Corporate Land Accumulation and Capital Misallocation

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Abstract

This paper documents a new and quantitatively significant empirical fact: nonfinancial corporations in both South Korea and Japan have persistently accumulated land over extended periods, with net land purchases reaching 15–20% of gross fixed capital formation. While we highlight Japan as a notable parallel case, our primary empirical analysis focuses on South Korea to investigate the drivers and consequences of this phenomenon. Using plant-level manufacturing data from Korea, we show that land accumulation is uniquely concentrated among small and medium-sized enterprises (SMEs) and is linked to structural shifts in financial intermediation and collateral-based lending regimes. We find that land accumulation is associated with elevated $MRPK$, suggesting that the rise in $MRPK$ dispersion is driven by a subset of firms that disproportionately allocate resources toward land. We propose a "precautionary collateral" mechanism: in environments characterized by fragile credit access and asymmetric pledgeability between machinery and land, constrained firms divert resources toward land to secure future borrowing capacity.

Keywords: Corporate land investment, collateral constraints, financial frictions, capital misallocation, SME financing, Korea, Japan

JEL Codes: E22, E44, G31, O47, R30

1. Introduction

This paper documents a new and quantitatively significant empirical fact: nonfinancial corporations in both South Korea and Japan have persistently accumulated land, with net land purchases reaching 15–20 percent of gross fixed capital formation (GFCF) (Figures 1 and 2). This trend is particularly striking as it diverges from standard economic models, which typically posit that firms prioritize investment in productive capital while land remains the domain of households or specialized developers. Yet national accounts data reveal that corporate land investment in these economies has remained at distinctively elevated levels for over two decades.

We show that this phenomenon is not global. By analyzing national accounts across advanced economies, we demonstrate that sustained corporate net land purchases are largely confined to South

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Korea and Japan (Figure 3). This sharp cross-country contrast points to specific institutional features shared by these economies: bank-centered financial systems, heavy reliance on land-based collateral, and prolonged low-interest-rate environments. While Japan provides a notable parallel, particularly during its asset-price boom in the 1980s, our primary empirical analysis focuses on South Korea to investigate the underlying drivers and macroeconomic consequences of this asset accumulation.

Drawing on the existing literature, we link these patterns of corporate land accumulation to fundamental shifts in financial intermediation. Previous studies document that in Japan, financial deregulation in the 1980s allowed large firms to bypass traditional banking relationships, which prompted banks to expand real estate–collateralized lending toward small and medium enterprises (SMEs) [Hoshi and Kashyap, 2001]. South Korea appears to have undergone a parallel transformation following the 1997–98 financial crisis; as large conglomerates (*chaebols*) aggressively de-leveraged and shifted toward direct financing, commercial banks reoriented their lending portfolios toward the SME sector [Hahm, 2004]. Taken together, these institutional reorientations—combined with a structural decline in interest rates—arguably created an environment conducive to the persistent corporate land accumulation documented in this paper.

Using firm-level financial statements and plant-level manufacturing data from South Korea, we document that land accumulation is concentrated among SMEs. We find that SMEs consistently exhibit much higher land shares within tangible assets than large firms, a gap that widened sharply after the late 1990s (Figure 4). By the mid-2010s, land accounted for nearly 70 percent of tangible assets for SMEs. To ensure our findings are not driven by relative price appreciation, we construct a real land series using the perpetual inventory method, deflating net land investment at the time of acquisition with regional price indices. Our results confirm a persistent upward trajectory in the physical accumulation of land since the late 1990s (Figure 6).

We then examine the macroeconomic consequences of this trend through the lens of capital misallocation. Our empirical framework is inspired by the seminal work of Gopinath et al. [2017], who document how declining interest rates triggered capital misallocation in Southern Europe, particularly Spain. Following Hsieh and Klenow [2009], we find that the dispersion of the marginal revenue product of capital ($MRPK$) in South Korea rose sharply by approximately 25 percent from the late 1990s onward, whereas the dispersion of the marginal revenue product of labor remained stable (Figure 5). At the micro level, we show that land-intensive plants exhibit systematically higher $MRPK$, indicating persistent under-investment in productive capital.

To rationalize these findings, we propose a "precautionary collateral" mechanism that centers on the **asymmetric pledgeability** between productive capital and land. We argue that in the bank-centered financial systems of Korea and possibly Japan, commercial banks exhibit a strong institutional preference for land as collateral due to the informational opacity of SMEs. This preference creates a fundamental

pledgeability friction: while machinery is subject to rapid depreciation and high asset specificity—making it poor collateral—land is non-depreciating and serves as a universal store of value. Consequently, banks assign significantly higher loan-to-value (LTV) ratios to land, making it the dominant instrument for relaxing borrowing constraints.

In an environment characterized by fragile credit access and asymmetric pledgeability, financially constrained SMEs treat land as a precautionary asset. When interest rates decline, the opportunity cost of holding highly pledgeable assets falls, prompting firms to reallocate resources away from machinery and toward land to secure future borrowing capacity. While individually rational, this behavior leads to a novel form of misallocation: under-capitalization in productive machinery rather than over-investment.

This paper contributes to the literature on misallocation and financial frictions by suggesting a new channel through which low interest rates can reduce allocative efficiency. Unlike existing mechanisms that operate through excessive capital deepening as in Gopinath et al. [2017], we highlight a "land diversion channel" that operates through precautionary asset accumulation. This mechanism offers a new perspective on the structural shifts in the Korean and Japanese economies, with broader implications for other economies facing prolonged low interest rates and collateral-dependent banking systems.

2. Stylized Facts

Stylized Fact 1: Corporate net land purchases account for a large share of aggregate investment in Korea and Japan.

To quantify corporate land investment, we utilize data from the National Accounts, which bifurcates non-financial assets into "produced assets" (e.g., machinery, buildings, and R&D) and "non-produced assets" (e.g., land and natural resources). Our analysis focuses on the *net acquisition of non-produced non-financial assets*. As is common across most economies, this category consists almost exclusively of land—typically accounting for 95–99% of the total throughout our sample period.[1]

Figure 1 illustrates net land purchases by nonfinancial corporations as a share of Gross Fixed Capital Formation (GFCF) in South Korea. The data reveal that corporate land accumulation is not only quantitatively substantial but remarkably persistent. While net land purchases fluctuated at relatively modest levels from the mid-1970s through the late 1980s, the share rose sharply beginning in the mid-1990s. Despite a temporary collapse during the 1997–98 financial crisis, the share rebounded strongly in the post-crisis period. By the mid-2000s, net land purchases exceeded 20% of GFCF and have remained at these elevated levels for decades.

A similar pattern is observed in Japan during its asset-price boom in the 1980s (Figure 2), where

[1] Across OECD economies, land typically accounts for over 95% of non-produced non-financial assets, ensuring that their net acquisition serves as a consistent and reliable proxy for corporate land investment.

corporate land purchases also approached about 20% of GFCF. Crucially, as shown in Figure 3, comparable data for other OECD countries reveal no such sustained episodes of corporate land accumulation[2]. This finding implies that the phenomenon cannot be attributed solely to sharp increases in the relative price of land; indeed, several other OECD countries underwent comparable or even more pronounced real estate booms during these periods without witnessing a similar shift in corporate investment behavior.

This sharp cross-country contrast indicates that the "land-heavy" investment profile of Korean and Japanese firms reflects specific institutional features inherent to these economies rather than a generic response to asset price appreciation. This suggests that such investment patterns may influence productivity and economic efficiency through previously overlooked channels.

Stylized Fact 2: Corporate land accumulation is disproportionately concentrated among small and medium sized firms.[3].

Aggregate flows mask substantial heterogeneity across firms. Using firm-level balance sheet data for Korean manufacturing firms from the *Financial Statement Analysis of Firms* published by the Bank of Korea, Figure 4 plots the share of land in total tangible fixed assets by firm size. Firm size classifications follow the Bank of Korea's definitions, and the data are based on administrative tax filings to the National Tax Service, covering a broad and economically important segment of the manufacturing sector.

Two patterns stand out in our original analysis of the Korean data. First, SMEs consistently exhibit a substantially higher aggregate share of land in total tangible assets than large firms throughout the sample period. Second, the divergence between SMEs and large firms widens markedly after the late 1990s. While the aggregate land share within large firms remains relatively stable or declines modestly, the corresponding aggregate land share within SMEs rises steadily, reaching approximately 70% by the mid-2010s.

While this paper does not analyze firm-level data for Japan, existing evidence from Japan's bubble era points to similar size-based financial mechanisms. Micro-level studies using Japanese corporate data show that land values played a central role in easing borrowing constraints and shaping investment behavior, with these effects being particularly pronounced among bank-dependent and financially constrained firms (Ogawa et al., 1996; Ogawa and Suzuki, 1998; Sekine and Tachibana, 2004). Although these studies do not directly report size-specific land shares, their findings suggest that collateral incentives associated with land were likely to matter most for smaller firms facing greater information frictions and heavier reliance on bank finance.

[2]A notable outlier is Germany in 2000, where a sharp spike reflects the government's auction of 3G (UMTS) spectrum licenses rather than land accumulation. Under SNA guidelines, these licenses are recorded as intangible non-produced assets. Aside from such rare regulatory events, net acquisition of non-produced non-financial assets in other advanced economies remain negligible, fluctuating near zero.

[3]Our firm or plant level analysis focuses on the manufacturing sector due to data availability

Stylized Fact 3: Structural reorientation of bank lending and the expansion of credit supply to SMEs.

The concentration of land among SMEs appears to be closely related to structural changes in the banking sector. In Korea—and plausibly in Japan as well—institutional and regulatory changes led commercial banks to pivot their lending portfolios away from large corporations and toward the SME sector, creating a credit environment conducive to corporate land accumulation.

In South Korea, this shift was a notable consequence of the 1997–98 South Korean financial crisis. Following the crisis, the government imposed rigorous financial restructuring, most notably mandating that large conglomerates (chaebols) drastically reduce their debt-to-equity ratios. As large firms aggressively de-leveraged and increasingly shifted toward direct financing in capital markets, commercial banks faced a contraction in their traditional corporate borrower base (Hahm, 2004). To maintain profitability, banks reoriented their lending toward SMEs. Given the high informational opacity inherent in the SME sector, banks relied heavily on collateral-based lending, with a strong institutional preference for real estate. This environment activated a collateral channel (Chaney et al., 2012), where the possession of land became a crucial factor in relaxing credit constraints, thereby providing SMEs with an incentive to maintain or increase land holdings to secure their borrowing capacity.

A similar structural shift was observed in Japan during the 1980s. As Hoshi and Kashyap [2001] document, financial deregulation—specifically the relaxation of corporate bond issuance restrictions—precipitated significant disintermediation. Large firms, particularly the *keiretsu*, increasingly bypassed traditional main bank relationships in favor of direct financing, while banks continued to experience steady deposit inflows. This change compelled banks to reorient their lending toward SMEs. To mitigate informational opacity and economize on monitoring costs, banks relied heavily on land as primary collateral. Taken together, these observations point to a close association between banking sector realignment and the rise of corporate land accumulation among SMEs in both economies.

3. Land Accumulation and Capital Misallocation

This section examines whether corporate land accumulation is systematically associated with capital misallocation in manufacturing. Following the framework of Hsieh and Klenow (2009), we use the dispersion of marginal revenue products of capital ($MRPK$) as a proxy for capital misallocation. Theoretically, in an efficient allocation without idiosyncratic frictions, $MRPK$ should be equalized across all firms; its dispersion thus reflects distortions that prevent capital from flowing to its most productive uses.

Using plant-level data from the Korean Manufacturing Survey, we calculate the $MRPK$ dispersion within each 2-digit industry. These industry-specific measures are then aggregated into an economy-wide

index by taking a weighted average based on each industry's share of total value-added. In constructing our capital measure, we follow standard practice by using real machinery stock derived via the perpetual inventory method. We explicitly exclude land and buildings from this measure, as they are considered fixed inputs rather than variable production capital.

A first salient pattern is a sharp divergence between capital and labor misallocation. Figure 4 plots the dispersion of log MRPK and log MRPN across manufacturing plants from 1982 through 2014. The dispersion of $MRPK$ rises steadily from the mid 1990s and accelerates markedly after 2000, increasing by roughly 25 percent over two decades. In contrast, the dispersion of $MRPN$ remains essentially flat throughout the period. Importantly, the timing of the rise in $MRPK$ dispersion closely coincides with the resurgence of corporate land accumulation documented earlier.

A second empirical pattern links the rise in $MRPK$ dispersion to structural shifts in asset composition. Figure 5 illustrates the evolution of land intensity among manufacturing plants. Crucially, asset shares are measured in real terms to disentangle genuine reallocations of capital from relative price movements. Both land stocks and total tangible fixed assets are constructed via the perpetual inventory method. Specifically, to ensure the accuracy of the land series, we do not simply deflate book values with an aggregate index; instead, we deflate net land investment at the time of acquisition using regional land price indices specific to each plant's location and period. This approach ensures that the resulting series reflects the physical accumulation of land units, independent of subsequent valuation effects or regional price appreciation.

The resulting trends, documented in Figure 5, reveal that both the median and aggregate real land shares in tangible fixed assets experienced a secular decline during the 1980s, bottoming out in the mid-1990s. However, after the 1997–1998 financial crisis, as corporate lending rates entered a prolonged structural decline, real land shares began a persistent upward trajectory. By the mid-2010s, the median real land share approached 20%, while the aggregate share rebounded to approximately 25%. The striking temporal alignment between falling borrowing costs and rising real land intensity suggests that the shift toward land-heavy balance sheets was closely tied to broader shifts in the macroeconomic and financial environment.

We now examine the relationship between land intensity and $MRPK$. Our baseline specification regresses log $MRPK$ (and log $MRPN$) on the lagged land-to-machinery ratio (real) with plant fixed effects and 2-digit industry-by-year fixed effects:

$$\ln MRPK_{it} = \beta \cdot \ln(L/K)_{i,t-1} + \alpha_i + \delta_{jt} + \epsilon_{it} \tag{1}$$

where L/K denotes the land-to-machinery ratio, α_i captures plant fixed effects, and δ_{jt} absorbs industry-by-year shocks. We use lagged values to mitigate mechanical correlation concerns arising from the common presence of K in both the regressor and dependent variable. The coefficient β captures

whether, *within the same firm over time*, increases in land intensity are related to higher $MRPK$.

Table 1 presents the results. Column (1) shows that the coefficient on the lagged land-to-machinery ratio is 0.444 and statistically significant for $MRPK$, implying that a 10 percent increase in a plant's land-to-machinery ratio is associated with a 4.4 percent higher $MRPK$ in the subsequent period. In contrast, Column (2) shows that the corresponding coefficient for $MRPN$ is close to zero (-0.027). This asymmetry is informative for interpretation: if land-intensive plants exhibited higher $MRPK$ because land contributed to higher output and revenue, we would expect $MRPN$ to rise as well, since both marginal revenue products share revenue(PY) in the numerator. The near-zero coefficient on $MRPN$ suggests that the elevated $MRPK$ among land-intensive plants reflects under-investment in machinery rather than higher productivity.

We note that these results reflect correlations rather than causal estimates; a more rigorous identification strategy using instrumental variables is left for future work. Nonetheless, the baseline patterns suggest that land-intensive plants tend to be under-capitalized in machinery. Rather than relaxing capital constraints, land accumulation appears to coincide with shortages of productive capital—a pattern difficult to reconcile with standard models in which collateral accumulation facilitates productive expansion.

The direction of this association contrasts with existing evidence from Southern Europe. Gopinath et al. [2017] document that declining borrowing costs in Spain led collateral-rich firms to over-invest, generating misallocation through excessive capital deepening and depressed $MRPK$. In Korea, the preliminary evidence points in the opposite direction: plants with higher land intensity exhibit higher $MRPK$, consistent with under-investment despite holding substantial collateral. While further work is needed to establish causality, these patterns are suggestive of a distinct misallocation mechanism—one operating through the diversion of resources away from machinery rather than through over-capitalization.

4. Mechanism Preview: Land as Precautionary Collateral

What mechanism can account for these empirical patterns? We provide a preliminary conceptual framework that integrates collateral-based lending with a firm-level precautionary saving motive. While a fully specified formal model is still under development, we sketch the key theoretical ingredients to illustrate how specific institutional frictions in Korea and Japan drive corporate land accumulation.

The core friction in our framework is the asymmetric pledgeability between productive capital and land. In the financial systems of both Korea and Japan, commercial banks exhibit a strong institutional preference for "hard" collateral, particularly in the SME sector. While machinery is subject to rapid depreciation and high asset specificity—offering low liquidation value in the event of default—land is non-depreciating and retains high value across diverse uses. Consequently, banks assign significantly higher loan-to-value (LTV) ratios to land than to productive equipment, making land the dominant instrument for relaxing

borrowing constraints. As this pledgeability gap widens, the incentive for financially constrained SMEs to accumulate land strengthens: the greater the differential in collateral value between land and machinery, the more attractive land becomes as a means of securing future borrowing capacity.

In this environment, SMEs face persistent uncertainty regarding access to external finance. Credit relationships are fragile, and borrowing limits fluctuate with the market value of collateral. For these constrained firms, land serves a dual role: it is not only a productive factor and a store of value but also a precautionary buffer asset. By accumulating land, firms create a "latent" borrowing option; they need not leverage the asset immediately but instead hold it to secure future credit availability, thereby insuring themselves against potential liquidity shocks or sudden credit withdrawals.

Our mechanism links this precautionary motive to the low-interest-rate environment. As corporate lending rates decline, the opportunity cost of holding non-depreciating assets like land falls. This induces constrained SMEs to reallocate resources away from productive machinery and toward land to strengthen their future borrowing capacity. This behavior, while individually rational, generates a distinct form of capital misallocation. Resources devoted to land acquisition are resources diverted from productive investment, leading to persistent under-capitalization in machinery.

Unlike canonical narratives of speculative credit booms, this mechanism operates through under-investment in productive capital rather than over-investment in productive capital. The resulting dispersion in $MRPK$ arises because productive firms, facing high informational frictions, are compelled to over-weight less-and-indirectly related assets such as land in their balance sheets to maintain financial viability. We aim to formalize this intuition in a model that explores how land-based collateral systems can shape allocative efficiency in a low-interest-rate environment.

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Figures and Tables

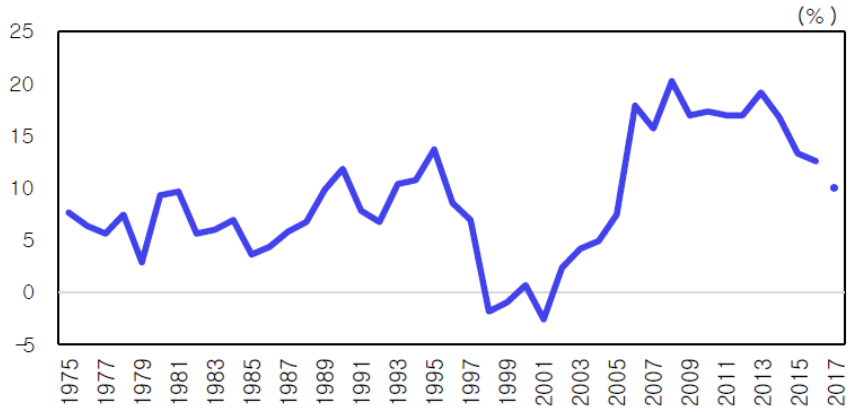


Figure 1: South Korea: Net Acquisition of Non-Produced Non-Financial Assets as a Share of GFCF, Nonfinancial Corporations

Notes: This figure plots the ratio of the net acquisition of non-produced non-financial assets to Gross Fixed Capital Formation (GFCF) for the non-financial corporate sector in South Korea. Based on the System of National Accounts (SNA), land accounts for approximately 95–99% of the total net acquisition of non-produced non-financial assets throughout the sample period. *Source:* Bank of Korea, National Accounts.

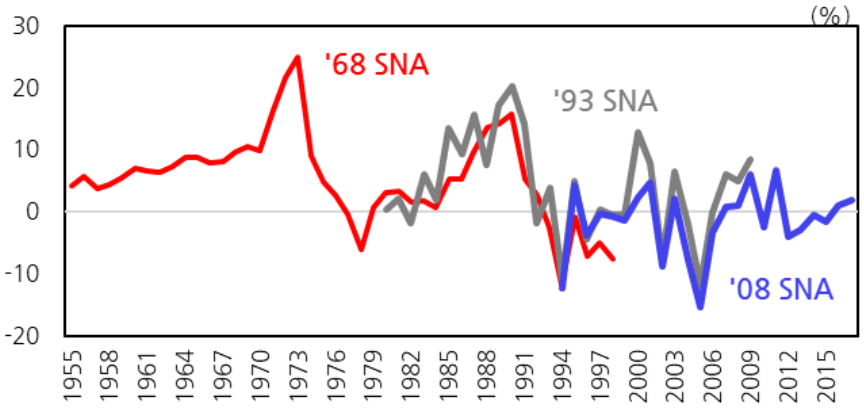


Figure 2: Japan: Net Acquisition of Non-Produced Non-Financial Assets as a Share of GFCF, Nonfinancial Corporations

Notes: This figure plots the ratio of the net acquisition of non-produced non-financial assets to Gross Fixed Capital Formation (GFCF) for the non-financial corporate sector in Japan. *Source:* Cabinet Office, Government of Japan, National Accounts.

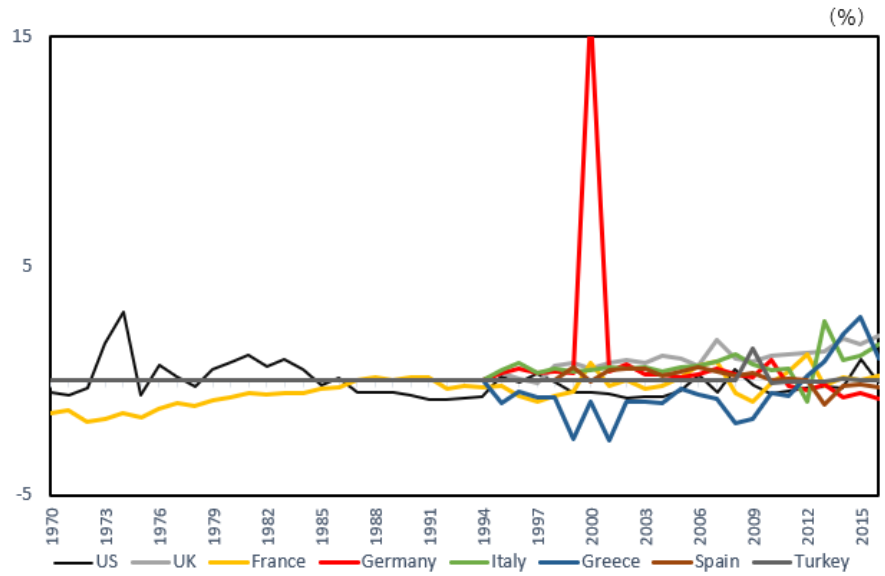


Figure 3: OECD Countries: Net Acquisition of Non-Produced Non-Financial Assets as a Share of GFCF, Nonfinancial Corporations

Notes: This figure illustrates the ratio of the net acquisition of non-produced non-financial assets to Gross Fixed Capital Formation (GFCF) for non-financial corporations across selected OECD economies. *Source:* OECD National Accounts Statistics.

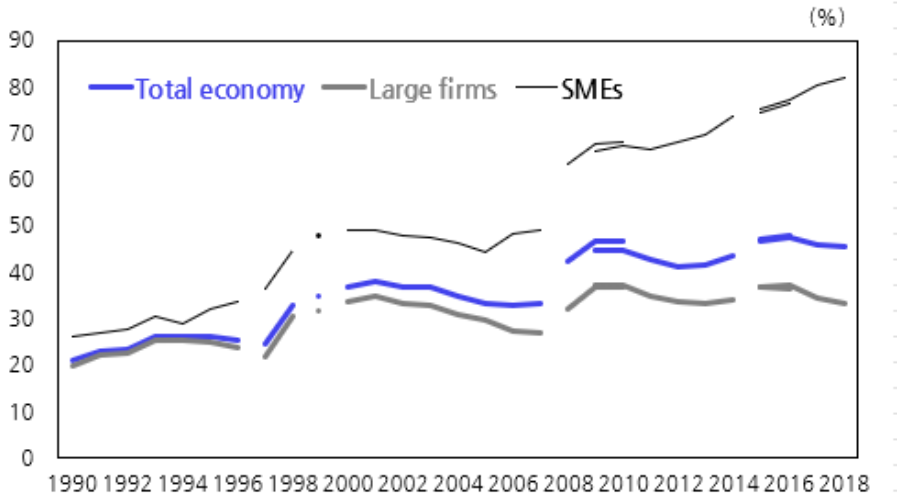


Figure 4: Land Share in Tangible Assets by Firm Size in Korean Manufacturing

Notes: This figure plots the aggregate share of land in total tangible fixed assets for manufacturing firms in South Korea, disaggregated by firm size. The land shares are calculated based on nominal book values from corporate balance sheets. Firm size classifications follow the Bank of Korea's standard definitions. *Source:* Bank of Korea, Financial Statement Analysis.

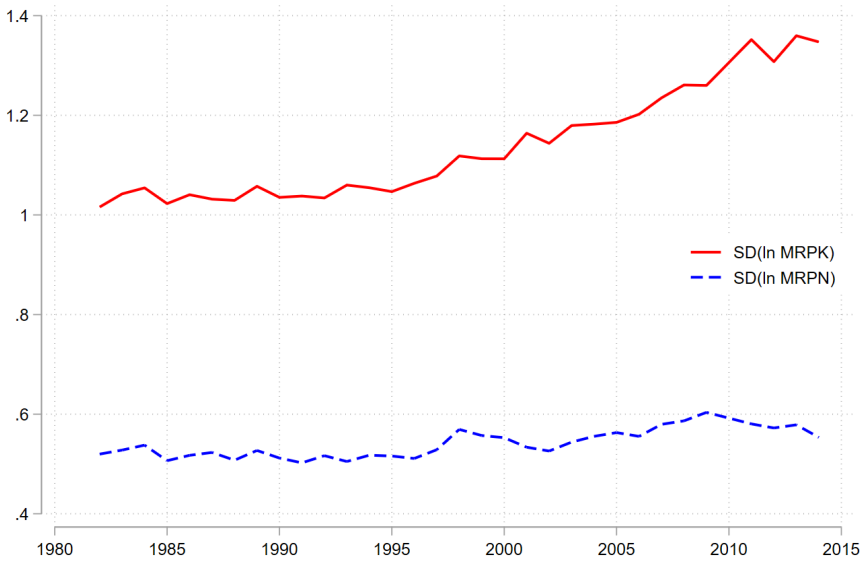


Figure 5: Dispersion of MRPK and MRPN in Korean Manufacturing, 1982–2014

Notes: This figure plots the standard deviation of log MRPK (solid red) and log MRPN (dashed blue) across manufacturing plants. Within-industry dispersion is computed at the 2-digit KSIC level and aggregated using value-added weights.

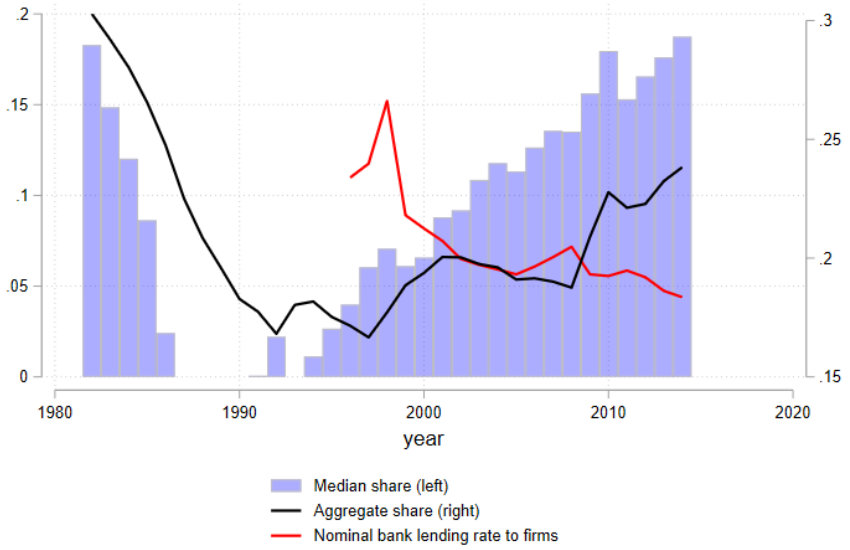


Figure 6: Trends in Median and Aggregate Real Land Shares and Interest Rates

Notes: The bars represent the median real share of land in tangible fixed assets, while the solid black line denotes the aggregate real share. The red line (right axis) illustrates the nominal bank lending rates to non-financial corporations. *Source:* Statistics Korea, Mining and Manufacturing Survey; Bank of Korea, Financial Statistics.

Table 1: Land Intensity and Marginal Revenue Products

	(1) $\ln(MRPK_{it})$	(2) $\ln(MRPN_{it})$
$\ln(L/K)_{i,t-1}$	0.444***	−0.027***
	(0.006)	(0.002)
Observations	468,244	464,454
R-squared	0.810	0.524
Within R-squared	0.069	0.001
Plant Fixed Effects	Yes	Yes
Year × 2-digit Industry Fixed Effects	Yes	Yes

Notes: Robust standard errors clustered at the plant level in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$