Monetary Policy, Financial Architecture, and Competition [*]

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Abstract

Exploiting a classic measure of product closeness between firms, I show that firms increase competitive proximity by converging in a Hotelling-like product space in response to monetary tightening, intensifying horizontal competition. This effect is more pronounced for focal firms with the closest and reciprocally important competitors. Consistent with financial-constraint mechanisms, firms with greater access to nonbank finance experience significantly smaller increases in competitive proximity and increase innovation in both quantity and quality. These results provide evidence of endogenous competition under monetary tightening and highlight how financial architecture, particularly the role of nonbanks, shapes the transmission of monetary policy to competition.

Keywords: Monetary policy, financial architecture, competition, nonbank lending, credit channels, breakthrough innovation, product differentiation, banks, firm strategy, networks.

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What are the long-run effects of monetary policy on the economy? Although the traditional consensus[1] rests on the assumption of monetary neutrality, implying no long-run effects, the long-term consequences operating through the innovation channel have received considerable attention in recent years: tighter financial conditions following monetary contractions reduce firms' innovation, with lasting consequences for productivity and growth (Bianchi, Kung, and Morales 2019, Queralto 2020, Ma and Zimmermann 2023). While this negative relation between monetary tightening and innovation is increasingly documented, how monetary policy shapes product-market competition remains less well understood. Competition is central to innovation and growth (Aghion et al. 2005), yet existing studies treat it as exogenous, focusing on how monetary policy operates through existing competitive conditions (Aghion, Farhi, and Kharroubi 2019). Monetary policy may instead reshape competitive interaction between firms when financial constraints bind. In parallel, recent studies emphasize that the transmission of monetary policy depends on the architecture of financial systems, particularly as nonbank lenders expand and act as shock absorbers for firms with access to them (Elliott, Meisenzahl, and Peydró 2024). In light of this modern aspect of financial architecture (Allen and Walther 2021), the mechanisms underlying the long-run effects of monetary policy are not readily discernible. Understanding how monetary policy affects competition within an evolving financial architecture is therefore central to assessing its long-run economic consequences.

Building on these insights, I examine whether monetary policy reshapes firms' competitive positioning in product space and how access to nonbank finance within a modern financial architecture mitigates or amplifies these effects. Though the idea that monetary policy affects competition has simple conceptual appeal, its direction is ultimately an empirical question, as

[1] Much of the literature has focused on its short-run effects, as monetary policy is commonly viewed as shaping short-term economic fluctuations (Friedman 1968).

several theories offer contrasting predictions. Demand-side and financing-constraint hypotheses suggest that tighter monetary policy, by reducing incentives and raising financing costs, crowds out costly product differentiation, leading firms to increase competitive proximity by converging in product space. By contrast, the escape-competition hypothesis predicts that firms may crowd in costly product differentiation to avoid intensified competition, thereby reducing competitive proximity. These views are not mutually exclusive, so I provide empirical evidence on which mechanism dominates in practice.

From a positive perspective, I ask whether monetary tightening increases competitive proximity, measured as the distance between firms in Hotelling-like product market space (Hotelling 1929), and whether this response is attenuated for firms with nonbank credit. Rather than focusing solely on the traditional bank lending channel, I account for the role of nonbank lenders in shaping firms' product-market responses to monetary policy. By alleviating financing frictions and risk-taking constraints, access to nonbank finance may allow firms to buffer increases in competitive proximity and preserve innovation activity. From a normative perspective, I explore how the long-run consequences of monetary policy raise regulatory considerations, particularly in light of an evolving financial architecture. If monetary tightening unintentionally intensifies competition by compressing distance in product space, ensuring that firms can maintain their competitive positioning through access to alternative sources of finance becomes relevant for the design of both macroprudential and monetary policies.

I base my empirical analysis on a panel that combines product similarity data from Hoberg and Phillips (2010, 2016), patent-level innovation data from Kogan et al. (2017) and Arts, Jianan, and Gomez (2021), and US syndicated loan data from Thomson Reuters DealScan. Using product similarity scores, I construct a firm-pair measure of competitive proximity, defined as

the annual change in product similarity. The measure exploits the asymmetric ranking of peers and follows the power-law distribution of closeness, reflecting highly clustered rivalries among close competitors and a long tail of weaker interactions. These features allow me to capture both the intensity and the strategic nature of competition across firms. I merge this proximity panel with the innovation and lending data. To identify exogenous monetary policy shocks, I use the high-frequency surprises of Jarociński and Karadi (2020). Following Elliott, Meisenzahl, and Peydró (2024), I cumulate these shocks and use them as an instrument for changes in the federal funds rate, isolating the exogenous component of monetary tightening.

I find that US monetary policy tightening increases competitive proximity, leading firms to converge in product space, with the effect strongest among closest and reciprocally important competitors. Consistent with financing-constraint mechanisms, firms with nonbank credit relationships exhibit significantly weaker increases in competitive proximity, reflecting relaxed financing frictions. This attenuation is most pronounced where competitive pressures are strongest. Among strategic competitors with nonbank access, monetary tightening not only offsets the increase in competitive proximity but can even reduce it, consistent with the escape-competition hypothesis. Furthermore, these firms not only sustain overall innovation activity but also increase breakthrough innovation, as measured by innovation novelty. These findings suggest that competition serves as a channel through which monetary policy leaves lasting real effects, and that the strength of this channel depends on financial architecture.

Taken together, I interpret my findings as follows. Firms' product-market choices systematically respond to monetary policy, and these responses are shaped by the surrounding financial architecture. Monetary tightening generally increases competitive proximity, reflecting tighter financial conditions. However, firms with access to nonbank credit respond differently:

under tighter monetary conditions, they maintain greater distance in product space and, when facing competitive pressure, may further reduce competitive proximity, a shift accompanied by breakthrough innovation. These results suggest that nonbank finance attenuates the conventional bank credit channel and enables firms facing competitive pressure to adjust their competitive positioning as a strategic response to monetary shocks. More broadly, these findings underscore that the long-run consequences of monetary policy require regulatory attention. Policymakers should consider that monetary policy and financial architecture jointly shape not only short-run transmission but also the economy's capacity for innovation. Accordingly, the design of monetary and macroprudential policy should ensure that the expansion of nonbank credit preserves financial stability while supporting firms' ability to adjust their competitive positioning and sustain innovation.

This paper contributes to the growing literature on the long-run effects of monetary policy in three ways. First, I provide new evidence that monetary policy endogenously shapes product-market competition. While competition is central to innovation and growth (Aghion et al. 2005), existing studies typically treat it as exogenous, focusing on how monetary policy operates conditional on prevailing competitive conditions (Aghion, Farhi, and Kharroubi 2019). I show that firms respond to monetary tightening by converging in product space, increasing competitive proximity. I further exploit variation in the bilateral importance of peers to identify strategic complementarity in competitive proximity, isolating effects among the most relevant competitors. By linking monetary policy shocks to changes in competitive proximity in product space (Hotelling 1929, Hoberg and Phillips 2016), I provide new evidence on endogenous competition and show how monetary policy generates long-run consequences through firms' strategic interactions.

Second, I link the long-run effects of monetary policy to the evolving financial architecture, focusing on the role of nonbank credit relationships. The traditional credit channel literature emphasizes the role of bank lending in transmitting monetary shocks (Bernanke and Gertler 1995, Kashyap and Stein 2000, Jiménez et al. 2012), while more recent work shows nonbank lenders are less constrained by monetary policy and can expand credit supply during tightening episodes (Xiao 2020, Elliott et al. 2022, Drechsler, Savov, and Schnabl 2022, Buchak et al. 2024, Elliott, Meisenzahl, and Peydró 2024, Cucic and Gorea 2024). Relatedly, Kerr and Nanda (2009) highlight how relaxing financing constraints shapes the allocation of innovative effort. I show that access to nonbank credit systematically attenuates the increase in competitive proximity induced by monetary tightening. This finding highlights the role of financial architecture in enabling firms to maintain, and in some cases even increase, distance in product space despite tighter financial conditions. Because lenders accumulate soft information about borrowers over time (Sufi 2007, Gustafson, Ivanov, and Meisenzahl 2021), these relationships represent a key feature of modern financial architecture and help explain why some firms are better able to adjust their competitive positioning under tightening.

Third, I contribute to the literature on the innovation channel of monetary policy by examining the composition of innovation. While prior work documents that monetary tightening depresses innovation (Ma and Zimmermann 2023), the mechanisms remain less well understood. I build on a strand of the literature, beginning with Hotelling (1929) and Chamberlin (1933), which emphasizes the role of product differentiation in shaping competition and innovation (Aghion et al. 2005). I show that firms buffered by nonbank credit relationships shift the type of innovation they pursue, sustaining both innovation quantity and innovation novelty despite tighter financial conditions, consistent with the escape-competition view (Boone 2001, Aghion et

al. 2005).

Collectively, these findings demonstrate that monetary policy has lasting effects on the economy through endogenous competition, and that financial architecture both buffers the short-run effects of monetary tightening and reshapes firms' long-run growth trajectories.

I. Conceptual framework

The theoretical literature on monetary policy increasingly emphasizes its real effects on firms. Several mechanisms link monetary policy to competition and imply different responses, making this an important question that requires empirical investigation. In this section, I outline the key mechanisms underlying the empirical predictions. These mechanisms are not mutually exclusive, so when I examine the data, I assess which one dominates in practice.

The demand hypothesis predicts that firms reduce incentives to compete through product differentiation as aggregate demand falls. Because monetary policy tightening lowers aggregate demand, the returns to differentiation decline (Comin and Gertler 2006, Anzoátgui et al. 2019, Barlevy 2007). As expected profits fall, firms are less likely to maintain distance in product space and face weaker incentives for breakthrough innovation.

Similarly, the financing-constraint hypothesis predicts that monetary policy tightening reduces credit availability, pushing firms to converge toward existing product standards and thereby increase competitive proximity (Bianchi, Kung, and Morales 2019, Queralto 2020, Ma and Zimmermann 2023). Higher rates also depress asset prices, which reduces borrowers' collateral values, lowers borrowing capacity, and tightens existing financing. Overall, tighter monetary policy makes it more difficult for firms to finance costly differentiation. From this view, tighter policy pushes firms to converge in product space, increasing competitive proximity.

By contrast, the escape-competition hypothesis suggests that firms differentiate to avoid

direct competition, reducing competitive proximity. In this view, greater competition raises the marginal return to differentiation. Consequently, monetary tightening may induce firms to increase distance in product space as they seek to escape intensified competition.

A complementary view is offered by recent research on the nonbank credit channel of monetary policy (Xiao 2020, Elliott et al. 2022, Drechsler, Savov, and Schnabl 2022, Buchak et al. 2024, Elliott, Meisenzahl, and Peydró 2024, Cucic and Gorea 2024). In line with the financing-constraint hypothesis, this view predicts that firms with access to nonbank lenders respond differently to monetary tightening. Because these lenders are typically less regulated and more risk-tolerant, they can expand credit supply during tightening by absorbing slack in the financial system. As a result, firms with nonbank credit relationships, relatively unconstrained by traditional lending frictions, are expected to maintain or increase distance from close rivals. Moreover, consistent with the escape-competition hypothesis, competitive pressure under looser credit frictions may reduce competitive proximity. Such shifts in competitive positioning may also translate into differences in innovation outcomes. If nonbank credit allows firms to pursue riskier strategies, monetary tightening could lead to both incremental and breakthrough innovation.

These mechanisms imply that monetary policy reshapes competitive interactions in product markets, reallocating competitive pressure across firms, with implications for long-run outcomes. Additionally, the architecture of the financial system conditions the short-run transmission of monetary shocks and shapes their long-run effects through competition.

II. Sample and empirical strategy

A. Data and variables

The sample construction integrates three primary datasets: product similarity scores from

Hoberg and Phillips (2010, 2016), patent-level innovation data from Kogan et al. (2017) and Arts, Jianan, and Gomez (2021), and US syndicated loan data from Thomson Reuters DealScan.

I construct a firm-pair panel of competitive proximity using Hoberg and Phillips' text-based similarity scores, which measure the cosine similarity between firms' product descriptions in 10-K filings. Intuitively, this approach assigns each firm a spatial location in a Hotelling-like product space (Hotelling 1929) and quantifies how close any two firms are in product space and hence the intensity of horizontal competition between them. For each firm pair-year (i, j) in year t, I define:

$$Competitive\ Proximity_{ijt} = Similarity_{ijt} - Similarity_{ijt-1},$$

such that a positive value indicates that two firms become closer competitors, whereas a negative value indicates strategic distance in product space. Higher competitive proximity reflects stronger horizontal competitive pressure.

While conceptually intuitive, identifying relevant peers in product space is challenging. Standard industry classifications often provide only noisy approximations of true competitive relationships, grouping together firms with little overlap and omitting rivals outside the same industry. Two features of Hoberg-Phillips scores help to address this challenge.

First, the product similarity measure is defined pairwise, allowing me to rank each firm's closest product-market peers and exclude distant ones. Figure 1 illustrates this property. Panel A shows that a focal firm's top peer (rank 1) accounts for a disproportionately large share of similarity, and the distribution follows a power law rather than a linear trend. This pattern indicates that overlap in product space declines sharply with peer rank, so only a handful of peers are relevant for each firm. Panel B confirms this pattern: the log of peer rank and the log of the average similarity score closely follow a linear relationship. Applying the 0.5 adjustment factor

of Gabaix and Ibragimov (2011), the R^2 of the log-log linear fit exceeds 95%, confirming the power-law distribution. These results underscore that standard industry classifications are too broad and would obscure the peer relationships necessary to detect firms' responses to monetary policy.

Second, product similarity scores yield asymmetric peer rankings: firm *j* may be the closest peer of firm *i* whereas firm *i* is not necessarily the closest peer of firm *j*. For example, Target's top peer in 2010 is Walmart, but Walmart's top peer is Costco. This asymmetry captures heterogeneity in the strategic importance of rivals. Standard industry classifications miss this variation by treating all firms in an industry as equally relevant. I exploit this feature to test whether monetary policy has stronger effects on competitive proximity with respect to a firm's most strategically relevant peers.

To examine the role of financial architecture, I construct a measure of firms' access to nonbank credit, which is typically less sensitive to monetary tightening (Elliott, Meisenzahl, and Peydró 2024). Using Thomson Reuters DealScan, I classify lenders in the US syndicated loan market following Elliott, Meisenzahl, and Peydró (2024): lenders are categorized as banks if they are depository institutions or unclassified lenders containing "Bank" in the name, and as nonbank lenders otherwise. I then construct the indicator variable $Nonbank\ Relation_{it} = 1$ if firm *i* obtained at least one syndicated loan from a nonbank lender by year *t*-1, zero otherwise. This indicator captures firms with nonbank credit relationships that are more likely to benefit from flexible funding during monetary tightening. The measure is motivated by evidence that lenders accumulate soft information about borrowers over time (Sufi 2007, Gustafson, Ivanov, and Meisenzahl 2021), making these relationships an important feature of modern financial architecture that shapes firms' competitive responses.

Finally, I merge the data with innovation characteristics from Kogan et al. (2017) and Arts, Jianan, and Gomez (2021), which provide information on both the activity and novelty of firms' innovation. I further augment the dataset with standard firm-level controls from Compustat, including size, age, industry, leverage, and profitability. The final sample spans from 1990 to 2019 and contains 1,089,806 firm-pair-year observations across 4,598 unique firms.

Table 1 reports summary statistics for the key variables used in the analysis. The mean of competitive proximity is approximately -0.03%, implying that, on average, firms become slightly closer to their peers over time. The variable is highly dispersed, with a standard deviation of 2.12%, suggesting substantial heterogeneity in firms' horizontal competitive pressure. Other firm-level characteristics are broadly comparable to those documented in prior studies, indicating that the sample is representative of publicly listed US firms.

B. Identification strategy

To identify the causal effect of monetary policy on competitive proximity, I exploit plausibly exogenous variation in US monetary policy. Specifically, I use the high-frequency shocks developed by Jarociński and Karadi (2020), which are constructed from asset price changes within a narrow window around FOMC announcements and isolate the unexpected component of monetary policy. These shocks are widely regarded as plausibly exogenous to firm behavior. Following Elliott, Meisenzahl, and Peydró (2024), I take the cumulative sum of these shocks and use it as an instrument for observed changes in the federal funds rate. This two-stage least squares (2SLS) approach addresses endogeneity concerns in the federal funds rate.

To examine heterogeneity in the transmission of monetary policy, I interact the instrumented federal funds rate (*FFR)* with cross-sectional variation in firms' nonbank credit relationships. This specification allows me to test whether firms with access to nonbank credit are able to

attenuate the increase in competitive proximity induced by monetary tightening, consistent with the view that financial architecture shapes the real effects of monetary policy.

The empirical specification takes the following form:

$$Competitive\ Proximity_{ijt} = \alpha_{ij} + \beta_1(Nonbank\ Relation_{it} \times FFR_{t-1}) + \beta_2\mathbf{X}_{it-1} + \beta_3\mathbf{X}_{jt-1} + \varepsilon_{ijt},$$

where $Competitive\ Proximity_{ijt}$ is the annual change in product similarity between firms *i* and *j*; $Nonbank\ Relation_{it}$ is a dummy equal to one if firm *i* had a nonbank credit relationship in the previous year; FFR_{t-1} is the lagged federal funds rate; $\mathbf{X}_{it-1}$ and $\mathbf{X}_{jt-1}$ are firm-level controls including size, age, industry, leverage, and profitability; and α_{ij} denotes firm-pair fixed effects, which absorb all time-invariant bilateral characteristics. The interaction allows me to test whether financial architecture reallocates competitive pressure across firms with heterogeneous access to funding.

To address endogeneity in FFR_{t-1}, I estimate the following first-stage regression:

$$Nonbank\ Relation_{it} \times FFR_{t-1} = \partial_{ij} + \gamma_1(Nonbank\ Relation_{it} \times JK_{t-1}) + \gamma_2\mathbf{X}_{it-1} + \gamma_3\mathbf{X}_{jt-1} + \epsilon_{ijt},$$

where JK_{t-1} is the cumulative Jarociński and Karadi (JK) shock, which serves as the instrument. Across all specifications, the first-stage regression exhibits strong predictive power, with the first-stage *F*-statistics well above the conventional threshold of 16, alleviating concerns about weak instruments (Stock and Yogo 2005).

III. Empirical results

A. Effects of monetary tightening on competitive proximity

I begin by estimating the effect of monetary policy tightening on competitive proximity in product space. Table 2 reports the results. The dependent variable is competitive proximity,

defined as the annual change in the product similarity between firm *i* and firm *j*. Product similarity is constructed using the cosine similarity of firms' 10-K product descriptions (Hoberg and Phillips 2010, 2016). Monetary policy is captured by the lagged federal funds rate, instrumented with the cumulative Jarociński and Karadi (2020) shocks to address endogeneity concerns.

Across all specifications, I find that tighter monetary policy increases competitive proximity among firms, implying stronger horizontal competitive pressure, as firms become more similar in product space. The estimated coefficients are positive and statistically significant. These findings are consistent with the demand and financing-constraint hypotheses: lower aggregate demand and tighter financial conditions reduce firms' incentives and ability to maintain distance in product space.

In Columns 1 to 3 of Table 2, I report OLS estimates of the baseline regression. Column 2 adds a rich set of firm-level control variables, and Columns 3 further includes firm-pair fixed effects to absorb all time-invariant bilateral characteristics. Column 4 presents 2SLS estimates using the instrumented federal funds rate, and the results remain robust. The coefficients are positive and larger in magnitude under 2SLS than under OLS, suggesting that OLS estimates are downward biased, likely reflecting bias from measurement error or omitted variables. Column 4, the preferred specification, implies that a 1 percentage point increase in the federal funds rate leads to a 0.028 increase in competitive proximity between firms, an economically meaningful effect, corresponding to a substantial shift in product-market positioning. This effect almost fully offsets typical year-to-year strategic distancing observed in the data. These results provide evidence that US monetary policy has significant real effects, reshaping firms' competitive positioning in product markets. More broadly, the findings suggest that monetary tightening

reallocates competition toward closer rivals in product space.

I further exploit variation in competitive proximity by considering heterogeneity in horizontal competitive pressure. If the observed effect truly reflects product-market responses, the impact of monetary tightening on competitive proximity should be strongest among the closest peers in product space. To test this prediction, I leverage the fact that each firm is connected to many peers at varying distances in product space. I therefore restrict the sample to the firm-peer pair observations where firm *j* ranks among the top 10 product-market peers of firm *i*. This restriction isolates the effect of monetary policy on the most relevant peers in product space and helps verify that observed convergence indeed reflects product-market behavior rather than broader industry trends.

Table 3 reports the results. The effect of monetary tightening on competitive proximity not only remains robust but becomes even stronger when the sample is restricted to a firm's top 10 product-market peers. That is, the response is disproportionately concentrated among the most relevant competitors in product space. These findings indicate that firms move closer to their most relevant competitors in product space when monetary policy tightens, suggesting that the baseline effects documented in Table 2 are not mechanical convergence within broad industries but rather targeted strategic adjustments in product positioning.

B. Strategic complementarity in competitive positioning

Building on the asymmetric nature of peer ranks, I examine strategic complementarity in firms' competitive positioning. In particular, I test whether firms adjust competitive proximity more strongly with respect to peers for whom they are most strategically relevant in product space. This prediction is consistent with an endogenous choice of product positioning and

suggests that monetary policy shocks trigger targeted adjustments in competitive proximity rather than uniform shifts in product space.

The empirical strategy leverages the directed nature of Hoberg and Phillips' (2010, 2016) product similarity network. Peer firms are ranked by their proximity to the focal firm *i*, but this ranking is not necessarily symmetric: firm *j* may be a top 10 peer for firm *i*, while firm *i* may not rank highly for firm *j*. This asymmetry allows me to distinguish between reciprocal and non-reciprocal peers and to test whether the effects of monetary tightening are amplified when both firms view each other as close competitors.

For example, in 2011, Walmart ranks Costco as its top product-market peer, whereas Costco ranks BJ's Wholesale Club as its top peer. Moreover, BJ's Wholesale Club also ranks Costco as its top peer, creating a reciprocal relationship. This directional symmetry enables me to identify cases in which the focal firm is strategically important to the peer (a "reciprocal peer") from those in which the relationship is one-sided.

Table 4 splits the sample into reciprocal and non-reciprocal peer pairs, where reciprocity is defined by whether the peer firm ranks the focal firm among its top 10 product-market peers. The results indicate that the effect of monetary tightening on competitive proximity is concentrated among reciprocal pairs. This finding suggests that firms adjust their competitive positioning with particular attention to competitors for whom they are strategically important. These results strengthen the view that product positioning is a strategic margin of firm response rather than a passive outcome, and that strategic complementarity amplifies the intensification of horizontal competition following monetary tightening.

C. Mechanisms

Why does monetary tightening increase competitive proximity among firms? A growing

literature highlights that both demand- and financing-constraint channels shape firms' incentives and ability to sustain strategic distance in product markets and, ultimately, their innovation outcomes. It is therefore natural to ask which mechanism dominates in practice.

To test which mechanism dominates, I examine the extent to which the increase in competitive proximity documented above is attenuated for firms with more flexible funding sources. Specifically, I exploit heterogeneity in firms' access to nonbank credit, which is typically less sensitive to monetary policy-induced funding constraints (Xiao 2020, Elliott et al. 2022, Drechsler, Savov, and Schnabl 2022, Buchak et al. 2024, Elliott, Meisenzahl, and Peydró 2024, Cucic and Gorea 2024). If the financing-constraint mechanism is the dominant driver, I expect the product convergence effect to weaken, or even disappear, among firms with nonbank credit relationships. The key variable of interest is the interaction between nonbank credit relationships and the federal funds rate. Table 5 reports the results, which replicate the baseline regressions from Table 2 but include this interaction term to capture heterogeneous effects.

Across all specifications, Table 5 shows that firms with nonbank credit relationships respond differently to monetary tightening. Rather than moving closer to competitors in product space, these firms maintain or increase strategic distance, mitigating the rise in competitive proximity. This reversal shows that financial architecture reallocates competition across strategic margins. In Column 4, which includes the full set of controls, a 1 percentage point increase in the federal funds rate is associated with a 0.038 reduction in competitive proximity among firms with nonbank credit relationships, an effect that is both statistically and economically significant. Compared to baseline estimates in Table 2, this reverses the net effect of monetary tightening from positive to negative.

These results indicate that nonbank credit relationships not only attenuate the adverse effects

of monetary tightening but also reduce competitive proximity, consistent with the financing-constraint mechanism being the dominant channel. If demand were the dominant channel, nonbank access should not reverse this effect. By relaxing funding frictions and buffering capital availability, nonbank lenders enable firms to sustain and even expand strategies that maintain distance in product space under tighter monetary conditions.

Exploiting the richness of the research design, I next examine whether the attenuation effect is concentrated among a firm's closest product-market peers, which would also be consistent with the escape-competition hypothesis. Table 6 investigates this mechanism by focusing on the top 10 closest peers. Columns 1 to 4 show that the mitigating effect of nonbank credit relationships is indeed strongest within this group. This pattern is consistent with both the financing-constraint and escape-competition views: greater credit availability during periods of monetary tightening enables firms to reduce competitive proximity precisely where horizontal competitive pressures are strongest.

Table 7 extends this analysis to the setting of strategic product differentiation discussed earlier. Consistent with the results in Table 6, the mitigating effect of nonbank credit access is concentrated among reciprocal peers, those for whom the focal firm is also among the top-ranked competitors. This pattern highlights that credit availability and competitive pressure operate as complements: when competitive pressure is strongest, access to flexible funding enables firms to diverge rather than converge in product space. Collectively, these findings strengthen the interpretation that credit availability facilitates a strategic, competition-driven response to monetary tightening rather than passive convergence.

Overall, these results suggest that the financing-constraint mechanism dominates the demand mechanism. Moreover, the financing-constraint and escape-competition mechanisms are not

mutually exclusive but can operate jointly in shaping firms' competitive responses. When credit constraints bind, firms are forced into closer competitive proximity despite incentives to compete through technological differentiation. However, when credit availability is higher, firms can act on these incentives to adjust their competitive positioning and increase distance in product space.

D. Potential capital-market-based explanations

While the evidence suggests that nonbank credit relationships mitigate the increase in competitive proximity in response to monetary tightening, it is important to rule out alternative capital-market explanations. One possibility is that the observed patterns reflect capital markets absorbing monetary shocks through investor-based channels rather than firms' relaxed financing constraints via nonbank lenders.

To address this concern, I exploit the capital-market network developed by Lee, Ma, and Yang (2015), which links firms based on investors' co-search behavior. These links capture perceived similarity from investors' perspective rather than actual overlap in product space. If the attenuation patterns are driven by investor behavior rather than nonbank lending, the effects should weaken or disappear when restricting the sample to firm pairs that are close in product space but not connected in capital-market space.

Table 8 shows that the results remain robust in this restricted sample and, if anything, the estimated attenuation effect becomes stronger. The IV estimates of the attenuation effect in Column 4 of Table 8 are larger than those reported in Table 5. This amplification further supports the interpretation that nonbank credit relaxes financing constraints and allows firms to sustain strategic distance from competitors in product space.

Taken together, these findings rule out capital-market absorption as the main driver and strengthen the view that nonbank credit access enables real strategic responses to monetary

tightening, particularly through strategic repositioning away from the most relevant competitors in product space.

E. Nonbank relationships and innovation

The results thus far indicate that monetary tightening increases competitive proximity among firms, whereas firms with nonbank credit relationships attenuate and, in some cases, reverse the increase in competitive proximity. Yet, greater distance in product space may not necessarily translate into breakthrough innovation. It is possible that firms may simply exploit existing knowledge and engage in incremental innovation rather than exploring new domains. To address this concern, I examine whether nonbank credit relationships are associated with multiple dimensions of innovation outcomes.

I focus on three key dimensions of innovation outcomes: value, activity, and novelty. Innovation value is measured using the patent-value estimates of Kogan et al. (2017), both in real and nominal terms, and the number of forward citations each patent receives. Innovation activity is proxied by the number of patent applications (and ultimately granted patents). Following Arts, Jianan, and Gomez (2021), innovation novelty is captured using four complementary measures: the number of new keywords introduced by a patent (*New Word*), the number of times these new keywords are reused in subsequent patents (*New Word Reuse*), one minus the cosine similarity between the focal patent and patents from the previous five years (*1-Backward*), and the ratio of forward to backward cosine similarity (*F/B*), which captures the degree of forward-looking originality.

Tables 9 and 10 show that firms with nonbank credit relationships not only reduce competitive proximity but also shift competition toward product differentiation, resulting in

higher innovation value, activity, and novelty following monetary tightening, relative to firms without such access.

These results suggest that financial architecture reallocates competition across strategic margins. By relaxing financing constraints, nonbank credit allows firms to maintain strategic distance from competitors and compete through technological differentiation rather than price-based rivalry. This shift translates into higher innovation value, activity, and novelty. Taken together, the evidence highlights that financial architecture not only buffers the short-run real effects of monetary tightening but also shapes the long-run direction and quality of innovation, with implications for productivity and economic growth.

IV. Discussions and policy implications

Monetary tightening increases competitive proximity among firms, reallocating competition toward closer rivals in product space, consistent with the demand and financing-constraint hypotheses. However, the analysis highlights that this effect is not uniform but shaped by financial architecture. In particular, nonbank credit relationships attenuate these effects, allowing firms to maintain strategic distance from close competitors and continue competing through product differentiation and preserving breakthrough innovation. These findings have several implications for international settings and for the design of both monetary and macroprudential policies.

The US financial system is characterized by a large and dynamic nonbank sector, including private credit funds, investment banks, hedge funds, and mutual funds. Figure 2 shows a significant increase in total financial assets held by nonbanks in the US, with the gap between nonbank and bank financial assets widening steadily from 2002 to 2023. My findings suggest that these non-depository financial institutions, or nonbanks, play a critical role in shaping firms'

ability to sustain strategic positioning away from direct horizontal competition, even under tighter monetary policy. The presence of well-developed nonbank lenders may therefore help explain why US firms have maintained distance in product space and, in some cases, achieved breakthrough innovations despite aggressive monetary tightening cycles in recent decades.

By contrast, European firms remain more reliant on bank lending, and the nonbank sector is relatively smaller and less integrated into corporate loan markets. Although Figure 2 shows nonbank financial assets in the euro area have also increased, their share remains modest compared with the US. This suggests that the increase in competitive proximity during tightening is likely to be stronger in Europe, where firms face tighter financing constraints transmitted through the bank-lending channel of monetary policy. This mechanism may help explain why European firms, on average, show lower resilience in breakthrough innovation during monetary contractions relative to their US counterparts.

Japan offers yet another case. Its corporate sector has long been characterized by close bank-firm ties and historically weaker product-market competition. Combined with limited nonbank intermediation, this structure may amplify the compression of competitive distance. At the same time, Japan's prolonged low-interest-rate environment in recent decades implies that episodes of monetary tightening have been rare, muting the salience of the competition channel relative to the US and Europe. Moreover, firms may face diminishing marginal returns to increasing distance in product space once a certain level is achieved. Prolonged monetary expansion may therefore generate asymmetric effects: while tightening clearly suppresses increases in distance in product space, further easing may not induce additional strategic adjustments, implying a potential ceiling effect. This dynamic helps explain why Japan's accommodative environment has not resulted in continuously increasing distance in product space.

These cross-country cases highlight that the strength of the competition-reallocation channel depends critically on financial architecture. Economies with more developed nonbank credit markets, such as the US, experience attenuated real effects of monetary tightening on firms' product strategies and breakthrough innovation. By contrast, bank-dependent systems like Europe and Japan are more exposed to convergence pressures when monetary policy tightens. While the modern US financial architecture appears to support greater distance in product space and breakthrough innovation, this resilience entails trade-offs: the rapid expansion of nonbank intermediaries raises concerns about systemic risk, an issue beyond the scope of this paper but central to ongoing regulatory debates. Although assessing the optimal degree of nonbank credit intermediation is beyond this study, the results underscore that macroprudential policy shapes not only the short-run transmission of monetary policy but also its long-term consequences.

V. Concluding remarks

This paper shows that monetary policy endogenously shapes competition. When the federal funds rate rises, firms face stronger horizontal competitive pressure and move toward closer rivals in product space. I argue that this response is primarily driven by tighter credit conditions that reduce firms' capacity to sustain differentiated offerings.

Using textual measures of product similarity and high-frequency monetary policy shocks, I provide causal evidence that monetary tightening significantly increases competitive proximity. The effect is strongest among top product-market peers and reciprocal peers, consistent with strategic positioning rather than mechanical convergence.

I further show that financial architecture conditions this transmission of monetary policy to competition. Firms with nonbank credit relationships respond differently: rather than converging in product space, they escape intensified horizontal competition by maintaining distance in

product space under tightening. These firms also sustain both the level and novelty of innovation. These findings highlight that nonbank credit not only buffers the short-run effects of monetary tightening but also shapes firms' long-run innovation trajectories.

In sum, the results point to the need to better understand the long-term consequences of monetary policy. Monetary tightening can unintentionally induce convergence in firms' strategic positioning, shifting competition toward closer rivals. Access to nonbank finance can attenuate these pressures by allowing firms to maintain strategic separation from close competitors and compete through adjustments in product positioning despite tighter funding conditions. Yet the growing role of nonbanks in modern financial architecture raises systemic risk concerns, highlighting a fundamental policy trade-off between competitive resilience and financial stability. Overall, this study provides evidence of endogenous competition under monetary tightening and highlights how financial architecture shapes the real effects of monetary policy on competition and innovation outcomes.

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Figure 1. Distribution of Average Product Similarity Scores.

The figure plots the distribution of product similarity scores based on Hoberg and Phillips' (2010, 2016) textual analysis of US firms' 10-K product descriptions from 1990 to 2019. Panel A shows the average similarity scores for the 100 closest product-market peers of a focal firm, ranked by proximity, with the top peer (rank 1) exhibiting the highest similarity. Panel B plots the log of similarity scores against the log of peer rank, adjusted using the 0.5 correction of Gabaix and Ibragimov (2011), for the top 100 product-market peers.

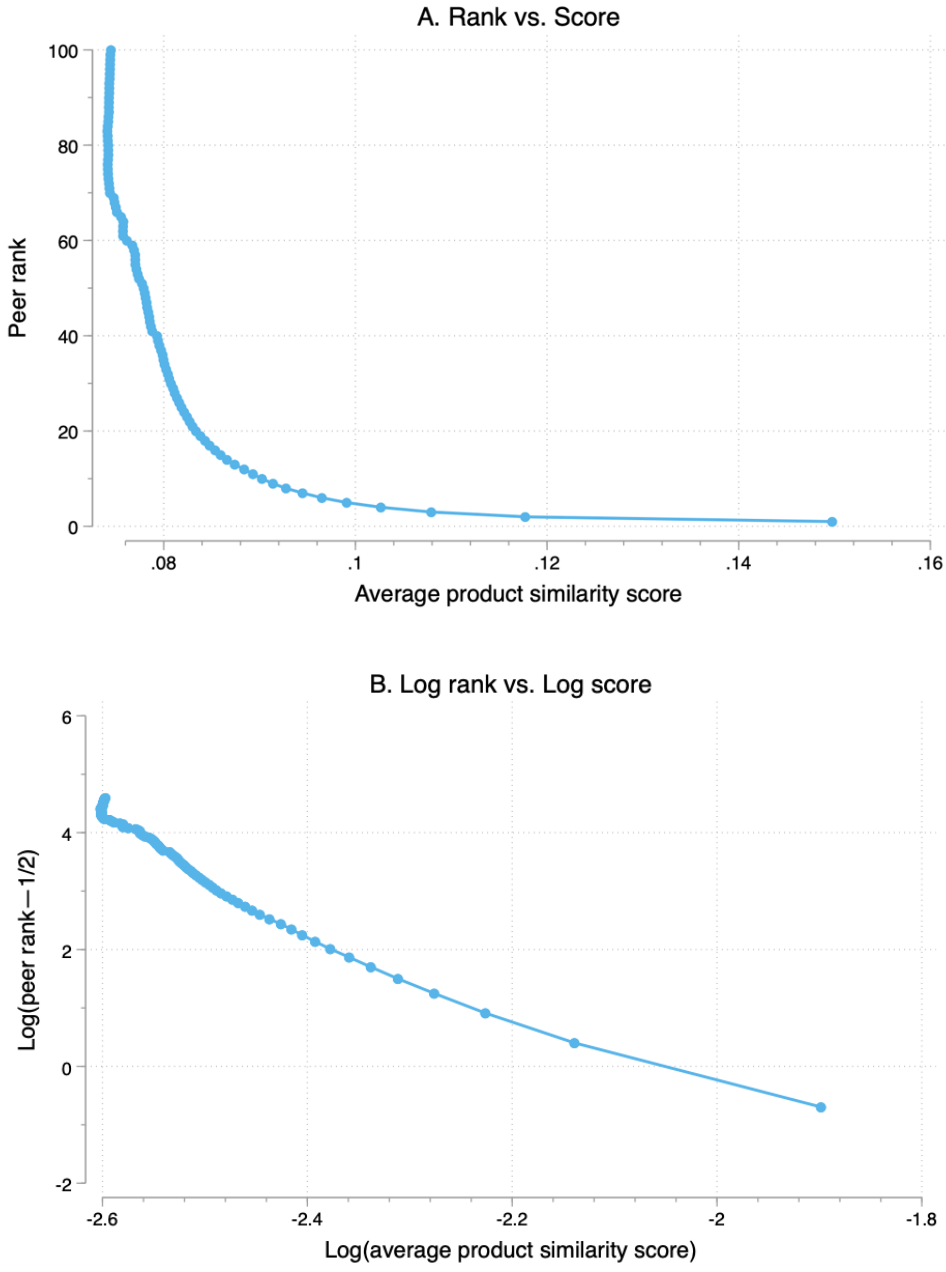


Figure 2. Total Financial Assets Held by Banks and Nonbank Financial Institutions.
This figure plots total financial assets held by banks and nonbank financial institutions (NBFIs) in the United States (USA) and the euro area (EA) from 2002 to 2023, based on data from the Financial Stability Board (FSB). NBFIs include all financial institutions other than banks, central banks, and public financial institutions. The euro area sample covers Austria, Belgium, Croatia, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia, and Spain.

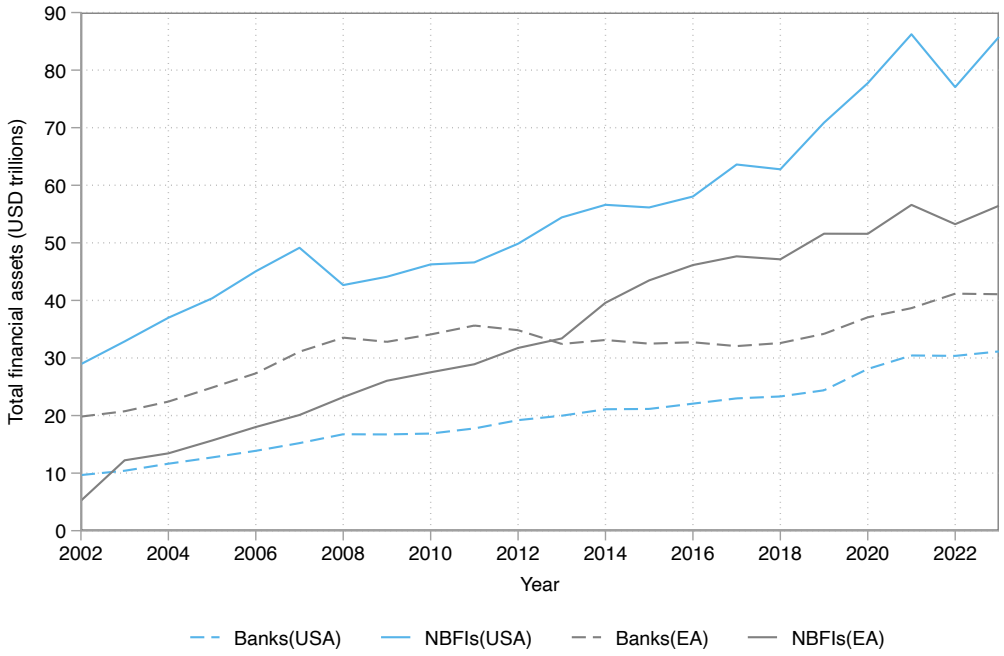


Table 1. Summary Statistics.

This table reports summary statistics for the variables used in the analysis. The sample consists of 1,089,806 firm-pair-year observations of publicly listed US firms from 1990 to 2019. *Competitive Proximity* is defined as the annual change in product similarity between two firms, where similarity is measured as the cosine similarity of 10-K product descriptions (Hoberg and Phillips 2010, 2016). *R&D* is research and development expenditure, and *Size* is the natural logarithm of total book assets. *Age* is the number of years since the firm first appears in Compustat. *HHI* is the Herfindal-Herschman Index of industry concentration, based on sales at the 4-digit SIC level. *Leverage* is total book debt divided by total book assets. *MB* is the market-to-book ratio, defined as the sum of the market equity and book debt divided by total assets. *Cash* is cash and cash equivalents scaled by total assets. *ROA* is return on assets, measured as net income over total assets.

	# obs.	Mean	Std dev.	Median
Competitive Proximity	1,089,806	-0.030	2.117	0.0
R&D	1,089,806	228.458	896.334	32.7
Size	1,089,806	5.494	2.095	5.2
Age	1,089,806	12.362	10.950	9.0
HHI	1,089,806	0.192	5.458	0.2
Leverage	1,089,806	0.181	0.296	0.1
MB	1,089,806	2.988	3.246	2.1
Cash	1,089,806	0.524	0.290	0.5
ROA	1,089,806	-0.300	0.790	-0.2

Table 2. Effects of Monetary Tightening on Competitive Proximity.

This table reports firm-pair-year regressions estimating the effect of monetary policy tightening on competitive proximity. The dependent variable, *Competitive Proximity*, is defined as the annual change in product similarity between two firms, where similarity is measured using the cosine similarity of product descriptions in 10-K filings (Hoberg and Phillips 2010, 2016). The main independent variable of interest is the lagged federal funds rate (*Fed Funds*). Columns 1 to 3 present OLS estimates, sequentially adding firm-level controls and firm-pair fixed effects while Column 4 reports two-stage least squares (2SLS) estimates instrumenting the federal funds rate with monetary policy shocks from Jarociński and Karadi (2020). Standard errors are clustered at the firm-pair level (reported in italics). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) *Competitive Proximity*	(2) *Competitive Proximity*	(3) *Competitive Proximity*	(4) *Competitive Proximity*
Fed Funds	0.024***	0.020***	0.022***	0.028***
	0.001	*0.001*	*0.002*	*0.002*
Pair FE?	N	N	Y	Y
Controls?	N	Y	Y	Y
R-squared	0.064	0.065	0.153	0.002
# observations	1,089,806	1,089,806	984,008	984,008

Table 3. Effect of Monetary Tightening on Competitive Proximity: Closest Peers.

This table reports firm-pair-year regressions estimating the effect of monetary policy tightening on competitive proximity. The sample is restricted to firm-peer pairs in which firm *j* ranks among the top 10 product-market peers of firm *i*. The dependent variable, *Competitive Proximity*, is defined as the annual change in product similarity between two firms, where similarity is measured using the cosine similarity of product descriptions in 10-K filings (Hoberg and Phillips 2010, 2016). The main independent variable of interest is the lagged federal funds rate (*Fed Funds*). Columns 1 to 3 present OLS estimates, sequentially adding firm-level controls and firm-pair fixed effects while Column 4 reports two-stage least squares (2SLS) estimates instrumenting the federal funds rate with monetary policy shocks from Jarociński and Karadi (2020). Standard errors are clustered at the firm-pair level (reported in italics). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) *Competitive Proximity*	(2) *Competitive Proximity*	(3) *Competitive Proximity*	(4) *Competitive Proximity*
Fed Funds	0.015***	0.020***	0.026***	0.036***
	0.002	*0.002*	*0.003*	*0.005*
Pair FE?	N	N	Y	Y
Controls?	N	Y	Y	Y
R-squared	0.084	0.085	0.169	0.002
# observations	582,583	582,583	486,710	486,710

Table 4. Testing for Strategic Complementarity.

This table reports firm-pair-year regressions estimating the effect of monetary policy tightening on competitive proximity. The sample is restricted to firm-peer pairs in which firm *j* ranks among the top 10 product-market peers of firm *i*. The dependent variable, *Competitive Proximity*, is defined as the annual change in product similarity between two firms, where similarity is measured using the cosine similarity of product descriptions in 10-K filings (Hoberg and Phillips 2010, 2016). *Reciprocal Peer* is a binary indicator equal to one if the focal firm is also listed among a peer's top 10 closest firms. The main independent variable of interest is the interaction between *Reciprocal Peer* and the lagged federal funds rate (*Fed Funds*). Columns 1 to 3 present OLS estimates, sequentially adding firm-level controls and firm-pair fixed effects while Column 4 reports two-stage least squares (2SLS) estimates instrumenting the federal funds rate with monetary policy shocks from Jarociński and Karadi (2020). All specifications include year fixed effects. Standard errors are clustered at the firm-pair level (reported in italics). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) *Competitive Proximity*	(2) *Competitive Proximity*	(3) *Competitive Proximity*	(4) *Competitive Proximity*
Reciprocal Peer x Fed Funds	0.037***	0.037***	0.036***	0.073***
	0.003	*0.003*	*0.005*	*0.007*
Pair FE?	N	N	Y	Y
Year FE?	Y	Y	Y	Y
Controls?	N	Y	Y	Y
R-squared	0.088	0.088	0.173	0.006
# observations	582,583	582,583	486,710	486,710

Table 5. Heterogeneity by Nonbank Relationships.

This table reports firm-pair-year regressions estimating how access to nonbank credit moderates the effect of monetary policy tightening on competitive proximity. The dependent variable, *Competitive Proximity*, is defined as the annual change in product similarity between two firms, where similarity is measured using the cosine similarity of product descriptions in 10-K filings (Hoberg and Phillips 2010, 2016). *Nonbank Relation* is an indicator equal to one if a firm obtained at least one syndicated loan from nonbank lender by or before prior year. The main independent variable of interest is the interaction between *Nonbank Relation* and the lagged federal funds rate (*Fed Funds*). Columns 1 to 3 present OLS estimates, sequentially adding firm-level controls and firm-pair fixed effects while Column 4 reports two-stage least squares (2SLS) estimates instrumenting the federal funds rate with monetary policy shocks from Jarociński and Karadi (2020). All specifications include year fixed effects. Standard errors are clustered at the firm-pair level (reported in italics). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) *Competitive Proximity*	(2) *Competitive Proximity*	(3) *Competitive Proximity*	(4) *Competitive Proximity*
Nonbank Relation x Fed Funds	-0.027***	-0.029***	-0.028***	-0.038***
	0.009	*0.009*	*0.011*	*0.013*
Pair FE?	N	N	Y	Y
Year FE?	Y	Y	Y	Y
Controls?	N	Y	Y	Y
R-squared	0.068	0.068	0.157	0.006
# observations	1,089,806	1,089,806	984,008	984,008

Table 6. Heterogeneity by Nonbank Relationships: Closest Peers.

This table reports firm-pair-year regressions estimating whether the moderating effect of nonbank credit access is concentrated among a firm's closest product-market peers. The dependent variable, *Competitive Proximity*, is defined as the annual change in product similarity between two firms, where similarity is measured using the cosine similarity of product descriptions in 10-K filings (Hoberg and Phillips 2010, 2016). *Nonbank Relation* is an indicator equal to one if a firm obtained at least one syndicated loan from nonbank lender on or before the prior year. *Top Peer* is an indicator equal to one if firm *j* ranks among the top 10 product-market peers of firm *i*. The main independent variable of interest is the triple interaction of *Nonbank Relation, Top Peer*, and the lagged federal funds rate (*Fed Funds*). Columns 1 to 3 present OLS estimates, sequentially adding firm-level controls and firm-pair fixed effects while Column 4 reports two-stage least squares (2SLS) estimates instrumenting the federal funds rate with monetary policy shocks from Jarociński and Karadi (2020). All specifications include year fixed effects. Standard errors are clustered at the firm-pair level (reported in italics). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) *Competitive Proximity*	(2) *Competitive Proximity*	(3) *Competitive Proximity*	(4) *Competitive Proximity*
Nonbank Relation x Fed Funds	0.004	0.002	0.008	0.017
	0.010	*0.010*	*0.012*	*0.016*
Nonbank Relation x Fed Funds x Top Peer	-0.118***	-0.117***	-0.126***	-0.211***
	0.022	*0.022*	*0.026*	*0.029*
Pair FE?	N	N	Y	Y
Year FE?	Y	Y	Y	Y
Controls?	N	Y	Y	Y
R-squared	0.068	0.068	0.157	0.006
# observations	1,089,806	1,089,806	984,008	984,008

Table 7. Heterogeneity by Nonbank Relationships: Reciprocal Peers.

This table reports firm-pair-year regressions estimating whether the moderating effect of nonbank credit access is concentrated among a firm's reciprocal product-market peers. The dependent variable, *Competitive Proximity*, is defined as the annual change in product similarity between two firms, where similarity is measured using the cosine similarity of product descriptions in 10-K filings (Hoberg and Phillips 2010, 2016). *Nonbank Relation* is an indicator equal to one if a firm obtained at least one syndicated loan from nonbank lender on or before the prior year. *Reciprocal Peer* is a binary indicator equal to one if the focal firm is also listed among a peer's top 10 closest firms. The main independent variable of interest is the triple interaction of *Nonbank Relation, Reciprocal Peer*, and the lagged federal funds rate (*Fed Funds*). Columns 1 to 3 present OLS estimates, sequentially adding firm-level controls and firm-pair fixed effects while Column 4 reports two-stage least squares (2SLS) estimates instrumenting the federal funds rate with monetary policy shocks from Jarociński and Karadi (2020). All specifications include year fixed effects. Standard errors are clustered at the firm-pair level (reported in italics). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) *Competitive Proximity*	(2) *Competitive Proximity*	(3) *Competitive Proximity*	(4) *Competitive Proximity*
Nonbank Relation x Fed Funds	0.012	0.014	0.009	0.003
	0.010	*0.010*	*0.012*	*0.016*
Nonbank Relation x Fed Funds x Reciprocal Peer	-0.055***	-0.054***	-0.063**	-0.130***
	0.021	*0.021*	*0.025*	*0.028*
Pair FE?	N	N	Y	Y
Year FE?	Y	Y	Y	Y
Controls?	N	Y	Y	Y
R-squared	0.068	0.068	0.157	0.006
# observations	1,089,806	1,089,806	984,008	984,008

Table 8. Potential Capital-Market-Based Explanations.

This table reports firm-pair-year regressions estimating how access to nonbank credit moderates the effect of monetary policy tightening on competitive proximity, restricting the sample to product-market peers that are not connected in capital markets (Lee, Ma, and Yang 2015). The dependent variable, *Competitive Proximity*, is defined as the annual change in product similarity between two firms, where similarity is measured using the cosine similarity of product descriptions in 10-K filings (Hoberg and Phillips 2010, 2016). *Nonbank Relation* is an indicator equal to one if a firm obtained at least one syndicated loan from nonbank lender by or before prior year. The main independent variable of interest is the interaction between *Nonbank Relation* and the lagged federal funds rate (*Fed Funds*). Columns 1 to 3 present OLS estimates, sequentially adding firm-level controls and firm-pair fixed effects while Column 4 reports two-stage least squares (2SLS) estimates instrumenting the federal funds rate with monetary policy shocks from Jarociński and Karadi (2020). All specifications include year fixed effects. Standard errors are clustered at the firm-pair level (reported in italics). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) *Competitive Proximity*	(2) *Competitive Proximity*	(3) *Competitive Proximity*	(4) *Competitive Proximity*
Nonbank Relation x Fed Funds	-0.065***	-0.067***	-0.067***	-0.043***
	0.011	*0.011*	*0.013*	*0.016*
Pair FE?	N	N	Y	Y
Year FE?	Y	Y	Y	Y
Controls?	N	Y	Y	Y
R-squared	0.091	0.092	0.199	0.007
# observations	741,015	741,015	636,037	636,037

Table 9. Innovation Value and Activity.

This table reports firm-year regressions estimating how nonbank credit relationships shape the effect of monetary tightening on firms' innovation value and activity. Innovation value is measured following Kogan et al. (2017), using real and nominal dollar patent value estimates and the number of forward citations. Innovation activity is proxied by the number of patent applications (and ultimately granted patents). *Nonbank Relation* is a binary indicator equal to one if a firm had an existing relationship with a nonbank lender in the syndicated loan market as of the prior year. The main independent variable of interest is the interaction between *Nonbank Relation* and lagged federal funds rate (*Fed Funds*). Columns 1 to 4 report two-stage least squares (2SLS) estimates, instrumenting the interaction term between *Nonbank Relation* and *Fed Funds* with the interaction term between *Nonbank Relation* and the monetary policy shocks of Jarociński and Karadi (2020). All specifications include year and firm-pair fixed effects. Standard errors are clustered at the firm-pair level (reported in italics). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) *Patent Value (Real)*	(2) *Patent Value*	(3) *Forward Citation*	(4) *# Patent Application*
Nonbank Relation x Fed Funds	138.455*	265.491*	0.139***	0.080***
	76.597	*149.248*	*0.041*	*0.029*
Pair FE?	Y	Y	Y	Y
Year FE?	Y	Y	Y	Y
Controls?	Y	Y	Y	Y
R-squared	0.134	0.110	0.357	0.319
# observations	31,462	31,462	31,462	31,462

Table 10. Innovation Novelty.

This table reports firm-year regressions estimating how nonbank credit relationships shape the effect of monetary tightening on firms' innovation novelty. Novelty measures follow Arts, Jianan, and Gomez (2021): the number of new keywords introduced by a patent (*New Word*), the number of times these new keywords are reused in subsequent patents (*New Word Reuse*), one minus the cosine similarity between the focal patent and patents from the previous five years (*1-Backward*), and the ratio of forward to backward cosine similarity (*F/B*), capturing forward-looking originality. *Nonbank Relation* is a binary indicator equal to one if a firm had an existing relationship with a nonbank lender in the syndicated loan market as of the prior year. The main independent variable of interest is the interaction between *Nonbank Relation* and lagged federal funds rate (*Fed Funds*). Columns 1 to 4 report two-stage least squares (2SLS) estimates, instrumenting the interaction term between *Nonbank Relation* and *Fed Funds* with the interaction term between *Nonbank Relation* and the monetary policy shocks of Jarociński and Karadi (2020). All specifications include year and firm-pair fixed effects. Standard errors are clustered at the firm-pair level (reported in italics). *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) *New Word*	(2) *New Word Reuse*	(3) *1-Backward*	(4) *F/B*
Nonbank Relation x Fed Funds	0.061**	0.079**	0.019**	0.023***
	0.024	*0.035*	*0.007*	*0.008*
Pair FE?	Y	Y	Y	Y
Year FE?	Y	Y	Y	Y
Controls?	Y	Y	Y	Y
R-squared	0.193	0.210	0.248	0.231
# observations	31,462	31,462	31,462	31,462