3. Investment Efficiency and Capital Allocation: The Role of Financial Structure[1]

The growth slowdown since the global financial crisis and rising global trade fragmentation have sharpened the focus on domestic drivers of growth in Asia. The relatively high investment rates in the region have been aided by a financial structure that's conducive to capital-intensive growth, but recent years saw an increase in capital misallocation and a decline in return to investment that has been more prominent than in other regions. Evidence suggests that inadequacies in financial intermediation have contributed to these developments. Financial institutions favored larger, less productive firms at the cost of small and young, more productive firms, and debt evergreening rose. Going forward, policies should focus on improving financial intermediation to meet the demand for both scale and mix of financing for a broader set of firms, and reforms to support timely restructuring of nonviable debt. Creating a broader suite of financing instruments is increasingly important for efficient capital allocation as economies develop. By supporting broad-based growth and improving capital allocation, financial reforms can play a key role in supporting job and income growth, spur domestic demand, and facilitate economic rebalancing.

3.1. Galvanizing Domestic Drivers of Productivity and Growth

Given that international trade and investment have been important engines of productivity growth and demand for the Asia-Pacific region, the broad growth slowdown after the global financial crisis amid rising global trade fragmentation has brought more focus on domestic drivers of growth. The chapter puts the lens on efficiency of investment, assessing its trends, and evaluating the impact of financial structure. Capital has been the key factor driving growth in Asia, and the share of investment in GDP has been higher in Asia compared to other regions (see Figure 3.1).[2] Financial intermediation channels savings into productive investment.[3] The chapter asks, how did distortions and constraints in the allocation of finance affect investment and allocation of capital, and, hence, growth and productivity?

The chapter finds that investment efficiency declined in the region after the global financial crisis, reflected in the high and rising incremental capital–output ratio (ICOR), consistent with a greater decline in returns. Allocative efficiency of capital also worsened, with an increase in evergreening.[4] In a region where finance is largely bank-based, financial intermediation contributed to these trends through financial constraints faced by smaller and more productive firms, more financing allocated toward larger, less productive firms, and a lack of optimal mix of financing. Easier financing conditions in recent years contributed to the rise of zombie firms. Policymakers should aim to diversify the financial structure to improve financial access and restructure nonviable debt. The saliency

[1] Rahul Giri (lead), Natalija Novta, Anne Oeking, Akshat Singh, Jeongwon Son, and Ying Xu, with contributions from Fei Han, Monica Petrescu, and Tatjana Schulze, and outstanding research support from Sofia Felici, Vyshnavi Thumbala Saikrishnan, and Ruihua Yang, under the guidance of Li Cui.

[2] Supported mainly by private investment, but also higher public investment rates (online Annex Figures 2.2 and 2.3). Data on public investment are available for a limited set of 13 economies, based on the *World Economic Outlook*. See online Annex Figure 2.1 and online Annex 1.1 for growth accounting results and methodology.

[3] Financial systems provide functions critical for efficiency and economic growth (Levine 2021): (1) screen investment and allocate resources; (2) provide mechanisms to trade, diversify, and manage risks; (3) mobilize savings; (4) facilitate exchange; and (5) exert corporate governance.

[4] Evergreening refers to provision of financing to firms that exhibit persistent inability to service their debt, based on publicly available income statements.

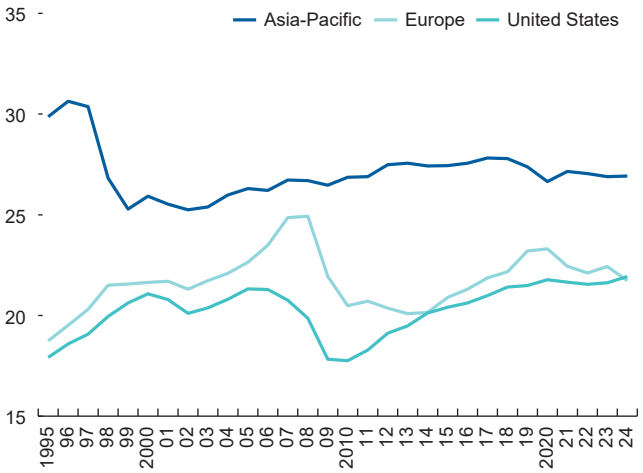
of policies to develop alternative financing instruments rises with the level of development. Improvements in financial intermediation and capital efficiency will boost job and income growth, strengthen domestic demand, and facilitate more balanced growth.

3.2. Decline in Investment Efficiency and Rise in Capital Misallocation

Although investment has stayed robust in Asia, there is evidence of a decline in its efficiency and a rise in capital misallocation. The ICOR (capital needed to produce one additional unit of output) for most Asian economies has risen over time, especially after the global financial crisis when output growth slowed (see Figure 3.2), suggesting a declining efficiency of investment. Although the trend of rising ICOR is also visible in the rest of the world (RoW), the level of ICOR is generally much higher in Asia (less than 3–4 is considered efficient), implying that investment efficiency worsened comparatively more in Asia.[5] Consistent with this, balance sheets of listed firms, excluding the financial sector, show that the average return on assets (ROA) has dropped significantly across the region compared to the period before the global financial crisis (see Figure 3.3). This drop is sharper than in other regions and not concentrated in a few sectors (online Annex Figure 2.4).

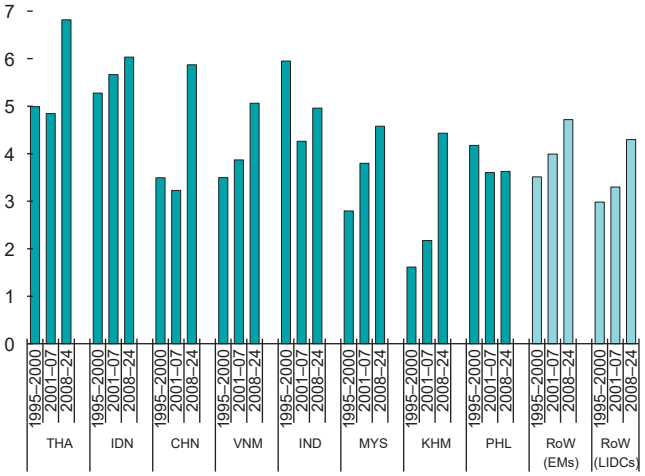
In addition, misallocation of capital, as measured by the dispersion in the marginal revenue product of capital (MRPK) across firms within sectors (following Hsieh and Klenow 2009; Gopinath and others 2017), increased by about 25 percent between the periods before and after the global financial crisis (see Figure 3.4),[6] which lowers total factor productivity (TFP). Furthermore, the higher dispersion in services suggests that service sectors account for a higher proportion of the allocative inefficiency. The rise of misallocation in Asia mirrors that in Europe, though its pace of increase is higher; the United States, in contrast, exhibits a declining trend.

Figure 3.1. Investment Rate, 1995–2024
(Percent of GDP)



Sources: IMF *World Economic Outlook*; and IMF staff calculations.
Note: Regional averages are derived using simple averages across countries.

Figure 3.2. Incremental Capital–Output Ratio, 1995–2024
(Average for each period)

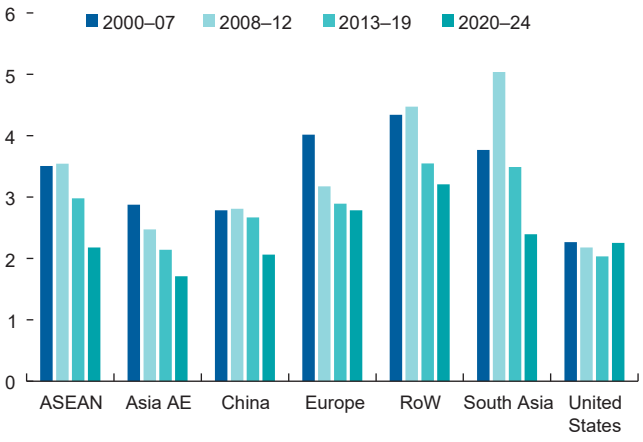


Sources: IMF *World Economic Outlook*; and IMF staff calculations.
Note: ICOR is investment rate divided by real GDP growth rate.
EMs = emerging markets; LIDCs = low-income developing countries; RoW = rest of the world.

[5] Advanced economies are excluded as their growth is structurally lower with volatility around zero resulting in misleadingly large or unstable ICOR, especially during slowdowns. ICOR implicitly assumes a proportional relationship between investment and growth, suitable for capital-scarce, fast-growing economies.

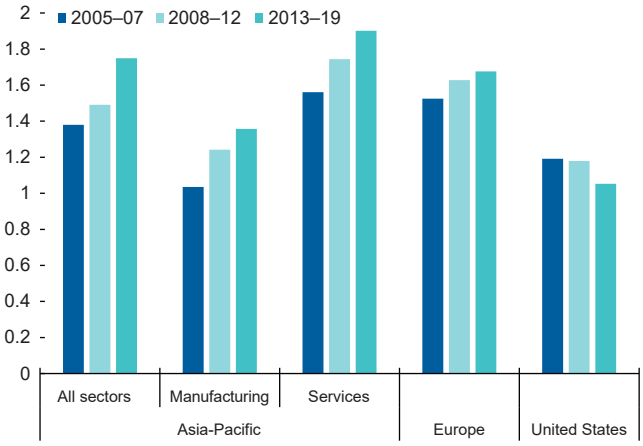
[6] MRPK is the extra nominal revenue that one additional unit of capital generates. Misallocation refers to departure from a frictionless environment where MRPKs are equalized across firms, resulting in zero dispersion in MRPKs. See online Annex 1.2 for details of the methodology and data.

Figure 3.3. Return on Assets
(Percent, average for each period)



Sources: Capital IQ; and IMF staff calculations.
Note: Return on assets (ROA) defined as net income divided by average total assets. AE = advanced economy; ASEAN = Association of Southeast Asian Nations; RoW = rest of the world.

Figure 3.4. Capital Misallocation
(Standard deviation of MRPK)



Sources: Orbis; and IMF staff calculations.
Note: See online Annex 1.2 for methodology and data. MRPK = marginal revenue product of capital.

3.3. Stylized Facts: Structure and Efficiency of Corporate Finance in Asia

The financial system has expanded steadily in Asia-Pacific, and except for a few episodes like the 2013 taper tantrum, financial conditions have been generally supportive of investment after the global financial crisis. Several trends, however, point to inadequacy in financial intermediation contributing to the deterioration in capital efficiency.[7]

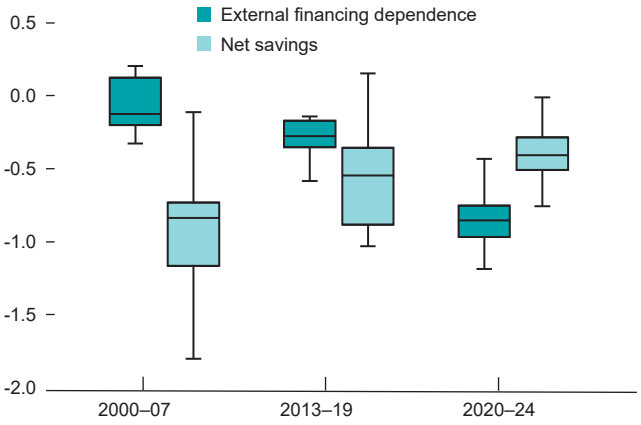
Despite expanding financial systems and accommodative conditions, financing constraints, which result from constrained access to financial resources or mismatches in financial instruments, appear to be rising in Asia. The reliance of listed Asian firms on external financing has fallen since the global financial crisis, whereas net savings have increased (see Figure 3.5). A more conservative approach in response to the 1997 Asian financial crisis, both in terms of financial sector regulation and firms' response to insulate against volatility, and increases in within firm financing for conglomerates may have contributed to this pattern early on, but the sustained trend points to financing constraints faced by firms. IMF (2009) finds that inefficiencies stemming from gaps in the depth of the financial system impacted the rise of corporate savings after the Asian crisis. Financing constraints not only encompass the adequacy of funding, but in the context of accommodative financial conditions, could also reflect the suitability of the available instruments of finance. For the small and medium enterprises (SMEs), surveys show that collateral constraint is more binding in Asia than in other regions (online Annex Figure 2.10), and the limited channel to access equity investors could be particularly constraining for startups.

Second, there has been a shift of financial resources from smaller to larger firms that tend to be less productive. Although the change in leverage at an aggregate level presents a mixed picture across countries, within an industry and country, there is a relative increase in leverage for larger firms (see Figure 3.6), suggesting a skewing of financial resources toward the larger firms. These firms, as we show later, tend to be less productive.

Third, data suggest that evergreening has risen visibly in the region. Evergreening allows financing to firms that exhibit persistent inability to service their debt. The share of these firms, often referred to as zombie firms, in total debt has risen in most economies in the region. What is striking is that although this share has almost tripled for the Asia-Pacific region after the global financial crisis, it has marginally declined in the RoW (see Figure 3.7).

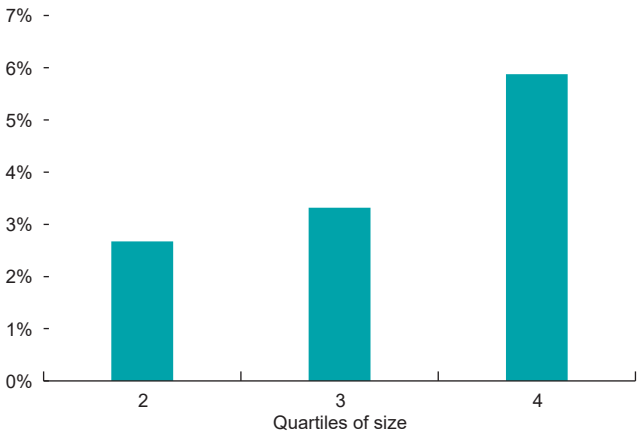
[7] Many recent studies link financial frictions to misallocation-driven TFP losses: Buera, Kaboski, and Shin (2011), Moll (2014), Midrigan and Xu (2014), and Gopinath and others (2017). Furthermore, capital misallocation can stem from credit constraints (Banerjee and Duflo 2005).

Figure 3.5. External Financing Dependence
(Ratios)



Sources: Capital IQ; and IMF staff calculations.
Note: External financing dependence is computed as ([capex – operational cash flow] / capex). Net savings is computed as ([net income – dividends paid – capex] / total assets).

Figure 3.6. Change in Firm Leverage from Before to After Global Financial Crisis, by Firm Size
(Percentage points, normalized relative to 1st quartile)

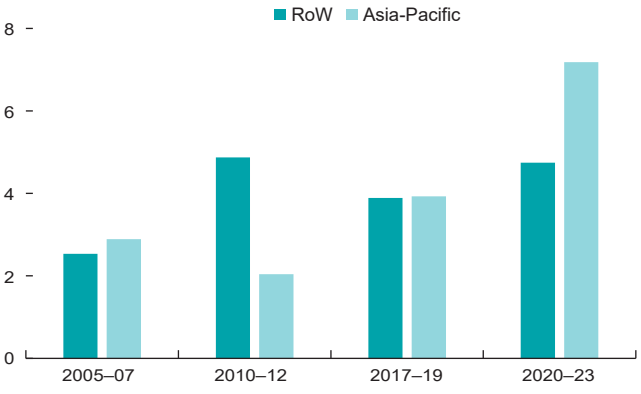


Sources: Orbis; and IMF staff calculations.
Note: Size defined as total net assets and fixed at average for the period before global financial crisis, 2005–07. The period after global financial crisis is 2013–19. Estimates control for country-by-sector fixed effects.

Collectively, these trends indicate that there is rising financial misallocation mirroring the rise of capital misallocation, and plausibly, in part, financial misallocation has contributed to capital misallocation in Asia. Before testing this empirically, we discuss features of Asian financial structure that are likely relevant for the pattern of corporate finance.

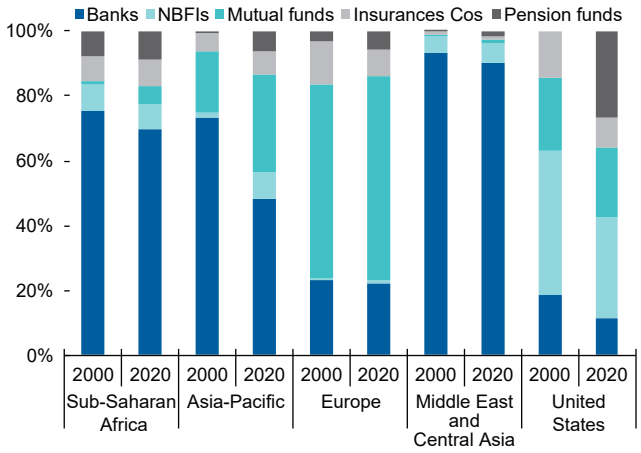
Debt finance, typically through banks, is more dominant in Asia compared to Europe and the United States. Such a structure could limit financial access for a broader set of borrowers, especially riskier, small, and young. Banks dominate financial intermediation in the Asia-Pacific region compared to other regions (see Figure 3.8),[8]

Figure 3.7. Share of Zombie Firms in Debt
(Percent, average for each period)



Sources: Capital IQ; and IMF staff calculations.
Note: Zombie firms are defined as firms older than 10 years that during three consecutive years could not cover interest payments with operating income. RoW = rest of the world.

Figure 3.8. Structure of Financial Sector
(Percent of financial sector total assets)



Sources: Global Financial Development Database; and IMF staff calculations.
Note: NBFIs = non-bank financial institutions.

[8] Financial development appears to be higher among Asian economies relative to peers outside the region with similar GDP per capita (online Annex Figure 2.5).

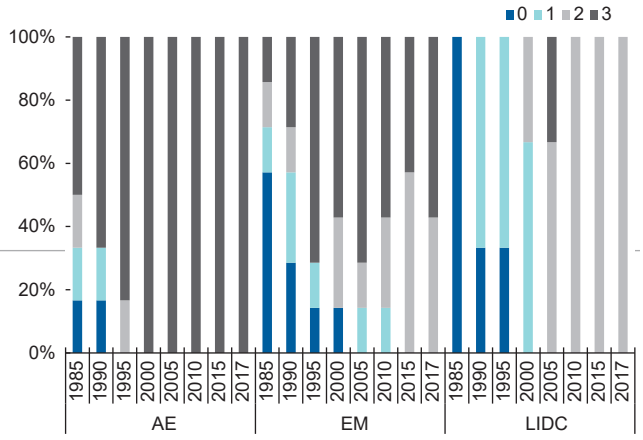
which is not only true for Asian emerging markets and low-income developing economies but also for Asian advanced economies (see online Annex Figure 2.6). Despite the improvement over time, in most Asian economies, the size of nonbank-based private sector financing remains small (see online Annex Figures 2.7 and 2.8). The underdeveloped capital markets in many Asian countries means that most companies rely on banks, which typically favor size and collateral over growth, with limited access to a broader set of investors. Market-based financing instruments, especially equity financing, are better tailored to meet the financing needs of riskier, innovative, and fast-growing companies, including those with fewer tangible assets and attract long-term investors and risk capital.[9] Listing procedures, bond market access for SMEs, and a lack of domestic institutional investor base that provides more stable long-term capital, are among the key areas of reforms needed to support capital market development in the region (OECD 2025).

Evergreening of loans has increased. Historically, weaknesses in the banking system, combined with other policies such as implicit state support or lack of insolvency laws, have often underpinned evergreening. See, for instance, Caballero, Hoshi, and Kashyap (2008), Acharya and others (2019), and Blattner, Farinha, and Rebelo (2023) for Japan in the early 1990s and in Europe in the early 2010s. More recently, Albuquerque and Iyer (2024) find that zombie shares can increase even with a strong banking sector and tight macroprudential policies if insolvency frameworks are not well prepared to deal with restructuring.

In addition, financial controls through interest rate ceilings or credit directives are more prevalent in Asia. Although there has been a sustained liberalization of interest rate controls in Asia over a long period, this trend has been reversed more recently, as the prevalence of interest rate controls increased since the global financial crisis, attributable to Asian emerging markets and low-income developing countries (see Figure 3.9).[10] Compared to peers in RoW (see online Annex Figure 2.9), they tend to have greater inclination to introduce interest rate controls. By distorting market incentives and signals, interest rate controls and financial repression could reinforce sectoral policies and result in rent seeking and efficiency losses, which can pose a drag on growth (see Jafarov, Maino, and Pani 2019).

Figure 3.9. Interest Rate Controls, Asia-Pacific, 1985–2017

(In percent, countries with a level out of all countries)



Sources: Jafarov, Maino, and Pani (2019); and IMF staff calculations.
Note: Smaller values indicate greater interest rate controls, with 3 representing a situation where banks are essentially free to set their own interest rates, subject at most to nonbinding consumer protection limits forbidding usury. AE = advanced economy; EM = emerging market; LIDC = low-income developing country.

3.4. Access to Finance, Investment, and Allocation of Capital: Empirical Test

This section empirically tests the link between financial inputs and capital allocation. In particular, we investigate the role of financial constraints, encompassing both the scale and mix of finance, in shaping the allocation of capital, and whether the impact differs by countries at different levels of development.[11]

Financial constraints curbed growth by making it difficult for small and young firms to expand. The impact is more significant for Asia. In the spirit of

[9] Tangible assets refer to physical assets such as buildings, machinery, or inventory. Intangible assets are nonphysical assets like patents, trademarks, copyrights, and goodwill, which represent intellectual property and brand value. These are typically riskier, and their valuation is generally more volatile.

[10] Data comes from Jafarov, Maino, and Pani (2019), who extend to 2017 the broader database of Abiad, Detragiache, and Tressel (2008) covering the period 1973–2005, but focus only on the interest rate ceiling indicator because of data constraints. Data beyond 2017 is unavailable but given the rise in overall debt and the pandemic's impact, the reversal in trend could have likely persisted.

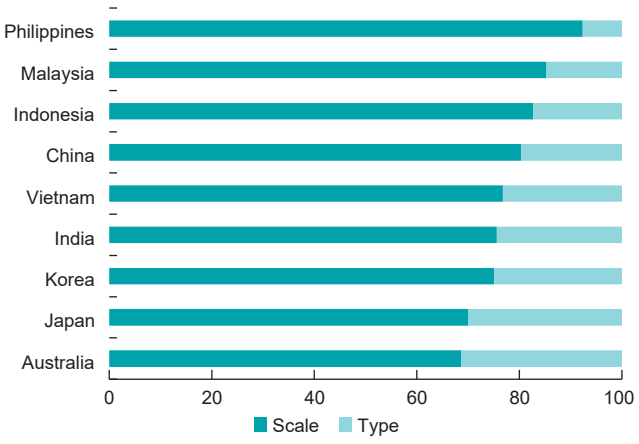
[11] See online Annexes 1.3–1.6 for details of methodologies and data.

Rajan and Zingales (1998), we test whether firms in sectors that have high dependence on external finance grow faster in countries that have more developed financial systems. Following the methodology of Li (2020), we find strong evidence of financing constraints in Asia (see online Annex Table 3.1, column 2), that is, a statistically significant positive interaction between external finance dependence and the level of financial development. Financial constraints are more pronounced in Asia than for the global sample (column 1). It is the small (low asset) and young firms that face the brunt of financing constraints (columns 3 and 5). Online Annex Table 3.2 presents similar evidence for capital expenditure.

Furthermore, financial constraints contributed to misallocation of capital and hence lower aggregate productivity. As demonstrated in Gopinath and others (2017), financing constrained smaller firms need to accumulate sufficient internal savings and cannot expand their capital. As a result, their productivity of capital, MRPK, is higher than that of larger firms who are unconstrained. Hence, leverage and firm size are positively correlated, whereas MRPK and firm size are inversely correlated. We find that these patterns hold in Asia (see online Annex Table 3.3), and that a 1 percent larger firm size before the global financial crisis (net worth) is associated with 2 percent more investment and 0.1 percent more leverage during the period after the global financial crisis. The increase in MRPK dispersion after the global financial crisis stems from greater deterioration in MRPK of larger firms. Going beyond size, Box 3.1 highlights how direct policy distortions from preferential credit policies towards state-owned enterprises (SOEs) have contributed to capital misallocation and lower productivity in Vietnam. Removing such misallocation could potentially raise TFP by over 50 percent. Lower productivity and lower borrowing costs of SOEs relative to private firms are also documented globally (see April 2020 *Fiscal Monitor*).

Among various factors affecting financial constraints, the scale of financing is key in low-income countries, while the diversification of financing instruments becomes increasingly relevant as countries develop. Following Whited and Zhao (2021), the importance of scale versus mix of financing is assessed by treating financial liabilities—debt and equity—as primitive inputs into production and allowing debt and equity to be either perfect or imperfect substitutes.[12] Estimates show that though the scale of financing is the dominant constraint in Asia, the importance of its mix rises with the level of development (see Figure 3.10). Box 3.2 illustrates the importance of financing constraints and financial structure for young high-growth firms called "gazelles." Developing a range of financing options could help expand the role of gazelles in the economy, including through nonbank financing such as venture capital, particularly for firms that have a high share of intangible assets and lack traditional collateral.

Figure 3.10. Scale versus Mix of Financing
(In percent)



Sources: Orbis; and IMF staff calculations.
Note: The figure shows the counterfactual aggregate TFP gains that each country would enjoy if finance misallocation was reversed under empirically estimated elasticity of substitution between debt and equity and under the alternative scenario of perfect substitutability, expressed as shares of the aggregate TFP gain. The chart shows gains for each country averaged over the time period 2010-2022. See online Annex 1.5 for methodology.

The rise of evergreening has been facilitated by easy financing. By crowding out more productive investment, this would further contribute to capital misallocation. Evergreening is a channel through which financing access supports a rise in misallocation of capital. We find strong evidence that the share of zombie firms has risen faster in sectors with high reliance on external sources of financing. Lower costs of financing, proxied by policy rates (see online Annex Figure 2.11), during the periods after the global financial crisis and COVID-19, was associated with an increase in the share of zombie firms in these sectors, by about 0.4 percent for a 1 percent decline in interest

[12] Deviations in debt-to-equity ratios across firms are departures from the first-best (marginal contributions of debt and equity are equalized across firms).

rates (see online Annex Table 3.4). This is similar to what other studies find using different country samples (Banerjee and Hofmann 2018; Albuquerque and Iyer 2024). Lower cost of capital reduces the pressure on creditors to clean up their balance sheets and encourages them to "evergreen" loans. Although other policies (such as subsidies and industrial policies supporting certain sectors or SOEs, fiscal support during the pandemic, and weak insolvency laws) are likely relevant, availability of easy financing contributed to distorting capital allocation toward unproductive firms. An increase in interest rate controls during this period could have exacerbated this effect. Additionally, Albuquerque and Iyer (2024) show spillovers from zombies to non-zombies, including a dampening of investment, productivity, and employment. Developing a strategy to restructure unviable debt is therefore key to improving capital efficiency.

3.5. Conclusion and Policy Recommendations

Asia-Pacific's growth slowdown has been accompanied by a decline in efficiency of investment and rise in capital misallocation. The chapter provides evidence that inefficiencies in financial intermediation have contributed to this phenomenon. To improve the return on investment, policies should aim to broaden financial access for firms and address evergreening. A more diversified financial structure, with a larger role for capital markets, is needed. Compared to banks, capital markets help to mobilize long-term financing and improve financial access to services and innovation intensive firms with larger intangible assets. Areas of focus could include streamlining listing procedures, broadening investor base and fostering long-term financing, and regulatory reforms to lower barriers to nonbank financing. Policy priorities differ by countries' development stage. Access to financing is the bigger constraint in lower income countries, but the importance of mix of financing rises with the level of development, suggesting that developing markets for alternative instruments of financing is more important for higher income countries.

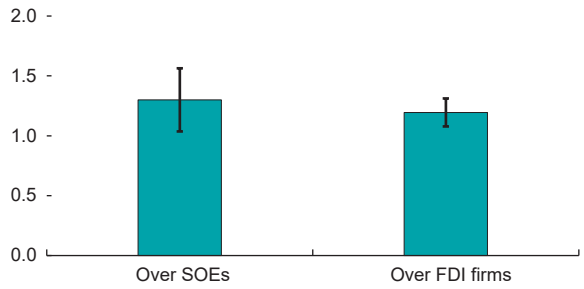
Restructuring nonviable debt would bring allocative efficiency gains. While financial repression may help to manage debt by holding funding costs low, it is likely to increase misallocation and hinder appropriate pricing of risks. It may also raise risks to fiscal sustainability if potential public costs are not accounted for transparently. Reviewing and strengthening financial oversight and risk management will be key to preventing evergreening.

Lastly, improvements in financial intermediation and capital efficiency will help to support job and income growth, particularly in services and smaller firms that tend to face more financing constraints, enabling stronger domestic demand growth. Better financial intermediation also reduces firms' precautionary motives to save and encourages better dividend payout, contributing to stronger consumption in the region. All of this should help Asian economies advance toward more balanced growth without excessively relying on external demand.

Box 3.1. Rising Misallocation and the Importance of Preferential Credit Policies[1]

Despite remarkable growth in the past two decades in Vietnam, misallocation is sizable and has risen—partly reflecting preferential credit policies. Reducing such misallocation can yield large total factor productivity gains.

Figure 3.1.1 Borrowing Cost Premium of Domestic Private Firms
(In percent)



Sources: Vietnam National Statistics Office (NSO); and IMF staff calculations.
Note: Figures in the chart denote domestic private firms' borrowing cost premium over SOEs and FDI firms, estimated from firm-level fixed-effect panel regressions using the Vietnam Enterprise Survey data during 2019–22 and controlling for firm size, leverage, profitability, and other characteristics, as well as sector and time fixed effects. Borrowing cost is approximated as a firm's credit interest expense in percent of the previous year's liabilities because of data constraint. Liabilities include both short- and long-term debt and other liabilities. FDI = foreign direct investment; SOEs = state-owned enterprises.

Resource misallocation, especially capital misallocation, is sizable and rising in Vietnam, notably since COVID-19. Misallocation remains relatively low in manufacturing but high in services, especially real estate services. Capital distortion has been the main source of the rising aggregate misallocation. Removing such misallocation and moving to the efficiency frontier could potentially raise aggregate total factor productivity by over 50 percent (IMF 2025, *forthcoming*).

The capital misallocation in Vietnam is likely related to preferential credit policies. Credit misallocation because of, for example, preferential credit policies, could constrain productive firms from scaling up and gaining market shares (see, for example, Chen and Irarrazabal 2015; Meza, Pratap, and Urrutia 2019; Jurzyk and Ruane 2021). In Vietnam's case, Le (2022) found that preferential treatment for SOEs was the main contributor to the capital misallocation, including, for example, preferential access to credit from development and state-owned banks and the allocation of prime land at below-market prices, which SOEs could in turn use as collateral to obtain bank loans.[2] IMF (2017) also found evidence of credit misallocation between SOEs and non-SOEs among listed firms. Moreover, SOEs' borrowing costs have been significantly lower than those of domestic private firms (see Figure 3.1.1), which could help less-productive SOEs stay competitive and gain market share—depressing overall productivity. Meanwhile, foreign direct investment firms also face lower borrowing costs than domestic private firms, likely reflecting external and parent funding but also banks' preferential policies and government incentives to boost innovation and technology.

[1] Prepared by Fei Han and Tatjana Schulze, in collaboration with the Vietnam National Statistics Office (NSO).

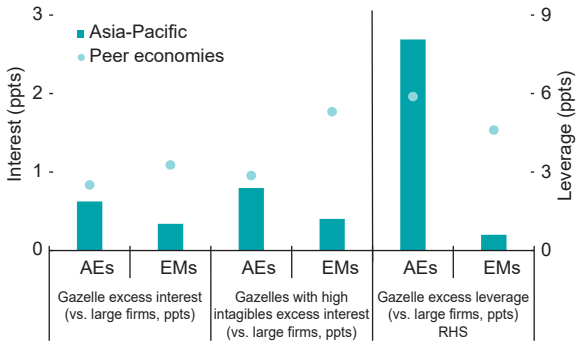
[2] According to Tu (2019), despite the significant reduction in the number of SOEs in Vietnam, which only accounted for 0.5 percent of the total number of firms and employed 9 percent of the labor force, they still held 29 percent of total assets in the economy.

Box 3.2. Role of External Financing in the Lifecycle of Gazelles[1]

Financing constraints are limiting Asian gazelles' contributions to productivity and growth.

Asia's young high-growth firms, or "gazelles,", may experience underfinancing, limiting their economic impact. With higher sales growth and total factor productivity than more established firms, gazelles could boost growth and productivity;[2] however, they make up under 2 percent of Asia's new entrants, potentially because of underfinancing—a global challenge.[3] In Asian advanced economies as in peers, gazelles carry higher leverage than other firms from a young age, signaling access to finance is crucial to foster more gazelle formation. After controlling for leverage, gazelles also face higher borrowing costs than other firms: on average by 63 bps in Asian advanced economies, up to 80 bps for those with more intangible assets, similar to peer economies, reflecting their risk profile (see Figure 3.2.1). In Asian emerging markets, gazelles see no excess leverage or excess interest costs, contrary to expectations. Their share of new entrants is also very low (just one percent). This suggests that access to financing for gazelles has been significantly more constrained than for their peers, likely due to a lack of tailored financing solutions. Across Asia, broadening the range of financing options, including nonbank alternatives, such as venture capital (Ando 2025), could support the emergence and growth of gazelles.

Figure 3.2.1 Financing Costs and Leverage
(In percentage points)



Sources: Orbis; and IMF staff calculations.
Note: Data cover 2008 to 2021. Asia-Pacific includes AUS, CHN, IND, IDN, JPN, KOR, MSY, NZL, PHL, THA, and VNM. Peer economies include BRA, CAN, CHL, GBR, GER, HUN, MEX, POL, ESP, CHE, TUR, and ZAF. Leverage is computed as debt to assets. Excess interest measures exclude KOR, THA, and MSY because of data limitations. Data labels in the figure use International Organization for Standardization (ISO) country codes. AEs = advanced economies; EMs = emerging markets; RHS = right-hand side; ppts = percentage points.

[1] Produced by Monica Petrescu.

[2] Gazelles support productivity, employment, and output as shown in Haltiwanger and others (2016), among others.

[3] Following the literature, gazelles are defined as firms that, between formation and age 10, (1) see a three-year period of annualized growth in deflated sales of 20 percent or more, (2) have at least 100 employees, and (3) reach sales of at least 100,000 in 2015 US$ terms.

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