MORNINGSTAR Indexes

Global Gateways: Navigating ADR Markets

ADRs provide US investors with efficient exposure to foreign equities, balancing access, liquidity, and tracking precision.

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Executive Summary

American depository receipts have become a key instrument in global investing, enabling US investors to access foreign equities through domestic markets. First introduced in 1927 by JPMorgan Chase to facilitate trading of UK-based Selfridges, ADRs have evolved into a widely adopted vehicle for cross-border equity exposure. As US-listed instruments representing shares of non-US companies, ADRs enable portfolio diversification while operating within the US regulatory framework and trading infrastructure.

The paper provides a comprehensive overview of ADRs, including their structural classification, liquidity profiles, regulatory requirements, and strategic use cases. We introduce and assess the Morningstar Global ADR Extended Index, a proprietary benchmark designed to capture investable global ex-US equity exposure through ADRs. A core focus of the paper lies in evaluating how effectively ADRs mirror their local counterparts. Additionally, we assess the directionality of price discovery between ADRs and their underlying securities to evaluate which market leads and how efficiently information is incorporated.

Key Takeaways

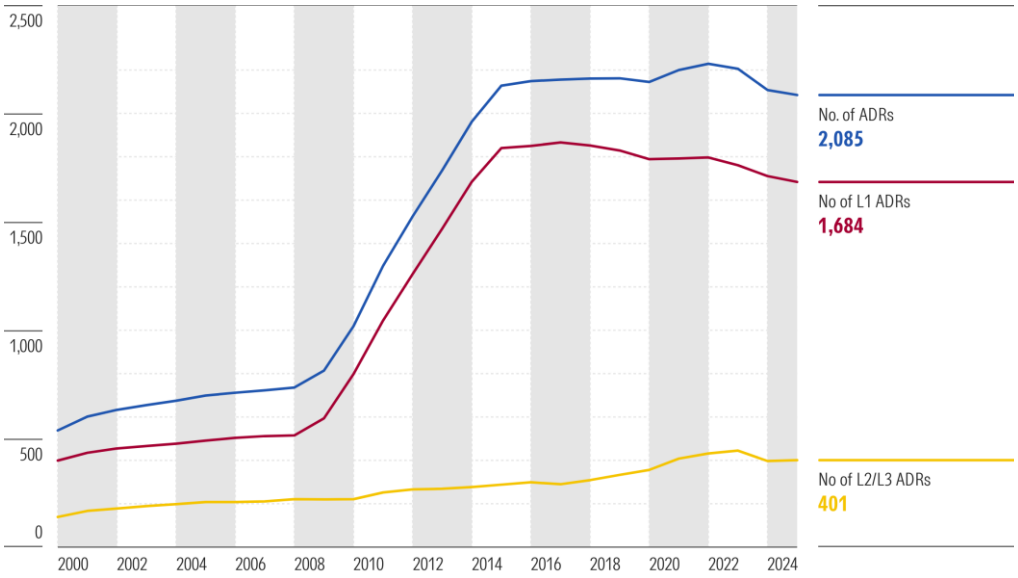
- ADRs serve as an effective bridge for US investors to access global equities through domestic infrastructure, without the complexities of direct foreign investment. However, strategic considerations such as limited market coverage, liquidity differences across ADR levels, foreign currency risk, and taxes must be properly considered, as they can materially impact portfolio construction and implementation.
- The ADR universe—especially Level 1—expanded significantly after the 2008 global financial crisis, largely due to the Securities and Exchange Commission's amended Rule 12g3-2(b), which eased disclosure requirements and enabled widespread issuance of unsponsored ADRs. However, this growth has recently come under pressure due to tightened regulatory scrutiny.
- ADRs largely move in tandem with their local counterparts, yet short-term pricing gaps arise from nonsynchronous trading hours, the influence of US market sentiment, and limited arbitrage and conversion frictions, along with limited coverage of ADRs, leading to return deviations and moderate tracking error against the global ex-US equity portfolio.
- The ADR market plays a leading role in global price discovery, regardless of the listing level or market segment. Further, the widespread presence of bidirectional causality supports the existence of efficient cross-market arbitrage and informational integration between the US and local exchanges.

The Evolution and Structure of the ADR Market

ADRs, issued by US-based depository banks, represent shares of non-US companies (called underlying stocks) held by a custodian bank in the issuer's home country. Traded in US dollars either on major US exchanges or over-the-counter markets, ADR prices reflect the value of the underlying foreign shares and are influenced by currency fluctuations, liquidity conditions, and foreign market trading hours. ADRs are broadly classified by both type and structure:

- Structure:
  - Sponsored ADRs are created with the direct participation and approval of the foreign company issuer and usually come with formal agreements between the depository bank and issuer.
  - Unsponsored ADRs, in contrast, are issued without the issuer's involvement, typically by one or more depository banks.
- Listing Level:
  - Level 1 ADRs are traded OTC and have minimal regulatory requirements; issuing companies are not permitted to raise new capital, and Level 1 ADRs are often used to establish a US market presence.
  - Level 2 ADRs are listed on US exchanges and require SEC registration and financial disclosures, but are not allowed to raise capital either.
  - Level 3 ADRs involve capital raising in US markets, subject to the most stringent US regulatory oversight.

Exhibit 1 Number of ADRs by Listing Type (2000-25)



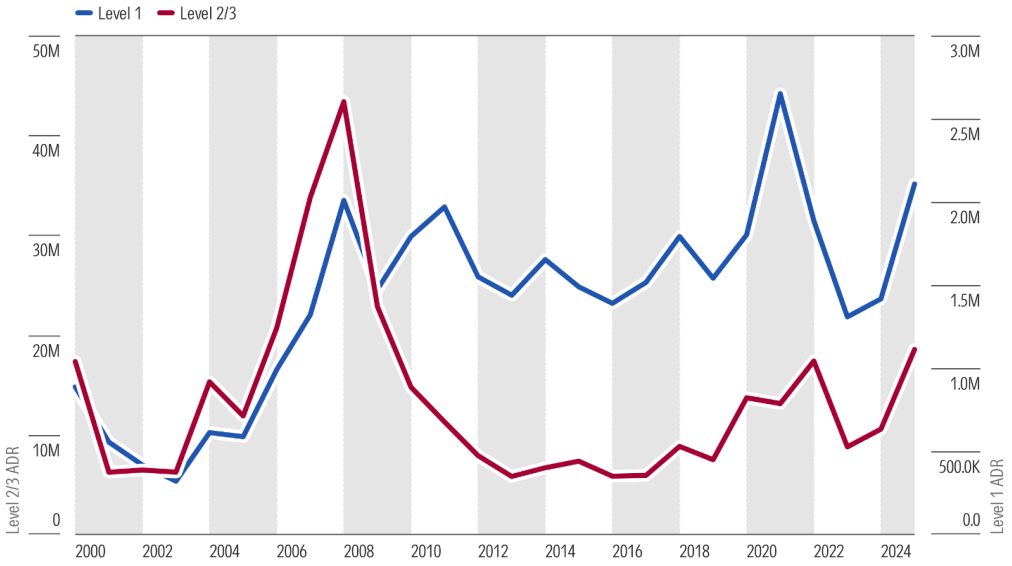
Source: Morningstar. Data as of June 30, 2025.

Over the past two decades, the ADR landscape has evolved significantly in both size and structure. Based on the Morningstar coverage universe, the number of active ADR programs grew steadily from just over 500 in 2000 to a peak of over 2,200 by 2022—a more than fourfold increase. This surge, especially evident in Level 1 ADRs between 2010 and 2015, was fueled by regulatory easing, particularly the SEC's amended rule 12g3-2(b) (2008). This rule allowed depository banks to create unsponsored Level 1 ADRs without the issuer's involvement—provided that key company disclosures were made publicly available in English.

However, since 2015, ADR growth has plateaued, with the total number stabilizing around 2,100–2,200 and showing a slight decline in 2023 and 2024. This recent dip correlates with increased regulatory scrutiny and geopolitical pressures. A key development is the Holding Foreign Companies Accountable Act, which mandates that foreign companies trading on US exchanges allow the Public Company Accounting Oversight Board to inspect their audit workpapers. Failure to comply for three consecutive years leads to mandatory delisting—a condition affecting many Chinese firms.

Structurally, the ADR market is now dominated by Level 1 ADRs, which comprise about 80% of all programs—up from 75% in 2000. These OTC-traded ADRs offer broader access but come with lower liquidity and transparency than Level 2 and Level 3 ADRs listed on exchanges like the New York Stock Exchange, NYSE American, and Nasdaq. As illustrated in Exhibit 2, Level 2/3 ADRs consistently show higher liquidity than Level 1 ADRs. Both segments saw liquidity spikes during the 2008 financial crisis, but Level 1 liquidity remained subdued in subsequent years. A secondary rise in the three-month average monthly median daily trading volume, or AMMDTV, has emerged after the pandemic (after 2022), with Level 2/3 ADRs responding earlier and more strongly.

Exhibit 2 ADR Liquidity Trend by Listing Type (2000-25)—Measured by the 3-Month AMMDTV



Source: Morningstar. Data as of June 30, 2025.

These liquidity gaps have important implications for ADR-based strategies. While Level 1 ADRs broaden global access, their lower liquidity can lead to higher execution costs and tracking error relative to local listings. For index investors, this underscores the need for robust liquidity filters. For the remainder of this analysis, we use the Morningstar Global ADR Extended Index as a proxy for the most liquid ADR universe. With stringent liquidity screens and balanced representation across Level 1 and Level 2/3 ADRs, this index provides a practical benchmark for measuring performance, assessing tradability, and analyzing global ex-US equity exposure via US-listed instruments.

Benchmarking Global Access: Construction and Performance of the Morningstar Global ADR Extended Index

The Morningstar Global ADR Extended Index[1] is designed to offer liquid and investable equity exposure to the companies represented in the Morningstar Global ex-US Target Market Exposure Index through US-listed instruments. The index encompasses Level 1, 2, and 3 ADRs, along with Canadian cross-listed equities.

To ensure real-world tradability, the index employs stringent liquidity filters:

- A minimum three-month AMMDTV of $500,000 for new entrants and $400,000 for existing constituents are required.
- Securities with more than 10 nontrading days in the review period are excluded.
- If a company has multiple ADR listings, the most liquid listing is selected.
- The index is float-adjusted, market-cap weighted, and maintained with a quarterly rebalancing and semiannual reconstitution.

As of June 2025, the Morningstar Global ADR Extended Index comprised 467 securities, including 423 ADRs and 44 Canadian cross-listed equities. ADRs dominate both in count and capitalization, contributing 90.84% of the index market cap, while Canadian listings account for the remaining 9.16%. Within the ADR segment, 291 Level 1 ADRs represent approximately 55.60% of ADR market capitalization, while Level 2 and Level 3 ADRs comprise the remaining 44.40%.

Over the period from Dec. 16, 2011, to June 30, 2025, the Morningstar Global ADR Extended Index posted comparable performance to its parent benchmark, delivering an active return of 0.41% with a tracking error of 2.66%. The monthly return correlation was around 0.95.

1 https://indexes.morningstar.com/docs/rulebook/global-adr-extended-index-rulebook.

Exhibit 3 Performance Summary—Morningstar Global ADR Extended Index Benchmarked Against Morningstar Global ex-US TME Index (Dec. 16, 2011, to June 30, 2025)

Performance Metrics	Morningstar Global ex-US TME GR USD	Morningstar Global ADR Extended GR USD
Return (%)	7.66	8.07
Risk (%)	14.30	14.77
Return/Risk	0.54	0.55
Sharpe Ratio	0.44	0.45
Max Drawdown	-34.52	-33.84
Active Return (%)	-	0.41
Tracking Error (%)	-	2.66
Information Ratio	-	0.15

Source: Morningstar Direct. Data as of June 30, 2025.

Exhibit 4 Cumulative Performance of the Morningstar Global ADR Extended Index Against Morningstar Global ex-US TME Index (Dec. 16, 2011, to June 30, 2025)

Source: Morningstar. Data as of June 30, 2025.

Exploring Return Divergences in ADRs Versus Local Listing

A central premise of ADR-based indexing is the assumption that ADRs faithfully represent the economic exposure of their corresponding foreign-listed shares. However, in practice, ADR performance can diverge from that of their underlying shares due to structural and behavioral issues, as well as market frictions. In this section, we quantify these deviations by decomposing the sources of tracking error with respect to the parent index into two core components: imperfect benchmark coverage and cross-market frictions.

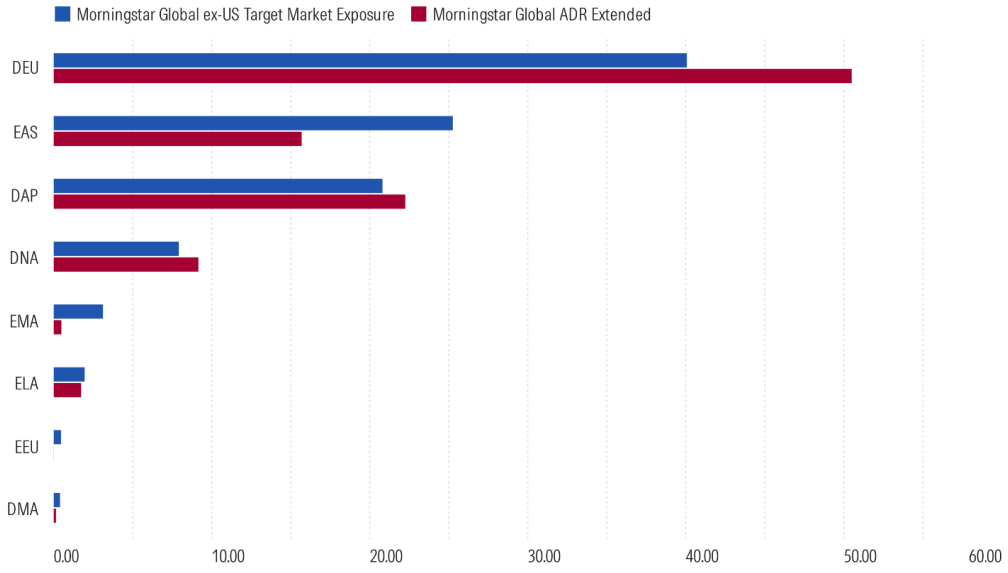
Imperfect Coverage

The tracking error between the Morningstar Global Markets Extended ADR Index and its parent index, the Morningstar Global ex-US TME Index, primarily arises from imperfect coverage, where not all securities in the parent benchmark have a corresponding ADR listed in the US market. The Morningstar Global Markets Extended ADR Index reasonably reflects the sector and regional composition of its benchmark, Morningstar Global ex-US TME Index. As shown in Exhibits 5 and 6, most sectors, such as financials, consumer cyclical, technology, and industrial, are well represented. However, the regional exposure is more skewed: Developed Europe (DEU) and Developed Asia-Pacific (DAP) are overweight relative to the Benchmark Index, while Emerging Markets (EMA) remain underrepresented due to limited ADR listings.

Exhibit 5 Sector Exposure: Morningstar Global ADR Extended Index Against Morningstar Global ex-US TME Index (June 30, 2025)

Source: Morningstar. Data as of June 30, 2025.

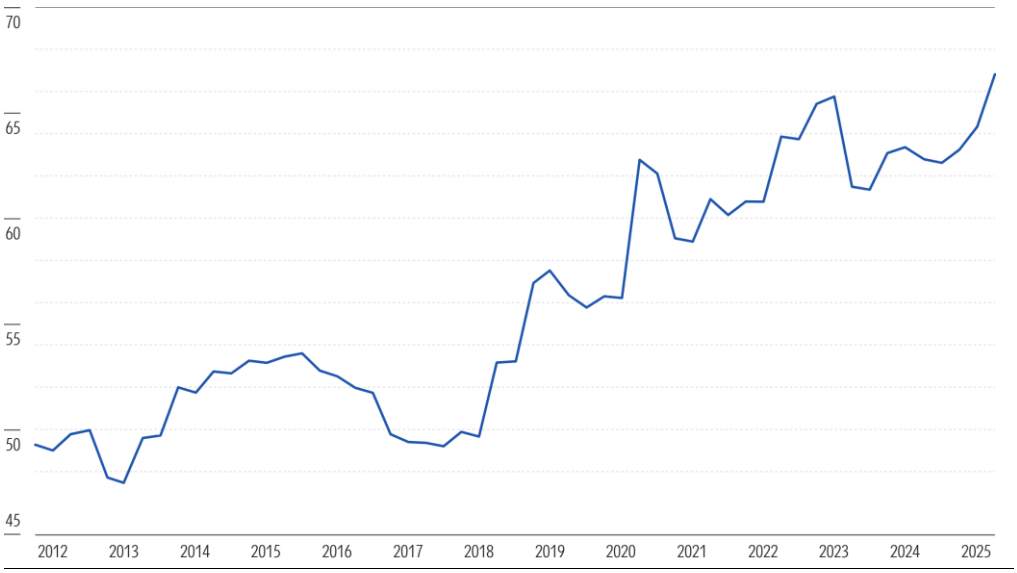
Exhibit 6 Region Exposure: Morningstar Global ADR Extended Index Against Morningstar Global ex-US TME Index (June 30, 2025)



Source: Morningstar. Data as of June 30, 2025.

Despite this, ADRs currently capture approximately 65% of the parent index by weight (Exhibit 7), reflecting the substantial but not full coverage of the global equity universe through US-listed instruments.

Exhibit 7 Benchmark Index Coverage—Weight of ADR-Linked Securities in the Parent Index (2012–25)



Source: Morningstar. Data as of June 30, 2025.

To isolate the impact of limited coverage, we constructed a hypothetical portfolio, carved out of Morningstar Global ex-US TME and containing securities of all the companies that have a corresponding security in the ADR Index. Comparing this against the Morningstar Global ex-US TME Index, we find that over the 2011-25 period, the local listing of the ADR portfolio delivered a return of 8.02% versus 7.66% for the Benchmark Index, with a tracking error of 1.68%.

Exhibit 8 Performance Summary—Local Listings of Global ADR Extended Index Benchmarked Against Morningstar Global ex-US TME Index (Dec. 16, 2011, to June 30, 2025)

Performance Metrics	Morningstar Global ex-US TME GR USD	Local Listing of Global ADR Extended GR USD
Return (%)	7.66	8.02
Risk (%)	14.30	14.55
Return/Risk	0.54	0.55
Sharpe Ratio	0.44	0.46
Max Drawdown	-34.52	-33.91
Active Return (%)	-	0.35
Tracking Error (%)	-	1.68
Information Ratio	-	0.21

Source: Morningstar Direct. Data as of June 30, 2025.

Exhibit 9 Performance of the Local Listing of Global ADR Extended Index Benchmarked Against Morningstar Global ex-US TME Index (Dec. 16, 2011, to June 30, 2025)

Source: Morningstar. Data as of June 30, 2025.

Cross-Market Frictions: Timing Differences and Price Divergence

While ADRs and their underlying securities theoretically represent the same economic interests, structural frictions can lead to persistent pricing deviations. This divergence arises from market mechanics that influence how and when information is reflected in prices.

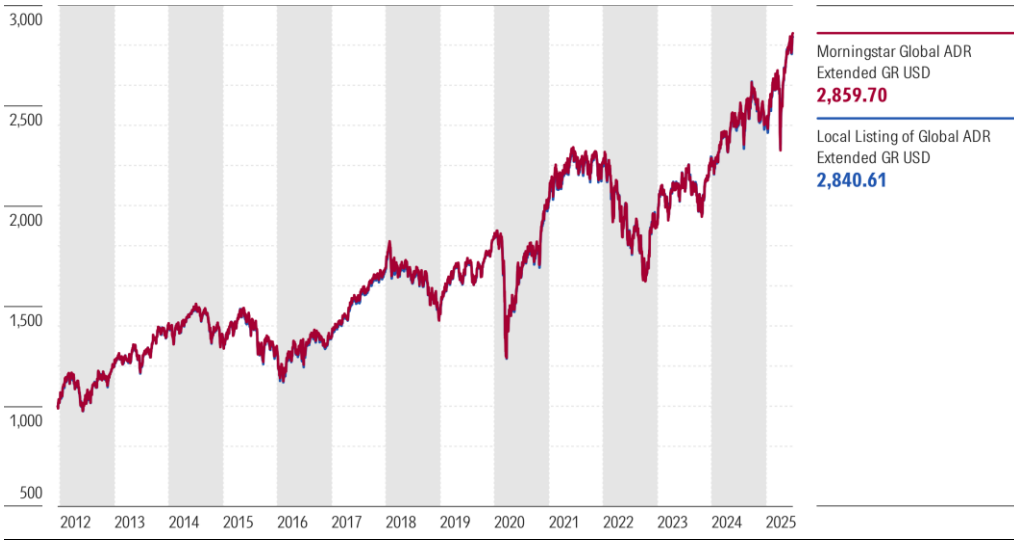
To isolate these effects, we compared the Morningstar Global Extended ADR Index directly against an Index comprising local listings of its constituent securities. The same companies are represented in both the Indexes with ADR and underlying local listing, respectively. As shown in the exhibits below, both portfolios delivered nearly identical long-term returns and similar risk. However, tracking error was 2%—highlighting the second layer of divergence beyond imperfect coverage.

Exhibit 10 Performance Summary—Local Listings of Global ADR Extended Index Benchmarked Against Morningstar Global ADR Extended Index (Dec. 16, 2011, to June 30, 2025)

Performance Metrics	Morningstar Global ADR Extended GR USD	Local Listing of Global ADR Extended GR USD
Return (%)	8.07	8.02
Risk (%)	14.77	14.55
Return/Risk	0.55	0.55
Sharpe Ratio	0.45	0.46
Max Drawdown	-33.84	-33.91
Active Return (%)	-	-0.05
Tracking Error (%)	-	1.99
Information Ratio	-	-0.03

Source: Morningstar Direct. Data as of June 30, 2025.

Exhibit 11 Cumulative Performance of the Local Listing of ADR Index Against Morningstar Global ADR Extended Index (Dec. 16, 2011, to June 30, 2025)



Source: Morningstar. Data as of June 30, 2025.

Some of the key reasons for persistent pricing differences between ADRs and their underlying Local listings are:

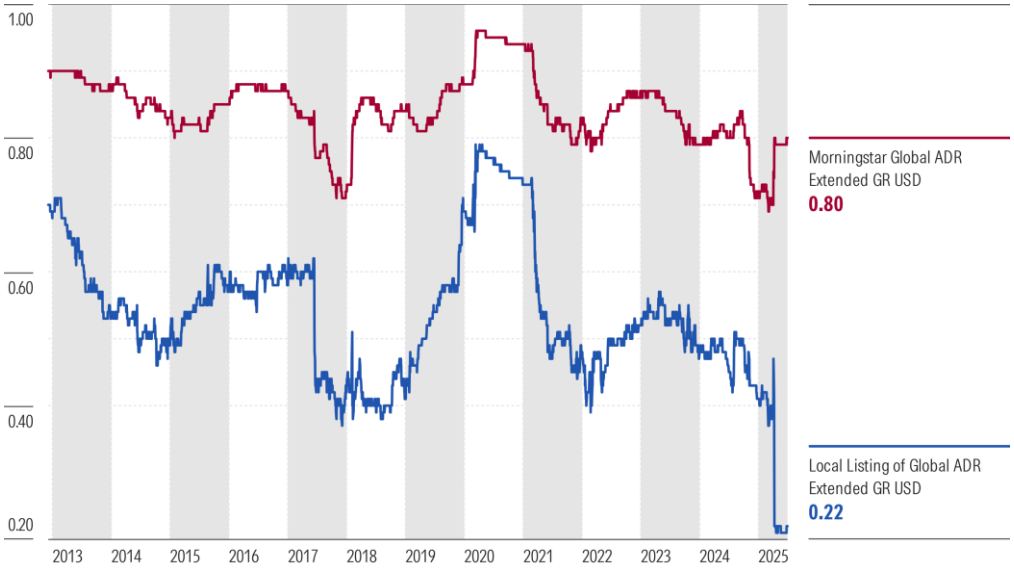
- Nonsynchronous Trading Hours

  ADRs trade during US market hours, while their underlying shares trade in foreign time zones. This misalignment can lead to pricing that reflects information released after the close of local markets, making ADRs an important venue for continued price discovery. At times, however, ADRs may also appear to overreact to US developments or exhibit greater intraday volatility and short-term mispricing, especially during periods of global market stress.

- Influence of US Market Sentiment

  As illustrated in the chart below, the one-year rolling correlation between the Morningstar Global ADR Index and the Morningstar US Market Index (used here as a proxy for the US market) is consistently higher than that between the local listings and the Morningstar US market Index. This suggests that ADRs tend to move more in sync with US market dynamics than their local counterparts. Unlike local shares, ADR prices are shaped by the risk appetite and sentiment of US investors, which can diverge from conditions in the issuer's home market. For instance, during periods of US-specific volatility or geopolitical events, ADRs may reflect broader risk-off behavior—even when the fundamentals of the underlying foreign companies remain unchanged.

Exhibit 12 Rolling Correlation ADRs and Local Listings With the US Market (2013-25)



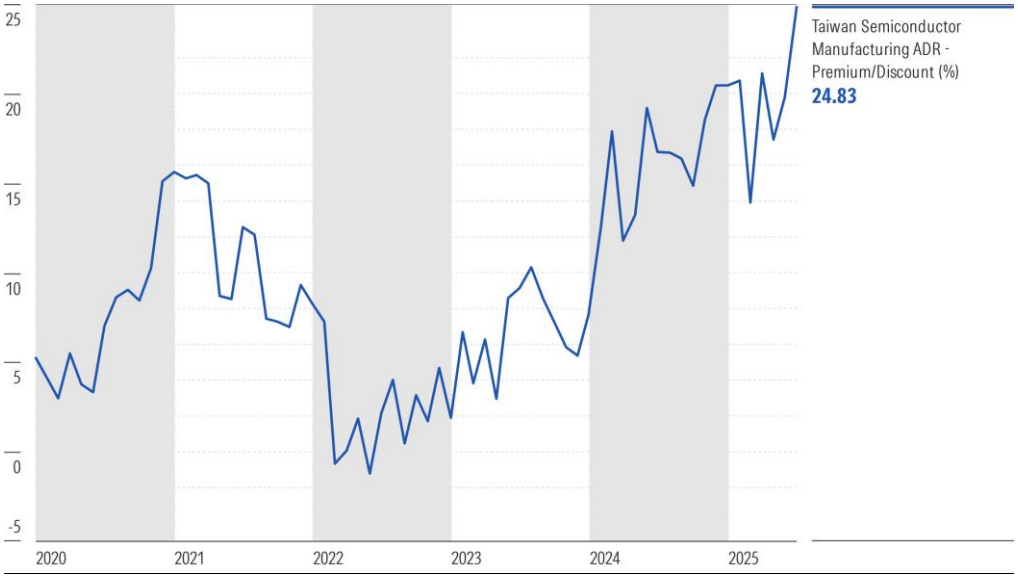
Source: Morningstar. Data as of June 30, 2025.

- Limited Arbitrage and Conversion Frictions

  Although arbitrage should, in theory, close price gaps between ADRs and their underlying shares, real-world constraints often prevent this. These include capital controls, conversion restrictions by

depositary banks, and regulatory barriers in the issuer's home country. Without seamless convertibility, the Law of One Price is violated, and pricing gaps may persist well beyond rational arbitrage windows—exposing investors to timing and liquidity risks. Emerging-markets ADRs, in particular, may face persistent discounts or premiums due to perception-based risk premia—that is, the compensation investors demand for perceived risks (such as political, liquidity, or governance concerns), even when the fundamental risk of the instrument is unchanged. A notable example is Taiwan Semiconductor, whose ADR consistently trades at a premium relative to its local listing.

Exhibit 13 Taiwan Semiconductor Manufacturing ADR (Premium/Discount—2020-25)



Source: Morningstar. Data as of June 30, 2025.

Assessing Price Leadership Dynamics Between ADRs and Local Listings

In the earlier sections, we established that differences in price movements between ADR and their local listings may stem from several structural frictions—notably, nonsynchronous trading hours, the influence of the US market sentiment, and arbitrage constraints, including conversion costs and regulatory barriers. While these factors contribute to observed deviations in short-term returns, they don't reveal which market is informationally leading the other.

To investigate the direction of price discovery, we conduct Granger causality tests to evaluate whether ADRs lead their underlying securities, whether the underlying securities lead the ADRs, or whether both exhibit a feedback loop, that is, bidirectional causality. This approach allows us to infer the direction of predictive information flow between the returns of ADRs and their corresponding local shares.

Methodology and Data Sample

The Granger causality framework posits that if the past values of one time series improve the forecast accuracy of another, beyond the information already contained in the latter's past values, then the

former Granger-causes the latter (Granger, 1969). Formally, for two stationary return series R_t^{ADR} and R_t^{Und}, the test evaluates the following vector autoregressive model:

$$R_t^{ADR} = \alpha_0 + \sum_{i=1}^{p} \alpha_i R_{t-i}^{Und} + \sum_{i=1}^{p} \alpha_j R_{t-j}^{ADR} + \epsilon_t$$

The null hypothesis $H_0: \beta_j = 0 \ \forall j$ implies that underlying returns don't Granger-cause ADR returns. Rejection of the null hypothesis suggests a causal relationship from underlying to ADR. A similar equation is estimated with roles reversed to test the reverse direction.

We conduct the Granger causality tests at Lag 1 and Lag 2 (daily returns), capturing near-term predictive influence. The analysis uses constituents of the Morningstar Global Markets Extended ADR Index, as of June 2025. Returns series are drawn from December 2011 (or from the date the ADR was first added to the index) through June 2025. To ensure statistical robustness, only securities with at least 24 months of overlapping history are included, minimizing sampling bias due to limited data.

Empirical Findings and Interpretations

Results of the Granger causality test conducted at a strict 1% significance level:

- Almost 100% of all ADR underlying pairs exhibit statistically significant Granger causality from ADRs to their underlying stocks. In other words, ADRs tend to lead price discovery, with movements in ADR prices helping to predict changes in the underlying securities.
- The percentage of pairs depicting Granger causality from underlying → ADR ranges from
  - About 78%-81% for Level 1 ADRs
  - About 66%-68% for Level 2/3 ADRs
- No pair in any category shows the absence of causality, reaffirming tight price linkage across the instruments.

Exhibit 14 Price Discovery Efficiency—Local Listings Versus ADR Listings (by Level and Region)

ADR Category	Region	ADR → Underlying (%)	Underlying → ADR (%)	Bidirectional (%)
Level 1	DM	99.59%	78.05%	77.64%
Level 1	EM	100.00%	80.95%	80.95%
Level 2/3	DM	100.00%	67.86%	67.86%
Level 2/3	EM	100.00%	66.18%	66.18%

Source: Morningstar Direct. Data as of June 30, 2025.

The dominance of ADR → Underlying Granger causality is a bit counterintuitive and implies that ADR market plays a leading role in global price discovery, regardless of the listing level or market segment. This can be due to timing differences between the local and US markets, as scheduled financial information is announced after local market close but before/during the US trading hours. The widespread presence of bidirectional causality further supports the existence of efficient cross-market arbitrage and informational integration between US and local exchanges. The unexpectedly high bidirectional causality in Level 1 ADRs further strengthens the case that even the least regulated ADRs

are informationally relevant instruments, which traditionally face assumptions of weak integration, due to their limited liquidity and low trading volumes.

ADRs as an Investment Vehicle

ADRs offer a compelling avenue for investors seeking to tap into global markets without the complexities of direct foreign investment, and their ease of trading on US exchanges provides a familiar and convenient entry point to international equities for US investors. Nevertheless, below are some strategic considerations that practitioners must consider:

- ADRs allow investors to bypass complex local market entry rules. However, this convenience comes with limitations—such as narrower coverage, potential disparities in shareholders' rights, and reliance on issuers participation. Practitioners should assess ADRs not just for liquidity access, but also for their role in regulatory navigation and portfolio construction trade-offs.
- ADRs eliminate the need for currency conversion. However, they are not currency-hedged, and investors are still exposed to fluctuations in foreign currency of the underlying stock. This led to the recent emergence of currency-hedged ADR exchange-traded funds, which aim to mitigate the currency risk.
- ADR dividends are paid in USD, but they are subject to foreign taxes.
- Imperfect coverage, difference in trading hours, and liquidity between ADR and local listings, US market sentiments can lead to return deviations.

Investors seeking to gain global ex-US exposure through ADRs may consider the Morningstar Global ADR Extended Index, which offers similar risk/return characteristics and exhibits a high monthly return correlation with its parent, the Morningstar Global ex-US TME Index, while maintaining a moderate tracking error.

Ultimately, the choice of ADRs as an investment vehicle depends on an individual investor's specific requirements. For those prioritizing ease of access and diversification within domestic framework, ADRs can serve as the valuable tool for global diversification.

About Morningstar Indexes

Morningstar Indexes was built to keep up with the evolving needs of investors—and to be a leading-edge advocate for them. Our rich heritage as a transparent, investor-focused leader in data and research uniquely equips us to support individuals, institutions, wealth managers and advisors in navigating investment opportunities across major asset classes, styles and strategies. From traditional benchmarks and unique IP-driven indexes, to index design, calculation and distribution services, our solutions span an investment landscape as diverse as investors themselves.

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