Pathway Research

Private Market Environment

4TH QUARTER 2022

CONTENTS

2022 Year in Review

2022 proved to be a tumultuous and volatile year for investors across all asset classes, marked by high inflation, rising interest rates in most major economies, Russia's invasion of Ukraine, and fears of an economic downturn. The resulting pressure drove sharp declines in most major global equity markets, ending a nearly 13-year run of predominantly strong growth and attractive performance since the Global Financial Crisis ("GFC"). Despite a moderate fourth-quarter recovery, the MSCI All Country World Index produced an annual return of –18.0% during 2022, its worst annual return since 2008. Unique to 2022 was the correlation in performance between equity and bond markets, which left few safe havens for investors. The Bloomberg US Aggregate generated a return of –13.0% during 2022, the first time in more than 50 years that major U.S. equity and bond markets both fell during the same calendar year. The topic of inflation dominated the conversation throughout most of 2022, prompting central banks to raise interest rates at a record pace. The U.S. Federal Reserve raised its benchmark interest rate by 4.25% during the year—the largest single-year increase since the early 1980s—to a range of 4.25% to 4.50%, its highest level since December 2007. These efforts did appear to show some effect in the second half of the year: U.S. CPI rose by 6.5% year over year in December, down from 9.1% in June, making it the sixth-consecutive month of slowing growth. Still, many investors remain wary that the drastic measures taken to curb inflation will have an adverse impact on economic growth in 2023 and lead to further volatility throughout much of the year.

What began as a resilient start to the year for private equity deal activity in the face of deteriorating macroeconomic conditions slowed markedly during the second half of 2022. In the U.S., buyout investment activity fell during each quarter of the year, totaling $311 billion in aggregate, down 38% from 2021 but still the second most active year since the GFC. Activity was impacted by the dislocation in leveraged credit markets, which hindered the ability of private equity firms to obtain financing for new leveraged buyout transactions. According to PitchBook LCD data, U.S.-sponsored leveraged loan bank issuance fell to $34.2 billion during the second half of 2022, down 84% from the same period in 2021. Annual deal value was buoyed by a number of notable take-private acquisitions, particularly in the technology sector, where large-cap buyout managers sought to take advantage of falling public market share prices to scoop up performing companies at discounted valuations. Take-privates accounted for 43% of total U.S. buyout deal value during the year and included nine of the 10 largest deals announced. M&A exit markets suffered from many of the same constraints during 2022 and experienced a similar decline in value. Following a record 2021, global M&A exit value fell to $525

Table 1. Notable PE-Backed M&A Exits Announced in 4Q22
At December 31, 2022

Seller	Portfolio Company	Industry	Region	Value (MM)
Warburg Pincus	Summit Health	Healthcare	U.S.	$9,000
Warburg Pincus	Ensign Natural Resources	Energy	U.S.	$3,000
Nordic Capital, Five Arrows	The Binding Site	Healthcare	UK	$2,730
TPG	Immucor	Healthcare	U.S.	$2,000
K2 Global, Mayfield, Menlo Ventures	Poshmark	Consumer	U.S.	$1,200

Table 2. Notable PE Investments Announced in 4Q22
At December 31, 2022

Buyer	Target	Industry	Region	Value (MM)
The Blackstone Group	Emerson Electric	Industrials	U.S.	$14,000
Thoma Bravo	Coupa Software	Software	U.S.	$8,000
Advent International	Maxar Technologies	Telecom	U.S.	$6,400
BDT Capital Partners	Weber	Consumer	U.S.	$3,700
Veritas Capital	Wood Mackenzie	Business Services	UK	$3,100

billion in 2022, a decline of 44% from the prior year. Exit activity was impacted by a growing gap between buyer and seller pricing expectations, which led many private equity firms to elect to hold their investments rather than sell at depressed values. Exit volume will likely remain muted until the market stabilizes and the extent of the potential reset in valuations becomes clearer; however, many private equity managers continue to cite that a market remains for the highest-quality assets and that those companies are still commanding attractive prices in the current environment.

The venture capital industry, following an unprecedented year in 2021, perhaps felt the most-immediate impact of the decline in public equity markets and macroeconomic uncertainty during 2022. U.S. venture capital investment activity still reached $238 billion—the second-highest annual total on record—but declined in each quarter of the year to a year-over-year decline of 31%. Rising interest rates had a significant effect on higher-growth technology companies, particularly those with low to no profits. Many such companies had recently completed IPOs in 2021 and saw material declines in their stock prices during 2022. This subsequently impacted funding rounds and valuations during 2022 for private technology companies, especially in the late- and growth-stage ends of the market. Several prominent venture-backed technology companies—including Klarna, Instacart, and Stripe—announced markdowns from the valuations established at their latest rounds of financing, largely as a result of declines in public market comparables. As a result, many venture capital managers have advised their portfolio companies to preserve cash and delay raising new capital until the environment is more favorable.

Private equity fundraising activity remained strong in 2022, although many limited partners' current overallocation to the private equity asset class, which was driven by the asset class's outperformance of public markets during 2022, has created a highly competitive fundraising landscape. During the year, private equity firms worldwide raised $709 billion, down just 12% from 2021 and the second-largest annual total on record. The year was host to a number of record-setting fundraisings, and many prominent private equity managers were still able to raise increasingly larger funds. The 10 largest funds raised during the year accounted for $153 billion in total commitments, headlined by Advent GPE X, which raised $25.0 billion, and Thoma Bravo XV, which raised $24.3 billion. As the industry enters a period that is expected to feature a slower pace of deployment and declining distributions to limited partners, fundraising will likely follow suit. The denominator effect has forced some limited partners to scale back future allocations; however, there is also a sense of optimism in the market that the current and upcoming vintages may be primed to take advantage of opportunities arising from the market dislocation, keeping overall interest in the asset class at a healthy level.

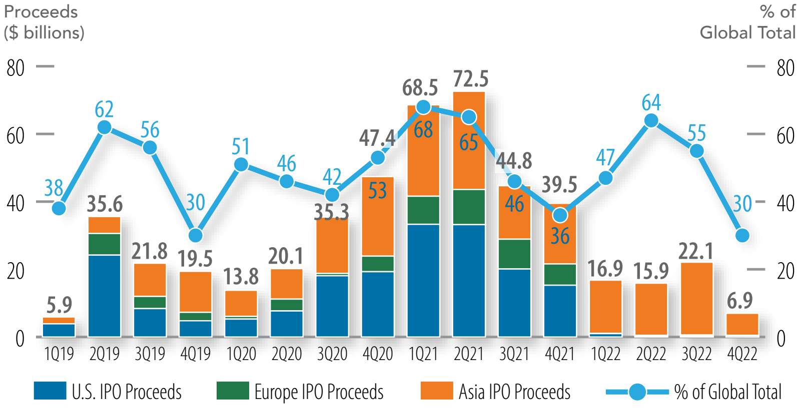
Looking forward, meaningful uncertainty remains regarding the likelihood and severity of an economic downturn in 2023. While each market cycle poses unique challenges, the private equity industry has successfully navigated many prior market swings. Most general partners came into the current crisis well-prepared for the changing environment, having taken advantage of strong market conditions in recent years to generate significant liquidity for their investors and lock in strong gains. The industry has adapted to current headwinds by focusing on investments in resilient and high-quality businesses and by structuring investments more conservatively, placing an increased emphasis on value-creation plans centered on operational improvements and growth. While we expect 2023 to present additional challenges for both the private equity industry and the economy more broadly, we believe that the long-term nature of the private equity asset class and its active, control-oriented operating model make it particularly well-suited to navigate periods of turmoil and expect that experienced and disciplined general partners will continue to be successful in the prospective market environment.

Global Exit Markets

Global M&A exit activity continued its downward trend during the fourth quarter, totaling just $104 billion—a decline of 59% from the same period last year, according to Mergermarket data. The fourth quarter capped a year that saw economic headwinds shake investor confidence and pose credible questions about the market outlook and the impact that continued volatility will have on the near- and medium-term path of operating performance for target companies. Additionally, stress in the credit markets limited buyers' ability to finance acquisitions, particularly at the large end of the market. The resulting pressure led to declines in both deal value and volume during each quarter of the year. In total, M&A exit value during 2022 reached $525 billion, a decline of 44% from the record 2021 total but still flat from the annual average over the prior five years. Notable exits were fewer than in recent years; however, there were a number of bright spots to point to during the year. Adobe's acquisition of venture-backed interface design platform Figma for $20.0 billion in September marked a tremendous win for its early-stage investors, including Index Ventures, Greylock Partners, and Kleiner Perkins. In the buyout markets, notable exits included Vista Equity's sale of security and software solutions provider Datto for $6.2 billion and Genstar Capital's sale of clinical research technology provider Advarra for $5.0 billion. Although we expect overall M&A exit activity to remain muted in upcoming quarters, we do see continued interest in high-quality businesses that have demonstrated resilience in the current environment.

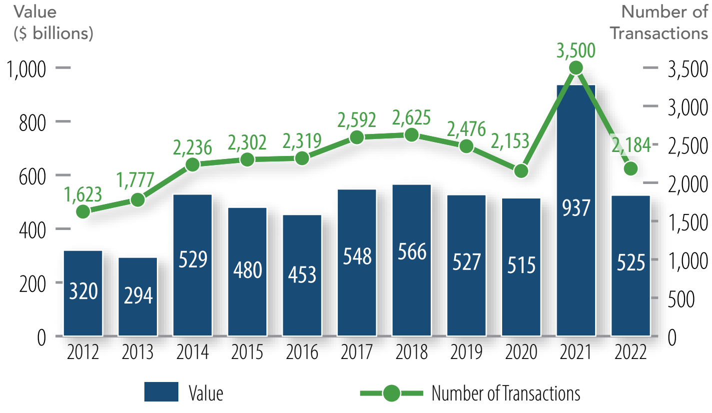
IPO market activity ground to a near complete halt at the start of 2022 and showed no signs of improvement as the year progressed. In the U.S., just 15 private equity–backed IPOs took place, raising $2.0 billion in proceeds—a stark contrast to the $102 billion raised through 169 IPOs in 2021. The IPOs that did take place were nearly all small biotech listings, averaging just $130 million in proceeds, and no buyout-backed IPOs occurred for the first time since at least 2000. The market was negatively impacted by poor aftermarket performance from the vast majority of recent listings. The Renaissance IPO Index, which measures the performance of companies that have gone public in the U.S. in the past three years, declined by 57.0% during 2022—its worst performance since its inception in 2009 and well below the broader market. One of the most striking changes from 2021 was the virtual disappearance of the previously active SPAC market. According to SPAC Research, after a record year in 2021, during which 613 blank-check IPOs raised $163 billion, only 86 were raised in 2022, totaling $13.4 billion. De-SPAC'ing transactions that closed in 2021, which included a large number of unprofitable, technology-focused companies, were among the hardest hit in the public markets in 2022.

Figure 1. Quarterly Global PE-Backed IPO Activity
At December 31, 2022



Source: Bloomberg, Renaissance Capital, and Pathway Research.

Figure 2. Global PE-backed M&A Exit Value & Volume
At December 31, 2022



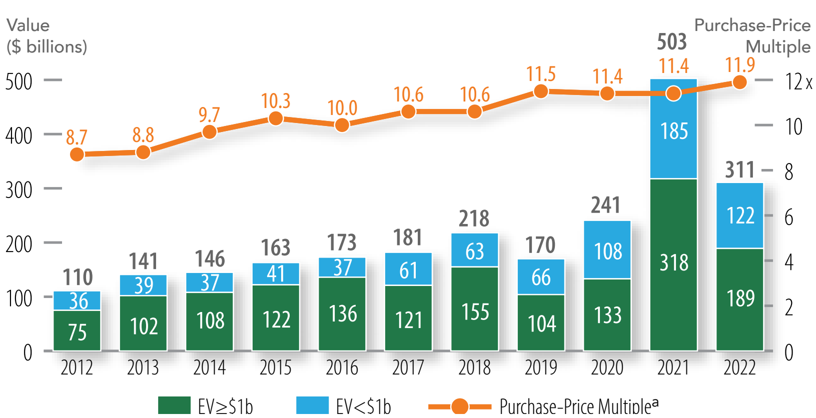
Source: Mergermarket.

U.S. Buyout Markets

Following a banner year in 2021, the U.S. buyout market retrenched in 2022 due to rapidly rising interest rates, dislocated financing markets, an uncertain economic outlook, and a wide gap between buyer and seller expectations. U.S.-based buyout investment activity totaled $311 billion in 2022, a decline of 38% from the record-setting prior year though still the second-highest annual total since the GFC, according to data from Refinitiv and Pathway Research. The slowdown in buyout activity accelerated as the year progressed: fourth-quarter transaction value fell by more than 50% from the same period in 2021. Traditional debt financing markets were largely inaccessible or prohibitively expensive for much of the year, constraining general partners' ability to obtain financing for new investments, particularly at the larger end of the buyout market. The all-in yield for a new-issue B-rated syndicated loan was 11.2% in December 2022, more than double the 5.2% average in December 2021, according to PitchBook LCD. Additionally, banks have been reluctant to underwrite new financing packages because they remain saddled with tens of billions in loan and bond commitments that have not yet been syndicated. Private equity firms, however, found workarounds, including overequitizing initial platform acquisitions, obtaining seller financing, and accessing the direct lending market. Nearly every multibillion-dollar buyout transaction announced since the first quarter featured committed financing from one or more direct lenders.

Buyout general partners endured the volatile market environment in 2022 by maintaining a high level of discipline, focusing their efforts on opportunities where they had strong conviction in their investment thesis and value-creation plan. This selectivity, coupled with rising financing costs that changed the calculus of underwritten returns, resulted in high bid-ask spreads and many failed sales processes during the year. One bright spot, however, was take-private investment activity, which surged in 2022 as buyout firms capitalized on the steep selloff in many public companies, particularly in the technology sector. There were 38 take-private buyouts totaling $132 billion in 2022, more than 40% of transaction value during the year. Not surprisingly, technology-related companies accounted for a record 55% of buyout transaction value in 2022, well above the healthcare sector, which garnered the second-highest proportion at 12%. General partners continued to be drawn to the durable growth characteristics of technology-focused companies, which often feature recurring revenue streams, strong customer-retention rates, and pricing power. Valuation multiples remained elevated in 2022, driven by the high level of technology buyouts and a lag effect from transactions that were agreed to many months before their closing dates. Equity contribution rates and interest coverage ratios also remained high, however, indicating a healthy level of capital structure flexibility for transactions closed during the year.

Figure 3. U.S. Buyout Investment Activity
At December 31, 2022



Source: Refinitiv, PitchBook LCD, and Pathway Research.
Notes: Amounts may not foot due to rounding. • EV=Enterprise value.
[a]Average PPM (as a multiple of trailing EBITDA) of all LBOs.

Table 3. U.S. Buyout Investment Statistics
At December 31, 2022

	2007	2021	2022
Purchase Price/EBITDA	9.7x	11.4x	11.9x
Equity Contribution %	30.9%	45.9%	45.8%
Debt/EBITDA	6.0x	5.8x	5.9x
EBITDA/Cash Interest	2.1x	3.5x	2.9x

Source: PitchBook LCD.

European Buyout Markets

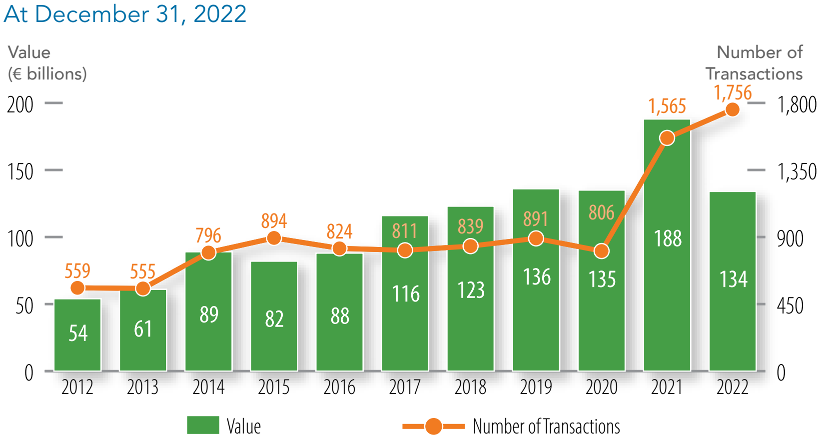
In 2022, Europe experienced a significant increase in geopolitical uncertainty and macroeconomic headwinds, including from the war in Ukraine, an energy crisis, inflationary pressures, and a looming recession. As a result, European buyout activity was choppy and saw a decline in 2022, particularly in the second half of the year. According to data provided by Refinitiv, the aggregate transaction value of European buyouts announced in 2022 was €134 billion, or 29% below the prior year. However, 2021 experienced exceptional activity, and the 2022 total is still in line with 2018–2020. In the fourth quarter, the European market experienced an increase in buyout activity: the aggregate deal value was up 23% from its low point in the prior quarter. It remains to be seen if this momentum continues into the new year.

Notably, the fourth quarter saw a revival of the market for large-cap deals (i.e., deals with enterprise values in excess of €1 billion), which had dried out in the third quarter. The largest deal of the quarter was the acquisition of Wood Mackenzie, a UK-based provider of technical consulting services, by Veritas Capital, with an enterprise value of €3.3 billion. This was followed by a Russia-based deal, stemming from Naspers' desire to sell the country's biggest online classifieds business, Avito, following Russia's invasion of Ukraine. Notably, at €2.5 billion, Avito is larger than the aggregate transaction value of all Russian buyouts during the past five years. For the full year, however, large-cap deals made a comparatively small contribution to European buyout activity, representing only 27% of the aggregate transaction value in 2022 (versus an average of 55% for the prior five years). Notably, small-cap and lower-mid-market deals (i.e., deals with enterprise values up to €250 million) experienced a 7% increase in their aggregate transaction value in 2022.

Across deal size ranges, buyout activity was down in all Western European regions, with the exception of France, where the aggregate transaction value increased from an average of €10.7 billion in 2018–2020 to €19.4 billion in 2021 and to €24.5 billion in 2022. As a result, buyout activity in France meaningfully exceeded the DACH region for the first time since 2017. Meanwhile, the United Kingdom maintained its traditional spot as the largest buyout market in Europe.

European credit markets also experienced a significant drop in activity, particularly in the high-yield bond market. European primary high-yield issuance totaled only €22.4 billion, the lowest annual total since the GFC, according to UBS. Starting at a level of around 250 basis points, spreads on BB-rated euro-denominated bonds more than doubled in the second and third quarters before ending 2022 at around 360 basis points. In this environment, European buyouts have increasingly been financed with debt from direct lending funds.

Figure 4. European Buyout Investment Activity
At December 31, 2022



Source: Refinitiv and Pathway Research.

Table 4. Notable European Buyouts Announced in 4Q22
At December 31, 2022

Buyer	Target	Country	Value (MM)
Veritas Capital	Wood Mackenzie	UK	€3,312
Kismet Capital Group	Avito Holding	Russia	€2,453
Hellman & Friedman	MA Med Alliance	Switzerland	€1,154
Bridgepoint	Laboratoires Vivacy	France	€900

Source: Refinitiv.

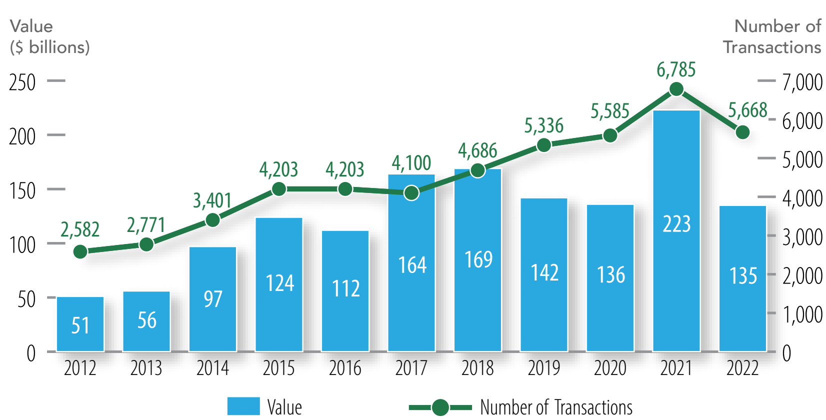
Asia Private Equity

Asia private equity investment activity slowed markedly in 2022, concluding the year at $135 billion from 5,668 transactions, down 40% in value from 2021, according to *Asia Venture Capital Journal* (*AVCJ*). Investment activity during the first quarter of 2022 maintained pace with the prior year, but transaction value and volume dropped dramatically in the second quarter following the public market correction amid mounting concerns over slowing economic conditions. The technology sector, particularly the growth-stage segment, experienced the most substantial hit, with investment amounts decreasing 43% year on year. The latter half of 2022 was characterized by a flight-to-quality as managers increased selectivity and focused on opportunities with stable and sustainable growth, away from the high-growth, high-cash-burn business model favored over the past years. Nevertheless, technology remained a core strategy for many investors: the sector still received the most investment dollars in 2022 as a result of Asian economies continuing to ride the wave of digitalization.

During the fourth quarter, Asia private equity investment activity plunged to $17.5 billion from 1,147 transactions, a decrease in value of 32% quarter on quarter and of 73% year on year. While all major Asian economies registered a slowdown in investment activity, China experienced the largest decline during the fourth quarter, hitting a historical low not seen since 2013. Even with the conclusion of the 20th National Congress and President Xi Jinping's reelection to a historic third term, market uncertainty has caused both buyers and sellers to continue to remain cautious, stay on the sidelines, and wait for more-concrete policies to materialize in the coming quarters. While the sudden lifting of COVID-19 restrictions led to a huge wave of infections and a near halt in the country's economic and investment activity during the final days of 2022, the additional political clarity and the expectation of an economic revival following China's opening have restored some confidence in the country.

Private equity managers generated $78.0 billion in exit proceeds in 2022, approximately two-thirds of the total for 2021, according to *AVCJ*. Exits across all channels plummeted, and the number of liquidity events was the lowest in more than a decade. The sponsor-to-sponsor channel experienced a more modest decline, accounting for half of the year's announced exits above $1.0 billion, although trade sales to strategic investors dropped dramatically. A-share IPOs represented the lone bright spot: Chinese companies raised $71.8 billion through 335 initial public offerings on mainland exchanges, just shy of the annual record set in 2021 and accounting for 58% of global IPO proceeds in 2022. In contrast, Asia ex-mainland IPOs have never been quieter as a result of investors seeking alternative exit routes or waiting for the right exit window.

Figure 5. Asia PE Transaction Value & Volume
At December 31, 2022



Source: *AVCJ*.

Table 5. Largest Asia PE Investments in 4Q22
At December 31, 2022

Buyer	Target	Country	Value (MM)
Bain Capital Asia	Mash Holdings	Japan	$1,441
Brookfield Asset Management	Trimco International Holdings	Hong Kong	$850
Square Peg Capital, Wellington Management	Rokt	Australia	$510
Brookfield Asset Management	LanzaTech	New Zealand	$500
Tonic Private Equity	Viva Republica (Toss)	South Korea	$405

Source: *AVCJ*.

Venture Capital Markets

Following an unprecedented year of investment activity in 2021 driven by a number of factors, 2022 proved to be a stark reality check after the previous year's euphoria, punctuated by the lack of funding activity in the fourth quarter. Fourth-quarter investment activity in the U.S. totaled $36.2 billion, according to data from PitchBook-NVCA Venture Monitor. This was a 23% decline from the prior quarter, a 61% decline from same the quarter in 2021, and the lowest quarterly level since the start of the COVID-19 pandemic in the first quarter of 2020. Although the 2022 annual deal value total of $238 billion was still the second-strongest on record (2021 holds the record at $345 billion), deal value and deal volume sequentially declined each quarter during 2022. European activity also declined in 2022 but saw less of a reversal from 2021 figures compared with the U.S. After a record year in 2021, during which European venture deal value hit €109 billion, 2022 totals were down only 16% to €92 billion, compared with a year-over-year decline of nearly 30% in the U.S.

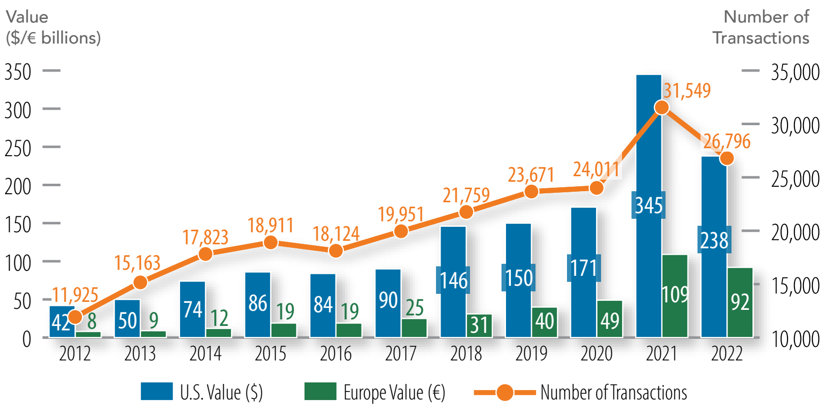
All stages of funding were impacted by the market turmoil, according to data from PitchBook-NVCA Venture Monitor:

- Angel & Seed—Although U.S. deal count in 2022 fell 18% from 2021, deal value actually increased by 9% as a result of more investors beginning to increase their focus on high-quality pre-seed and seed opportunities during the year in response to the decline in late-stage rounds.
- Early-Stage—Although U.S. deal value was down 22% in 2022 relative to 2021, the annual total was still the second strongest on record over the past 10 years. After a record fourth quarter of 2021, quarterly value declined sequentially through year-end.
- Late-Stage—Deal value dropped most substantially year over year, down 36% from $146 billion in 2021 to $93.7 billion in 2022. The fourth-quarter total value of $13.5 billion was the lowest quarterly total since the second quarter of 2018.

Exit markets for venture-backed companies became nearly nonexistent during 2022 following a record year for public offerings and M&A in 2021. In the U.S., 2022 saw just $71.4 billion of exit value generated, according to the PitchBook-NVCA Venture Monitor, a more than 90% drop compared with the $753 billion total in 2021. There were only 15 public offerings of venture-backed companies totaling $2.0 billion of offering value in all of 2022, down dramatically from the $58.1 billion of capital raised across 131 offerings in 2021.

Venture capital fundraising in 2022 maintained its resilience relative to other parts of the market: $148 billion was raised by U.S. venture capital firms across 1,006 funds, a slight uptick to the $143 billion raised in 2021 across 1,018 funds, based on data from Refinitiv and Pathway Research. The strong annual total was driven by the increasing size of many late- and growth-stage funds raised during the year.

Figure 6. Venture Capital Transaction Value & Volume
At December 31, 2022



Source: PitchBook-NVCA Venture Monitor Report.

Table 6. Largest Venture Capital Deals in 2022
At December 31, 2022

Company	Select Investors	Region	Value (MM)
Altos Labs	Foresie Capital Management	U.S.	$3,000
Epic Games	Newman Capital, Inertia Ventures	U.S.	$2,000
Celonis	Durable Capital Partners, Splunk Ventures	Germany	$2,000
SpaceX	Adventure Fund, Gaven Capital, Space.VC	U.S.	$1,725
Gopuff	Marcy Venture Partners	U.S.	$1,500
Anduril	Lightspeed Venture Partners, Andreesen Horowitz, General Catalyst	U.S.	$1,480
TerraWatt Infrastructure	Vision Ridge Partners, Keyframe Capital	U.S.	$1,000

Source: PitchBook Data, Inc.

Private Credit Markets

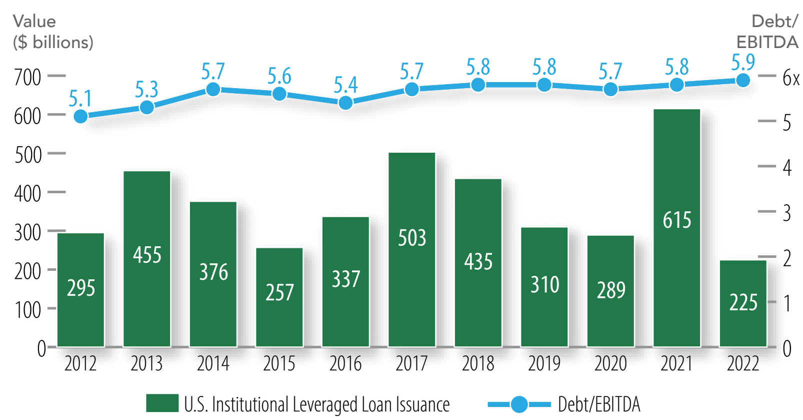
Leveraged credit markets were dislocated for most of 2022, restricting borrowers' access to financing and driving primary bank loan and high-yield issuance to their lowest levels since the GFC. U.S. institutional leveraged loan issuance totaled $225 billion in 2022, a decline of 63% from the prior year and the lowest annual total since 2010, according to data from PitchBook LCD. Similarly, U.S. high-yield bond issuance totaled $102 billion in 2022, a 78% decline from the prior year and the lowest annual total since 2008. With the public credit markets largely closed during the year, direct lenders, particularly those with larger pools of capital, were called upon to finance larger-sized companies in addition to their core constituency of middle-market companies. Nearly every multibillion-dollar buyout transaction announced since the first quarter of 2022 featured committed financing from a direct lending firm rather than from the syndicated debt markets. Despite their willingness and capacity to remain active in the current environment, direct lenders are mindful of the uncertain economic outlook and have been seeking higher spreads, tighter documentation, and more-conservative structures for new facilities. In the core middle market, spreads increased from 500–600 basis points in 2021 to 600–725 basis points in 2022 for unitranche facilities, and leverage multiples contracted by a full turn or more from the prior year. While direct lenders are benefiting from rising interest income resulting from an increase in base rates and spreads, they are closely monitoring existing borrowers' operating performance in the current environment and their ability to withstand higher debt-financing costs. Direct lending portfolios have been resilient to date overall, but private credit firms are preparing for a potentially greater challenge in 2023.

Indicators of distress in the leveraged credit markets remain at very low levels but have increased in recent quarters. The trailing 12-month high-yield default rate at year-end 2022 was 1.3%, up from 0.5% in 2021 but well below historical averages and the peak default rates reached in prior cycles, according to Fitch Ratings. High-yield default value of $19.1 billion in 2022 was driven by a small number of companies in the healthcare and broadcasting sectors, including Bausch Health, Endo International, and Diamond Sports Group, which accounted for 70% of the annual total. Most companies and industry sectors continue to report solid operating results, despite the uncertain economic outlook. Additionally, many companies took advantage of robust credit markets in 2021 to refinance their debt and extend maturities, providing themselves greater balance-sheet flexibility. Still, the major credit ratings agencies anticipate an increase in defaults in 2023 as a result of rising interest rates and economic headwinds impacting a broader swath of industry sectors. In the meantime, distressed debt and opportunistic credit investors have become more active, taking advantage of market volatility to acquire discounted secondary debt, provide capital solution financings, serve as anchor investors in select syndicated financings, and acquire "hung" bonds and loans from bank underwriters.

Figure 7. High-Yield Bond Spreads over U.S. Treasuries
At December 31, 2022

Source: BofA Merrill Lynch.

Figure 8. U.S. Institutional Leveraged Loan Issuance
At December 31, 2022



Source: PitchBook LCD.

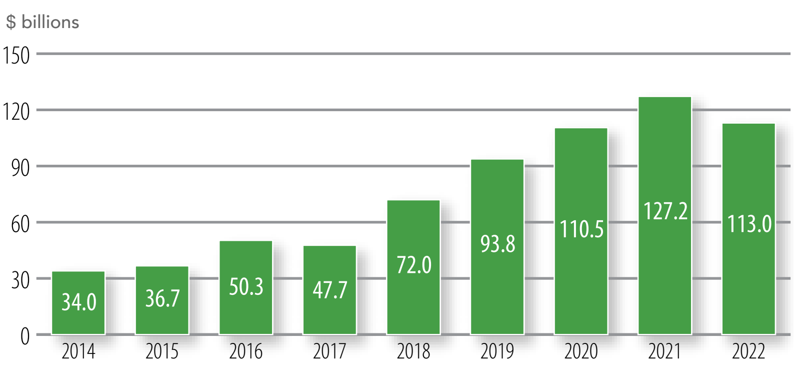
Private Infrastructure Market

Global infrastructure fundraising slowed in the fourth quarter: just three funds raised a combined $1.7 billion, a decrease of 83% from the prior quarter. Fourth-quarter fundraising was driven by smaller, industry- or region-specific funds, such as Climate Adaptive Infrastructure Fund I ($1.0 billion), which accounted for 58% of the quarter's total. Despite the macroeconomic headwinds seen throughout the year, $113 billion was raised in 2022—the second-highest annual infrastructure fundraising total in history. Looking ahead to 2023, several large infrastructure funds are expected to reenter the market, which should lead to another strong year of fundraising.

Global infrastructure investment value totaled $2.2 billion during the fourth quarter, a decrease of 77% from the prior quarter. Total transaction value in 2022 amounted to $70.9 billion, down from the record-breaking $155 billion transacted in 2021. This is largely reflective of continued market volatility, geopolitical instability in certain regions, and less accommodating debt markets. Notable deals in the fourth quarter include Brookfield's $500 million investment in California Bioenergy, a U.S. operator of renewable natural gas processing plants, and Actis's investment in Yellow Door Energy, a Dubai-based provider of sustainable energy solutions.

Public-to-private infrastructure transactions accounted for a meaningful portion of deal activity in 2022. During the year, global infrastructure public-to-private transactions totaled $25.5 billion, or 36% of total transaction value for the period. This was the result of a combination of large-cap managers around the globe increasingly exploring public markets for deal flow as a result of public share price volatility and broad declines in valuations. In Europe, Energy Capital Partners announced its plans to acquire Biffa (LON: BIFF), a provider of waste management services in the United Kingdom, for £1.3 billion. Within the U.S., IFM Investors and DigitalBridge completed their $11.0 billion public-to-private acquisition of Switch, a U.S.-based designer, constructor, and operator of hyperscale data centers, which represented the largest transaction among infrastructure managers in 2022. Other notable public-to-private transactions included J.P. Morgan Infrastructure's acquisition of Falck Renewables and KKR Infrastructure's acquisition of ContourGlobal PLC. While the global economic picture remains uncertain, these take-private transactions should continue to be a meaningful avenue of deal flow for private infrastructure investors in 2023.

Figure 9. Global Private Infrastructure Capital Raised
At December 31, 2022



Source: PitchBook Data, Inc.

Table 7. Notable Infrastructure Deals in 4Q22
At December 31, 2022

Asset/Company	Acquirer	Industry	Region	Deal Size (MM)
California Bioenergy	Brookfield Asset Management	Renewables	U.S.	$500
Yellow Door Energy	Actis	Renewables	UAE	$405
Ruhrfibre Essen	DIF Capital Partners	Internet Services	Europe	$182
Mesa Minerals Partners III	NGP	Energy-Related	U.S.	$150
Alight	DIF Capital Partners	Renewables	Europe	$148

Source: PitchBook Data, Inc.

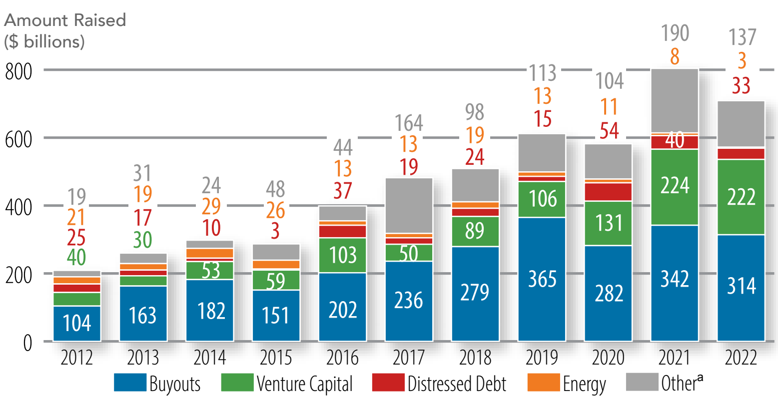
Fundraising Market

Private equity fundraising activity fell sharply during the fourth quarter of 2022, capping a year of gradual declines in activity that served to reflect growing exposure concerns and allocation constraints from many limited partners globally. During the quarter, worldwide private equity fundraising totaled $127 billion, a decrease of 28% from the prior quarter and the lowest quarterly amount since the second quarter of 2020, according to data from Refinitiv and Pathway Research. The decline was not wholly unexpected: many limited partners had widely expressed that the frenzied pace of fundraising activity in 2021 and into the early parts of 2022 had limited available allocations for the second half of the year, forcing many private equity managers to extend fundraising into 2023 to access a fresh pool of allocation dollars. The fourth-quarter total brought annual fundraising activity to $709 billion, down 12% from the prior year but still the second-highest figure on record. The annual total was driven by continued success from large, proven fund managers that were able to raise successive funds at increasingly larger sizes. During the year, 21 mega funds (i.e., those of $5.0 billion or greater) were raised, accounting for $238 billion of commitments, or 34% of the annual global total.

While every strategy saw a decrease in fundraising from the prior year, venture fundraising held up the best, totaling $222 billion—a decrease of just 1% and the second-largest annual total on record. The strong annual figure was weighted toward the first half of the year, which was fueled by a combination of accelerated fundraising timelines for many venture managers who quickly put to work their existing funds in 2021 and the scale of many late- and growth-stage funds. Buyout fundraising saw more of a decrease, falling 8% from 2021; however, 2022 still had the third-largest annual total to date. The four largest funds raised during the year were all by buyout managers, including Advent Partners GPE X ($25.0 billion), Thoma Bravo Fund XV ($24.3 billion), and Francisco Partners VII ($13.5 billion).

Looking forward, we expect the denominator effect to remain a driving factor for the fundraising market in 2023. The private equity industry's outperformance of public equities to date in 2022 has led many limited partners to be well above their targeted exposure to the asset class, forcing them to make tough decisions on how to manage that exposure and its impact on their go-forward pacing. Still, interest in the asset class remains strong, and historical precedent would serve to show that funds raised in recessionary vintages may benefit from opportunities that arise as a result of the market dislocation. The number of funds in the market in early 2023 remains robust, and we expect fundraising activity to remain highly competitive throughout the year.

Figure 10. Global Fundraising by Strategy
At December 31, 2022



Source: Refinitiv and Pathway Research.
Notes: Fundraising amounts are based on net amounts raised, which are adjusted for fund-size reductions. • Data is continuously updated and is therefore subject to change.
• Amounts may not foot due to rounding. • [a]Comprises special situations and other fund strategies not classified as buyout-, venture capital–, credit-, or energy-focused.

Table 8. Notable Funds Raised in 4Q22
At December 31, 2022

Fund	Strategy	Region	Amount (MM)
Veritas Capital Fund VIII	Buyouts	U.S.	$10,550
TPG Partners IX	Buyouts	U.S.	$6,693
Ares Special Opportunities Fund II	Distressed Debt	U.S.	$4,697
Sixth Street Growth Partners II	Special Situations	U.S.	$4,350
Sentinel Capital Partners VII	Buyouts	U.S.	$4,260

Source: Refinitiv and Pathway Research.

About Pathway Capital Management, LP

Founded in 1991, Pathway provides private market portfolio solutions for institutional investors worldwide. Pathway manages capital on behalf of some of the largest corporate and public pension plans, government entities, and financial institutions around the globe. Since its formation, the firm has committed more than $100 billion to more than 1,000 private market investments.

Pathway is registered as an investment adviser with the SEC in the United States and as a portfolio manager and exempt market dealer in Ontario, Quebec, and Saskatchewan, Canada. Pathway's wholly owned UK subsidiary is regulated in the UK by the Financial Conduct Authority. Pathway's wholly owned Hong Kong subsidiary is regulated in Hong Kong by the Securities and Futures Commission.

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