	-7.892	-7.205	10.277	26.776	0.147	-4.313	1.196	-1.836	-1.866	-1.696
IKO	-0.795	1.789	-1.211	-1.520	0.737	-0.200	-11.695	26.351	-15.685	-16.919	9.055	13.496	2.339	-2.707	1.683	1.752	1.423	0.567
IXI	0.070	-0.571	0.400	0.279	-0.641	-0.093	0.906	-3.016	4.843	4.131	-7.741	28.474	0.222	-5.594	1.934	-1.725	-0.571	-1.599
IAA	-0.029	1.388	-1.559	-1.260	-0.357	-0.364	-1.032	21.951	-19.861	-15.103	-4.956	3.475	1.460	-5.114	2.171	2.990	0.940	0.342
IEU	0.089	-0.710	0.560	-0.498	0.607	0.009	1.086	-5.580	7.568	-5.293	8.356	34.705	0.463	-3.203	0.671	-0.374	-0.671	-0.904
IEM	-0.334	0.252	-0.992	-1.101	-0.090	-0.453	-4.778	6.342	-12.911	-11.431	-0.775	1.956	0.503	-4.294	1.135	-0.739	-0.965	-1.270
IWLD	0.321	-0.013	0.540	-1.141	1.257	0.193	4.397	2.922	6.472	-11.672	17.815	50.829	0.507	-3.921	2.508	-1.118	-1.130	-0.939
IHWL	0.496	0.620	0.388	-1.616	1.125	0.203	6.821	8.874	4.280	-17.165	15.307	46.142	0.797	-1.100	2.638	0.603	0.190	0.387
IHVV	0.769	0.858	-0.461	-1.028	0.999	0.227	10.716	11.848	-8.186	-86.740	13.427	-90.052	1.185	-0.926	4.420	0.904	0.277	0.820
IJH	0.434	0.130	1.243	0.309	0.476	0.518	5.434	3.237	17.666	-85.383	6.354	-86.961	1.750	-1.781	0.712	-0.612	-0.157	-0.347
WDMF	0.169	-0.224	0.566	-1.051	0.219	-0.064	2.082	0.427	7.534	-10.632	3.539	30.145	0.820	-4.014	1.053	-1.409	-2.041	-1.385
WVOL	0.139	-0.888	0.478	-0.198	-0.321	-0.158	2.081	-6.842	6.207	-1.001	-3.460	24.414	-0.388	-4.847	1.276	-2.828	-1.774	-2.052
IZZ	-0.525	-0.417	-2.412	-0.462	-1.806	-1.124	-7.657	-1.674	-29.343	-11.176	-22.127	-40.058	1.297	-4.310	2.931	7.200	2.244	2.048
AUMF	-0.195	0.046	-0.333	-0.153	-0.303	-0.188	-2.720	0.905	-4.576	-1.574	-3.662	16.626	0.055	-0.334	0.795	-0.301	-0.403	-0.165
MVOL	-0.197	-0.419	0.119	-0.257	-0.220	-0.195	-2.622	-4.108	1.501	-2.718	-2.422	17.001	-0.354	-0.830	0.458	-0.330	-0.969	-0.451
IOZ	-0.075	-0.012	0.010	-0.157	0.003	-0.046	-1.046	0.134	0.126	-1.574	0.052	27.221	0.014	-0.276	0.034	-0.352	-0.048	-0.161
ILC	-0.306	-0.120	-0.044	0.120	0.051	-0.060	-4.311	-0.505	-0.661	1.694	0.668	27.031	0.291	-0.961	0.332	-0.539	-0.010	-0.374
IHD	-0.061	-0.417	-0.587	-0.184	0.088	-0.232	-1.159	-4.466	-8.074	-1.655	1.084	12.911	0.856	-0.359	1.558	-0.712	0.124	0.015
ISO	-0.476	0.701	-0.322	-1.773	-0.299	-0.434	-6.616	7.071	-4.574	-18.984	-4.008	-3.758	0.393	1.461	1.219	1.116	0.475	0.992
SYI	-0.362	-0.044	-0.410	-0.348	-0.373	-0.307	-5.117	-1.309	-5.750	-5.183	-4.648	4.753	0.457	0.750	1.329	1.737	-0.139	0.762
QMIX	0.435	-0.551	0.830	-0.582	0.516	0.129	6.225	-3.386	11.446	-5.702	7.506	47.052	0.032	-4.010	0.766	-1.487	-1.869	-1.543
WEMG	-0.110	-0.034	-0.855	-1.011	-0.284	-0.459	-1.564	2.670	-11.171	-10.259	-3.056	2.167	0.087	-4.019	0.863	-1.344	-1.566	-1.544
WDIV	-0.303	-2.113	0.263	-0.083	-0.489	-0.545	-4.098	-21.229	3.411	0.202	-5.656	-4.587	-0.236	-1.485	0.694	-2.514	-1.319	-0.976
WXOZ	0.362	0.165	0.973	-1.912	0.869	0.091	5.077	5.171	13.657	-19.912	12.231	41.168	0.248	-4.023	0.479	0.438	-1.244	-0.825
OZF	-0.713	-0.381	0.561	0.342	-0.104	-0.059	-10.150	-6.794	7.111	2.653	-1.355	19.283	1.456	2.083	1.886	1.891	0.038	1.397
OZR	0.166	0.559	-0.663	1.059	-0.183	0.188	1.512	5.828	-9.967	9.776	-2.415	37.638	1.879	1.181	3.495	3.302	0.184	1.727

[4] This index is designed to measure the performance of the 200 largest stocks listed on the Australian Stock Exchange based on their float-adjusted market capitalization. As being highly representative, liquid and tradable, the S&P/ASX 200 Index is widely considered the preeminent benchmark index for the Australian stock market.

STW	-0.060	0.029	-0.016	-0.173	-0.042	-0.052	-0.885	0.256	-0.234	-2.283	-0.502	25.475	0.141	0.083	0.100	0.505	-0.081	0.150
SFY	-0.016	-0.328	-0.065	0.082	0.021	-0.061	-0.270	-3.651	-0.916	0.888	0.359	25.552	0.131	-0.164	0.217	0.071	-0.215	-0.037
SSO	-0.060	0.874	-0.337	-1.983	-0.242	-0.350	-1.104	9.486	-4.605	-22.800	-3.333	-1.203	0.767	1.293	0.672	3.675	0.542	1.595
WXHG	0.161	0.461	0.496	-2.892	0.661	-0.223	2.019	6.917	6.543	-30.434	8.853	9.389	0.687	-1.116	1.061	3.476	-0.065	1.004
Average	0.042	0.159	-0.052	-0.732	0.182	-0.080	0.316	4.280	-0.588	-11.755	2.730	19.619	0.861	-1.956	1.409	0.277	-0.153	-0.094
Min	-0.795	-2.252	-3.112	-2.892	-1.806	-1.124	-11.695	-22.116	-36.540	-86.740	-22.127	-90.052	-0.388	-5.594	0.034	-2.828	-2.041	-2.052
Max	0.951	4.033	1.356	1.059	2.153	0.659	10.751	61.287	19.263	9.776	29.863	91.902	4.948	2.083	4.420	7.200	3.439	2.250

In order to further assess the return and risk of the Australian ETFs around the crisis in financial markets that was triggered by the COVID-19 pandemic, we use daily return data over the period 17/1/2020 to 27/4/2020. More specifically, as noted by Zhang *et al*. (2020) and Gormsen and Koijen (2023), the 20th of February 2020 was the start of the drawdown in financial markets, when the World Health Organization (WHO) declared the COVID-19 health crisis as a global pandemic. The crisis in financial markets lasted up to the 23rd of March 2020, when the S&P 500 Index in the United States plunged to 2237.40 reaching an accumulated fall of over 30% within about one month. This period covers 23 trading days.

In our analysis, we compute daily return and volatility over 23 trading days before the burst of the financial crisis, over 23 trading days during the crisis and 23 trading days after the crisis. The relevant calculations are presented in Table 4. The sample's average return before the burst of crisis amounts to 8.5 bps. The average risk during that period is equal to 72 bps. During the COVID-19 crisis, the average daily return is quite negative at -134 bps, while the average volatility equals 435 bps. Finally, after the crisis, the average daily return significantly increased at 62 bps, with the corresponding risk being equal to 277 bps. The risk during the period of recovery remained at quite high levels compared to the risk before the crisis.[5]

This table presents the return and volatility of ETFs 23 days before (Bef.Cr.), 23 days during (Dur.Cr.), and 23 days after (Aft.cr.) the crisis in financial markets that triggered by the burst of the Covid-19 health crisis. The COVID-19-related financial crisis started on February 20, 2020, and lasted to March 23, 2020.

Table 4. Return and Risk Around the Covid-19 Crisis.

	Daily Returns			Volatility		
Ticker	Bef.Cr.	Dur.Cr.	Aft.Cr.	Bef.Cr.	Dur.Cr.	Aft.Cr.
ACDC	0.205	-1.240	0.521	0.868	2.841	2.172
ESTX	0.114	-1.196	0.201	0.638	3.490	2.535
TECH	0.316	-0.998	0.514	0.683	5.608	2.987
ROBO	0.130	-1.028	0.647	0.737	3.389	2.237
ZYUS	0.036	-1.384	0.510	0.530	5.467	3.094
CURE	0.203	-0.745	1.086	1.316	5.569	3.079
ZYAU	-0.030	-2.208	0.722	0.690	3.828	3.366
IJR	0.046	-1.515	0.520	0.810	5.327	3.606
IHOO	0.108	-1.603	1.068	0.622	4.453	3.014
IXJ	0.155	-0.636	0.800	0.699	4.493	2.378
IOO	0.223	-0.837	0.545	0.576	5.223	2.601
IVE	0.072	-0.962	0.328	0.557	4.622	2.448
IJP	-0.019	-0.391	0.145	0.643	3.649	2.047
IKO	-0.045	-1.138	0.749	1.473	5.742	3.740
IXI	0.150	-0.471	0.297	0.512	4.533	1.918
IAA	-0.018	-0.374	0.167	1.364	4.328	2.643
IEU	0.113	-1.140	0.381	0.569	4.898	2.660
IEM	-0.018	-0.824	0.273	1.118	5.168	2.754
IWLD	0.172	-1.063	0.542	0.550	5.105	2.685
IHWL	0.057	-1.846	1.137	0.719	5.148	3.470

[5] We applied t-testing on the differences in returns and risk between the period before and during the crisis and the period after and during the crisis, which showed that the differences in returns and risks are statistically significant at 1%.

IHVV	0.098	-1.882	1.294	0.692	5.398	3.663
IJH	0.150	-1.537	0.772	0.649	5.885	3.370
WDMF	0.176	-1.128	0.530	0.500	4.247	2.473
WVOL	0.206	-0.905	0.494	0.316	3.678	1.987
IZZ	-0.087	-0.182	0.065	1.497	4.220	2.617
AUMF	0.033	-1.891	0.854	0.606	3.687	2.827
MVOL	0.078	-1.753	0.741	0.444	3.357	2.761
IOZ	0.076	-1.834	0.691	0.608	3.822	3.001
ILC	0.153	-1.672	0.560	0.555	3.938	3.220
IHD	-0.059	-1.809	0.632	0.760	3.974	2.963
ISO	0.024	-2.135	1.027	0.822	3.810	2.454
SYI	0.015	-1.937	0.600	0.749	4.121	2.970
QMIX	0.182	-0.990	0.497	0.404	3.995	2.230
WEMG	-0.005	-0.930	0.190	0.807	3.042	1.619
WDIV	0.126	-1.649	0.421	0.338	3.415	2.433
WXOZ	0.192	-1.037	0.537	0.440	4.142	2.320
OZF	0.173	-2.293	0.573	0.769	4.971	3.655
OZR	-0.217	-1.620	0.861	1.068	4.371	3.061
STW	0.075	-1.832	0.683	0.608	3.817	2.876
SFY	0.087	-1.765	0.601	0.570	3.863	2.983
SSO	0.032	-2.094	1.014	0.826	3.801	2.455
WXHG	0.077	-1.809	1.133	0.615	4.164	3.147
Average	0.085	-1.340	0.617	0.722	4.348	2.774
Min	-0.217	-2.293	0.065	0.316	2.841	1.619
Max	0.316	-0.182	1.294	1.497	5.885	3.740

Overall, the analysis of daily returns around the COVID-19 era indicates that, similar to other financial instruments and markets worldwide, the equity ETFs in Australia were severely impacted by the health crisis as their returns declined significantly, while, at the same time, their risk skyrocketed.[6]

3.2. Research Methods

The first model used to examine the performance of the Australian equity ETFs is the following:

$$R_i - R_f = \alpha_i + \beta_i(R_m - R_f) + \varepsilon_i \quad (1)$$

where R_i denotes the monthly return of ETFs, R_m represents the return of the S&P/ASX 200 Index and R_f is the risk-free rate[7]. Alpha represents the above market return that can be achieved by an ETF. Beta measures the part of the risk that cannot be mitigated by diversification techniques and indicates the systematic risk of ETFs. The model is applied for each single ETF with the method of Least Squares and, when it is necessary, adjustments are made for autocorrelation and heteroskedasticity.

After estimating model (1), we compute three alternative types of risk-adjusted returns. The first risk-adjusted return computed is the Sharpe ratio, shown in formula (2):

[6] We applied additional testing to returns concerning the possible impact by the increasing interest rates in Australia during the study period. On Tuesday the 3rd of May 2022, the Reserve Bank of Australia announced that they were lifting the cash rate from a historical low of 0.10% per annum to 0.35% per annum. This was the first rate increase since November 2010. In our analysis, we run a regression model with the return of each ETF as the dependent variable and a dummy variable with zero value during January 2019 to April 2022 and value one from May 2022 to December 2023 as the independent variable of the model. No statistically significant slopes were obtained from this testing at all.

[7] The yield on Australian government bonds-interpolated-5 years maturity, is used as the risk-free rate.

$$SR_i = \frac{R_i - R_f}{\sigma_i} \quad (2)$$

where R_i denotes the average monthly return for the ith ETF, R_f is the risk-free rate and σ_i is the standard deviation of ETFs' excess return (i.e., ETF return minus the risk-free rate). The Sharpe ratio is estimated by the division of excess return by risk and is used to determine how well an ETF compensates its investors for the per unit risk they take. The higher the Sharpe ratio, the better the performance of an ETF.

The next risk-adjusted return measure used is the Modigliani-Modigliani (MM) ratio. The MM ratio measures the risk-adjusted return of a portfolio by multiplying the Sharpe ratio with the standard deviation of the market index (i.e., S&P/ASX 200 Index) and adding the risk-free return thereafter to it. The MM ratio is shown in formula (3):

$$MM_i = SR_i * \sigma_m + R_f \quad (3)$$

Where SR_i is the Sharpe ratio of the ith ETF and σ_m is the standard deviation (risk) in market return. R_f is defined as above. Similar to the Sharpe ratio, the higher the MM ratio, the better the performance of an ETF.

The third risk-adjusted return measure regards the Information Ratio (IR) shown in formula (4):

$$IR_i = \frac{R_i - R_m}{TE_i} \quad (4)$$

where R_i and R_m are defined as above and TE is the tracking error of the ith ETF, that is the standard deviation of the differences between ETFs and market returns. The IR identifies how much the return of an ETF exceeds the return of the market benchmark and, thus, the higher the information ratio of an ETF, the better.

In the next step, we apply cross-sectional regression analysis on the performance of ETFs trying to identify some factors that can affect it. The explanatory variables considered are the age, size and expense ratio of ETFs. The applied model is as follows:

$$Perf = \lambda_0 + \lambda_1 Age + \lambda_2 Size + \lambda_3 ExpRatio + u \quad (5)$$

where Perf is the performance of ETFs, computed as the average monthly raw return, excess average monthly raw return, total raw return, excess total raw return, alpha, Share ratio, MM ratio and IR ratio. Age is the average age of ETFs (in years) over the study period. Size is the natural logarithm of average daily assets over the same period. ExpRatio is the published expense ratio of ETFs. In this model, we expect a positive estimate for the age and size factors and a negative estimate for expense ratio.

In the last step, we assess performance persistence by applying the following cross-sectional regression model:

$$Perf_t = \phi_0 + \varphi_1 (Perf_{t-1}) + u \quad (6)$$

where $Perf_t$ is the performance of ETFs in year t, computed in the eight alternative versions described above. The model is applied with the one-lagged annual performance of ETFs as the independent variable. A significantly positive slope approximating unity will indicate a high level of performance persistence. The opposite will be the case, if negative and significant values of the slope are obtained.

4. Empirical Results

The results of the single-factor performance regression analysis are presented in Table 5. The table includes the average alpha and beta estimates, average R-squared values and the number of statistically significant and insignificant positive and negative estimates. The model is applied over the entire study period, as well as on an

annual basis. As shown in Table 5, no significantly positive alphas are obtained, with two exceptions in 2020 and four exceptions in 2021. In most of the cases, alphas are not statistically significant, even though a sufficient number of significantly negative alphas are estimated for the entire period under study (i.e., twenty coefficients).

This table presents the results of a single-factor performance regression model via which the monthly excess return (return minus risk free rate) of each ETF is regressed on the excess return of the S&P/ASX 200 Index. Alpha reflects the above market return that can be achieved by an ETF. Beta counts for the systematic risk of ETFs. The study period spans from 1/1/2019 to 31/12/2023.

Table 5. Performance Regression Results.

	2019			2020			2021			2022			2023			2019-23		
	alpha	beta	R^2	alpha	beta	R^2	alpha	beta	R^2	alpha	beta	R^2	alpha	beta	R^2	alpha	beta	R^2
Average	0.101	0.783	0.369	0.080	0.657	0.709	0.018	0.768	0.292	-1.833	0.693	0.526	-0.821	0.663	0.500	-0.425	0.709	0.553
Min	-0.750	0.142	0.004	-2.329	0.016	0.001	-2.933	0.030	0.000	-5.486	0.087	0.003	-3.413	0.059	0.006	-2.262	0.039	0.001
Max	0.855	1.685	0.933	3.989	1.175	0.999	1.515	1.261	0.944	1.523	1.563	0.983	1.373	1.342	0.985	0.481	1.222	0.988
Sign.>0	0	42		2	42		4	42		0	42		0	42		0	42	
Insign.>0	23	0		17	0		18	0		5	0		10	0		8	0	
Sign.<0	0	0		3	0		1	0		20	0		13	0		14	0	
Insign.<0	19	0		20	0		19	0		17	0		19	0		20	0	

Overall, the results of the time series regression analysis of performance indicate that the equity ETFs in Australia failed to deliver any material above market return. Consequently, the outperformance of ETFs over the market in raw return terms discussed above is not verified by the results of the regression analysis on performance.

On the other hand, the average beta of the sample over the entire study period is equal to 0.709, indicating an average good fit of the ETFs examined with the market index. All individual betas are positive and statistically significant. Extreme betas are equal to 0.039, indicating a poor fit of the corresponding ETF with the market index, and 1.222, showing an aggressiveness of the respective ETF relative to the market.

The risk-adjusted returns of the Australian ETFs are provided in Table 6 on an annual basis over the period 2019-2023, as well as for the entire period under study. The average Sharpe ratio of the sample over 2019-2023 is negative at minus 26 bps, while all the respective individual Sharpe ratios are negative too. Negative average Sharpe ratios are presented in 2020, 2022 and 2023, with the majority of single Sharpe ratios being negative too. The negative Sharpe ratios of 2022 and 2023 must be the result of the increasing risk-free rates in Australia during the last two years of the study period.[8] The rise in risk-free rates is the response of the RBA to the skyrocketing in inflation rates triggered by the Russian Ukrainian crisis that burst in February 2022 and the conflict between Israel and Hamas in Palestine started in October 2023.[9]

This table presents three types of ETFs' risk-adjusted return, i.e., the Sharpe Ratio, the Modigliani-Modigliani (MM) Ratio, and the Information Ratio on an annual basis over the period 2019-2023.

The average MM ratio over the period 2019-2023 was quite positive at 52 bps. At the annual level, with the exception of 2022, all the annual average MM ratios are positive, ranging from 28 bps in 2020 to 140 bps in 2019. We remind that 2022 was the only year with a negative average raw return at the sample level. At the fund level, the majority of individual MM ratios are positive for years 2019, 2020, 2021 and 2023, but only five MM ratios were positive in 2022.

The average IR over the entire period under study is slightly negative at minus 3 bps, while twenty six out of forty individual IRs are negative too. At the annual level, the sample's average IR was positive in 2020, 2021 and 2023 and negative in 2019 and 2023.

[8] Based on data by the RBA, the average yield on the Australian government bonds-interpolated-5 years maturity during 2022-2023 was equal to 3.319%, while the corresponding average yield during 2019-2020 was equal to 0.804%.

[9] According to information found on https://tradingeconomics.com/australia/inflation-cpi, inflation in Australia during the fourth quarter of 2023 was equal to 4.10%.

Table 6. Risk-Adjusted Return.

	Sharpe Ratio						Modigliani-Modigliani Ratio						Information Ratio					
Ticker	2019	2020	2021	2022	2023	19-23	2019	2020	2021	2022	2023	19-23	2019	2020	2021	2022	2023	19-23
ACDC	0.011	0.476	0.143	-0.587	-0.592	-0.088	1.201	4.432	1.021	-0.356	1.378	1.373	-0.068	0.886	0.027	-0.070	-0.060	0.157
ESTX	0.188	-0.118	0.253	-0.649	-0.501	-0.219	1.644	-0.526	1.207	-0.702	1.734	0.735	0.110	-0.100	0.242	-0.113	0.265	0.026
TECH	0.180	0.211	-0.065	-1.091	-0.140	-0.153	1.623	2.220	0.671	-3.170	3.133	1.058	0.148	0.322	-0.117	-0.809	0.411	0.056
ROBO	0.191	0.358	0.066	-0.860	-0.307	-0.150	1.651	3.441	0.893	-1.875	2.486	1.073	0.173	0.464	-0.012	-0.594	0.271	0.055
ZYUS	-0.099	-0.397	0.392	-0.522	-1.733	-0.365	0.928	-2.857	1.442	0.008	-3.046	0.028	-0.221	-0.570	0.368	0.142	-0.428	-0.123
CURE	0.166	0.187	-0.508	-0.594	-0.392	-0.214	1.589	2.015	-0.074	-0.393	2.156	0.761	0.147	0.219	-0.543	-0.134	0.016	-0.052
ZYAU	-0.084	-0.154	0.053	-0.839	-0.959	-0.345	0.965	-0.832	0.870	-1.758	-0.043	0.123	-0.417	-0.412	-0.054	-0.931	-0.308	-0.373
IJR	0.112	-0.027	0.551	-0.679	-0.531	-0.160	1.453	0.233	1.709	-0.868	1.617	1.023	0.071	0.011	0.445	-0.107	0.166	0.092
IHOO	0.232	0.068	-0.011	-0.791	-0.518	-0.194	1.754	1.025	0.762	-1.493	1.667	0.857	0.151	0.161	-0.064	-0.375	0.369	0.043
IXJ	0.149	-0.107	0.367	-0.800	-1.174	-0.288	1.547	-0.438	1.399	-1.540	-0.877	0.401	0.045	-0.011	0.350	0.079	-0.109	0.035
IOO	0.286	0.029	0.621	-0.930	-0.587	-0.169	1.887	0.694	1.826	-2.269	1.400	0.982	0.217	0.060	0.570	-0.147	0.279	0.136
IVE	0.073	-0.159	0.202	-0.889	-0.884	-0.353	1.356	-0.872	1.121	-2.041	0.248	0.085	-0.031	-0.092	0.074	-0.107	0.171	-0.027
IJP	0.045	-0.016	-0.109	-1.132	-0.991	-0.377	1.288	0.326	0.597	-3.398	-0.166	-0.034	-0.057	0.021	-0.157	-0.144	0.184	-0.024
IKO	-0.108	0.272	-0.282	-0.657	-0.414	-0.243	0.905	2.724	0.306	-0.742	2.069	0.617	-0.152	0.292	-0.424	-0.309	0.181	-0.042
IXI	0.129	-0.292	0.188	-0.799	-1.046	-0.357	1.498	-1.983	1.098	-1.539	-0.381	0.063	0.023	-0.071	0.125	0.048	-0.128	-0.018
IAA	0.061	0.351	-0.331	-0.529	-0.679	-0.281	1.327	3.389	0.223	-0.028	1.041	0.435	-0.007	0.184	-0.381	-0.127	-0.080	-0.058
IEU	0.125	-0.181	0.345	-0.747	-0.704	-0.282	1.486	-1.056	1.362	-1.249	0.946	0.427	0.030	-0.140	0.368	-0.091	0.190	0.002
IEM	-0.022	0.005	-0.252	-0.909	-1.018	-0.417	1.119	0.501	0.356	-2.152	-0.274	-0.227	-0.103	0.043	-0.335	-0.159	-0.031	-0.100
IWLD	0.204	-0.054	0.193	-1.030	-0.587	-0.239	1.683	0.002	1.106	-2.827	1.398	0.637	0.136	-0.003	0.135	-0.275	0.334	0.051
IHWL	0.240	0.053	0.151	-0.796	-0.448	-0.179	1.774	0.900	1.035	-1.519	1.938	0.932	0.167	0.187	0.100	-0.528	0.398	0.062
IHVV	0.291	0.084	-0.034	-0.666	-0.473	-0.163	1.900	1.156	0.724	-0.797	1.842	1.008	0.233	0.240	-0.080	-0.281	0.389	0.059
IJH	0.171	-0.015	0.615	-0.618	-0.670	-0.141	1.602	0.331	1.817	-0.524	1.078	1.117	0.151	0.045	0.572	0.074	0.192	0.177
WDMF	0.136	-0.103	0.309	-1.062	-1.411	-0.327	1.513	-0.406	1.301	-3.006	-1.796	0.209	0.071	-0.048	0.256	-0.238	0.070	-0.019
WVOL	0.208	-0.319	0.257	-1.368	-1.478	-0.428	1.694	-2.211	1.213	-4.716	-2.056	-0.283	0.062	-0.149	0.192	-0.046	-0.077	-0.040
IZZ	-0.069	-0.159	-0.458	-0.291	-0.771	-0.326	1.002	-0.874	0.009	1.297	0.684	0.215	-0.141	-0.044	-0.483	-0.031	-0.296	-0.131
AUMF	0.031	-0.023	-0.031	-0.643	-0.954	-0.278	1.253	0.266	0.729	-0.668	-0.025	0.448	-0.164	0.022	-0.257	-0.098	-0.215	-0.126
MVOL	0.037	-0.086	0.182	-0.668	-1.074	-0.296	1.267	-0.260	1.087	-0.805	-0.490	0.361	-0.148	-0.291	0.081	-0.144	-0.101	-0.120
IOZ	0.085	-0.030	0.149	-0.643	-0.775	-0.249	1.386	0.207	1.032	-0.666	0.670	0.591	-0.085	-0.022	0.014	-0.131	0.003	-0.056
ILC	-0.014	-0.047	0.100	-0.608	-0.762	-0.264	1.140	0.063	0.950	-0.471	0.722	0.518	-0.200	-0.073	-0.040	0.063	0.048	-0.042
IHD	0.067	-0.080	-0.104	-0.689	-0.736	-0.281	1.342	-0.214	0.605	-0.923	0.823	0.434	-0.029	-0.209	-0.207	-0.056	0.059	-0.099
ISO	-0.078	0.048	-0.022	-0.748	-0.752	-0.264	0.980	0.855	0.744	-1.252	0.760	0.518	-0.244	0.211	-0.136	-1.133	-0.258	-0.191
SYI	-0.034	-0.030	-0.053	-0.479	-0.899	-0.255	1.090	0.207	0.692	0.250	0.189	0.562	-0.214	-0.028	-0.168	-0.084	-0.241	-0.128
QMIX	0.294	-0.179	0.452	-0.961	-1.120	-0.292	1.908	-1.041	1.541	-2.442	-0.666	0.382	0.218	-0.098	0.395	-0.154	0.143	0.036
WEMG	0.065	-0.060	-0.226	-1.013	-1.331	-0.445	1.337	-0.046	0.399	-2.731	-1.485	-0.366	-0.040	-0.006	-0.317	-0.154	-0.087	-0.107
WDIV	-0.015	-0.340	0.212	-1.029	-1.342	-0.421	1.137	-2.382	1.137	-2.820	-1.529	-0.246	-0.132	-0.569	0.109	-0.016	-0.167	-0.157
WXOZ	0.241	-0.015	0.579	-0.862	-0.752	-0.249	1.776	0.332	1.757	-1.889	0.760	0.590	0.160	0.032	0.546	-0.462	0.251	0.025
OZF	-0.117	-0.058	0.217	-0.385	-0.797	-0.193	0.883	-0.031	1.147	0.773	0.584	0.862	-0.256	-0.100	0.170	0.115	-0.054	-0.020
OZR	0.105	0.034	-0.079	-0.239	-0.778	-0.147	1.437	0.742	0.647	1.588	0.659	1.087	0.057	0.132	-0.132	0.161	-0.064	0.042
STW	0.087	-0.024	0.131	-0.556	-0.793	-0.236	1.391	0.258	1.001	-0.178	0.601	0.655	-0.096	0.089	-0.036	-0.186	-0.080	-0.089
SFY	0.105	-0.068	0.097	-0.551	-0.807	-0.247	1.437	-0.110	0.944	-0.153	0.547	0.598	-0.021	-0.436	-0.098	0.095	0.040	-0.086
SSO	0.069	0.066	-0.033	-0.561	-0.726	-0.227	1.348	1.011	0.725	-0.209	0.859	0.695	-0.033	0.279	-0.162	-0.446	-0.184	-0.123
WXHG	0.141	0.032	0.277	-0.673	-0.599	-0.228	1.527	0.720	1.247	-0.833	1.352	0.694	0.052	0.115	0.235	-0.552	0.279	-0.060
Average	0.092	-0.021	0.107	-0.742	-0.810	-0.263	1.405	0.284	0.961	-1.216	0.536	0.524	-0.011	0.013	0.028	-0.201	0.041	-0.032
Min	-0.117	-0.397	-0.508	-1.368	-1.733	-0.445	0.883	-2.857	-0.074	-4.716	-3.046	-0.366	-0.417	-0.570	-0.543	-1.133	-0.428	-0.373
Max	0.294	0.476	0.621	-0.239	-0.140	-0.088	1.908	4.432	1.826	1.588	3.133	1.373	0.233	0.886	0.572	0.161	0.411	0.177

Overall, the analysis of ETFs' risk-adjusted returns provides mixed results. When considering Sharpe and Information Ratios, a rather negative view of ETFs' performance is obtained. The opposite is the case when the Modigliani-Modigliani ratios are assessed. Due to the differences among the various methods used to compute risk-adjusted returns, we believe that the results of these methods must be examined in combination to the raw return analysis and the performance regression analysis to make a solid conclusion about the performance of the ETFs examined.

The results of the cross-sectional regression model (5) on the determinative factors of performance are provided in Table 7. With respect to age, all the relevant estimates are negative, being statistically significant in the case of (absolute and excess) raw returns. This finding is not in line with our expectations, but it is not new in literature. For instance, Ferreira et al. (2006) accentuate a negative impact of age on the performance of 10,568 actively managed mutual funds from 19 countries around the world between 1999 and 2005. The same study reports a positive impact on performance by the size of funds. This finding is similar to our results on the size factor considered by model (5). As shown in Table 6, all the respective estimates are positive, being statistically significant in the cases of raw returns and the IR. Finally, the expected negative relation between performance and expenses is verified by our results only in the case of alphas. In sum, based on our results, the younger ETFs in Australia tend to outperform the older ones. This performance advantage concerns the large ETFs too.

This table presents the results of a cross-sectional regression model via which the various types of performance are regressed on ETFs' average age over the study period 2019-2023, average size (expressed as the natural logarithm of average daily assets) over the same period, and the expense ratio.

Table 7. Cross-Sectional Regression Results.

	Dep. Var.: Average Raw Return		Dep. Var.: Excess Average Raw Return		Dep. Var.: Total Return		Dep. Var.: Excess Total Return	
Variable	Coef	T-Stat	Coef	T-Stat	Coef	T-Stat	Coef	T-Stat
Constant	-1.165	-1.272	-1.782[c]	-1.946	-166.278[c]	-1.676	-170.474[c]	-1.718
Age	-0.025[c]	-1.842	-0.025[c]	-1.842	-2.434[c]	-1.642	-2.434[c]	-1.642
Size	0.110[b]	2.208	0.110[b]	2.208	10.558[b]	1.960	10.558[b]	1.960
Expense Ratio	-0.413	-1.500	-0.413	-1.500	32.750	1.097	32.750	1.097
R^2	0.205		0.205		0.110		0.110	
	Dep. Var.: Alpha		Dep. Var.: Sharpe Ratio		Dep. Var.: Modigliani-Modigliani Ratio		Dep. Var.: Information Ratio	
Variable	Coef	T-Stat	Coef	T-Stat	Coef	T-Stat	Coef	T-Stat
Constant	-0.907	-0.649	-0.474[c]	-1.911	-0.504	-0.418	-0.537[c]	-1.872
Age	-0.026	-0.993	-0.005	-1.218	-0.022	-1.218	-0.006	-1.369
Size	0.060	0.769	0.015	1.082	0.071	1.082	0.030[b]	1.905
Expense Ratio	-1.133[c]	-1.975	-0.063	-0.843	-0.306	-0.843	-0.014	-0.168
R^2	0.222		0.073		0.073		0.099	

[a] Statistically significant at 1%; b Statistically significant at 5%; c Statistically significant at 10%

The results of the regression analysis on performance persistence are provided in Table 8. We note that two versions of the model are applied; one with the absolute values of performance measures and one with the classifications of ETFs based on their performance. More specifically, before running the second version of the model, we classify ETFs in three descending categories each one including fourteen ETFs. The top category receives three grades, the median category receives two grades, and the bottom receives one grade.

This table presents the results of a cross-sectional regression model which evaluates the persistence in the annual performance of ETFs. Panel A concerns the absolute values of performance and Panel B concerns the classification of returns in three categories, i.e. Category 3 concerns the top performers, category concerns the median performers and category 1 is the bottom performers.

Table 8. Performance Persistence.

Panel A: Return Values																
	Dep. Var.: Average Raw Return								Dep. Var.: Excess Average Raw Return							
	2020-19		2021-20		2022-21		2023-22		2020-19		2021-20		2022-21		2023-22	
Variable	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
Constant	-0.793	-1.317	1.097[a]	7.697	-1.249[a]	-6.013	0.424[b]	2.825	0.125	0.773	-0.006	-0.047	-0.721[a]	-5.135	-0.135	-1.075
Slope	0.793[b]	2.031	-0.288[b]	-2.299	0.198	1.274	-0.434[a]	-4.011	0.793[b]	2.031	-0.288[b]	-2.299	0.198	1.274	-0.434[b]	-4.011
R^2	0.193		0.117		0.139		0.287		0.193		0.117		0.139		0.287	
	Dep. Var.: Total Return										Dep. Var.: Excess Total Return					
Variable	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
Constant	-9.698	-1.284	13.177[a]	7.418	-17.791[a]	-4.026	7.265[a]	3.830	4.068[c]	1.887	0.542	0.298	-11.727[a]	-3.879	0.470	0.284
Slope	0.670[c]	1.730	-0.264[b]	-2.139	0.047	0.181	-0.192[b]	-2.607	0.670[c]	1.730	-0.264[b]	-2.139	0.047	0.181	-0.192[b]	-2.607
R^2	0.170		0.103		0.001		0.145		0.170		0.103		0.001		0.145	
	Dep. Var.: Alpha										Dep. Var.: Sharpe Ratio					
Variable	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
Constant	0.188	0.929	0.246[c]	1.829	-0.850[c]	-5.899	0.109	0.733	-0.033	-0.924	0.096[b]	2.424	-0.720[a]	-19.091	-0.548[a]	-3.205
Slope	0.148	0.448	-0.111	-0.909	0.056	0.334	-0.383[c]	-3.132	0.136	0.551	-0.561[b]	-2.525	-0.201	-1.533	0.353[a]	1.600
R^2	0.005		0.020		0.003		0.197		0.008		0.137		0.055		0.060	
	Dep. Var.: Modigliani-Modigliani Ratio										Dep. Var.: Information Ratio					
Variable	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
Constant	-0.355	-0.300	0.993[a]	14.773	-0.576	-1.250	0.834[a]	3.096	0.019	0.504	0.031	0.723	-0.205[a]	-4.644	0.010	0.255
Slope	0.455	0.551	-0.113[b]	-2.525	-0.666	-1.533	0.245[c]	1.600	0.597[b]	2.358	-0.257	-1.535	0.122	0.783	-0.154	-1.301
R^2	0.008		0.137		0.055		0.060		0.122		0.056		0.015		0.041	
Panel B: Return Classification																
	Dep. Var.: Average Raw Return								Dep. Var.: Average Excess Raw Return							
	2020-19		2021-20		2022-21		2023-22		2020-19		2021-20		2022-21		2023-22	
Variable	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
Constant	1.429[a]	4.364	2.643[a]	8.171	1.643[a]	4.888	2.714[a]	8.508	1.429[a]	4.364	2.643[a]	8.171	1.643[a]	4.888	2.714[a]	8.508
Slope	0.286[c]	1.886	-0.321[b]	-2.147	0.179	1.148	-0.357[b]	-2.418	0.286[c]	1.886	-0.321[b]	-2.147	0.179	1.148	-0.357[b]	-2.418
R^2	0.182		0.103		0.032		0.128		0.182		0.103		0.032		0.128	
	Dep. Var.: Total Return										Dep. Var.: Excess Total Return					
Variable	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
Constant	1.500[a]	4.536	2.714[a]	8.508	1.571[a]	4.710	2.714[a]	8.508	1.500[a]	4.536	2.714[a]	8.508	1.571[a]	4.710	2.714[a]	8.508
Slope	0.250[c]	1.633	-0.357[b]	-2.418	0.214	1.387	-0.357[b]	-2.418	0.250[c]	1.633	-0.357[b]	-2.418	0.214	1.387	-0.357[b]	-2.418
R^2	0.163		0.128		0.046		0.128		0.163		0.128		0.046		0.128	
	Dep. Var.: Alpha										Dep. Var.: Sharpe Ratio					
Variable	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
Constant	1.857[a]	5.451	2.286[a]	6.761	1.786[a]	5.258	2.500[a]	7.559	1.643[a]	4.888	2.786[a]	8.869	2.357[a]	7.014	1.643[a]	4.888
Slope	0.071	0.453	-0.143	-0.913	0.107	0.682	-0.250[c]	-1.633	0.179	1.148	-0.393[b]	-2.702	-0.179	-1.148	0.179	1.148
R^2	0.005		0.020		0.011		0.063		0.032		0.154		0.032		0.032	
	Dep. Var.: Modigliani-Modigliani Ratio										Dep. Var.: Information Ratio					
Variable	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat	Coef	T-stat
Constant	1.643[a]	4.888	2.786[a]	8.869	2.357[a]	7.014	1.643[a]	4.888	1.500[a]	4.536	2.786[a]	8.869	1.929[a]	5.650	2.714[a]	8.508
Slope	0.179	1.148	-0.393[b]	-2.702	-0.179	-1.148	0.179	1.148	0.250[c]	1.633	-0.393[b]	-2.702	0.036	0.226	-0.357[b]	-2.418
R^2	0.032		0.154		0.032		0.032		0.063		0.154		0.001		0.128	

[a] Statistically significant at 1%; b Statistically significant at 5%; c Statistically significant at 10%

Based on the results in Table 8, performance persistence is rather poor. In particular, absolute and excess raw returns display sufficient persistence between 2019 and 2020, both when absolute performance and performance ranking are considered. This is also the case for the absolute MM ratio in years 2022 and 2023. However, in most of

the cases, the slopes of model (6) are significantly negative, indicating that the performance of ETFs reverts from one year to another. Based on these results, investors should not expect that, for sure, the performance of the Australian equity ETFs in a year will be repeated in the following year.[10]

5. Conclusion

This study examines the performance of forty-two equity ETFs traded on the Australian Stock Exchange over the five-year period 2019-2023. Various types of performance are considered, including raw returns, relative to the market returns, alphas and risk-adjusted returns. In addition, some determinative factors of performance are examined at the cross-sectional level. Performance persistence is evaluated too.

Based on our analysis, the average return of the examined ETFs has been positive during the period under study, while at the cumulative level, the examined ETFs managed to outperform the basic benchmark of the market's return. However, this outperformance in raw return terms does not translate into a significant above market return, i.e., alpha, when the market regression model of performance is applied. In fact, in several cases, the alpha of ETFs over the study period is significantly negative.

Moreover, mixed results are obtained on the risk-adjusted return of the examined ETFs. In particular, the majority of Sharpe and Information ratios are negative, whereas the opposite is the case for the Modigliani-Modigliani ratio. At the cross-sectional level, the performance of ETFs in Australia is found to be negatively related to the age of funds but positively related to their size. A weak negative relationship between performance and managerial cost is revealed too. Finally, when it comes to persistence, our analysis shows that the performance of the Australian equity ETFs does not persist. In fact, in several cases, performance significantly reverts from one year to another.

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Conflict of interest

The author claims that the manuscript is completely original. The author also declares no conflict of interest.

Author contributions

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[10] We note that we have run a one lagged time-series regression model of raw monthly returns for each ETF in the sample over the period 2019-2023. These regressions provided only two significant estimates, which were negative. These results indicate lack of short-term performance persistence but they are not reported for space saving purposes.

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