Proceedings of ICMRED 2026 Symposium: Financial Innovation, Risk Governance, and the Dynamics of Global Capital Flows
DOI: 10.54254/2754-1169/2026.BL35338

An Analysis of the Mechanisms Through Which Patience Capital Influences Supply Chain Resilience

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Abstract. This paper asks whether long-horizon, strategically committed equity—what is termed patient capital—helps firms keep their supply chains intact under stress, and if so, through what route. Working with a panel of Chinese A-share firms listed in Shanghai and Shenzhen over 2020–2024, a composite gauge of patient capital is built out of strategic equity participation and its bearing on firm-level supply chain resilience is estimated. Identification leans on an OLS model that nets out province and year heterogeneity through fixed effects, paired with a mediation step that situates ESG on the transmission path. The estimates tell a consistent story: patient capital raises resilience by a statistically reliable margin; with covariates and the two layers of fixed effects partialled out, ESG is found to relay part—but not the whole—of that influence; and the pattern is unmoved by the richer controls. The evidence is read as showing that a steady, value-oriented supply of long-term capital eases the near-term funding squeeze that resilience-building entails and, by raising governance quality and sustainability capacity, leaves firms better braced against external shocks. The paper accordingly contributes micro-level evidence on how patient capital feeds through to the durability of corporate supply chains.

Keywords: patient capital, supply chain resilience, ESG, fixed effects, mediating effects

1. Introduction

The reconfiguration of global production, sharper geopolitical frictions, and an intensifying contest over frontier core technologies have together pushed supply chain resilience to the foreground of the development-versus-security debate. Resilience, properly understood, is not merely the speed of rebound after a disruption. It also encompasses a firm's ability to keep operating, to redeploy resources as circumstances shift, and to improve in a sustained way when the surrounding environment is hard to predict. For China, where industrial upgrading and the pivot to high-quality growth are advancing in tandem, putting corporate supply chains on a more resilient footing is of plain practical consequence.

China has, at the same time, made the cultivation of patient capital a deliberate aim of policy. Measured against money that pursues fast gains and turns over often, patient capital weighs long horizons, shared risk, and joint value creation more heavily, and is on that account better suited to underwrite corporate efforts in innovation, in tightening governance, in upgrading technology, and in reworking supply chains. Resilience, however, is slow to build: it usually involves protracted

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DOI: 10.54254/2754-1169/2026.BL35338

gestation, returns that materialise only with a lag, and spillovers that accrue beyond the investing firm, so it depends on funding that is at once continuous and stable. Probing how patient capital reinforces resilience therefore answers both to the broader call for finance to serve the real economy and to a sharper theoretical reading of how long-term capital behaves.

On that basis, the empirical exercise below takes A-share firms listed in Shanghai and Shenzhen between 2020 and 2024 as its working sample and follows the linkage that runs from patient capital, through ESG, to supply chain resilience. Three marginal contributions are intended. The first is one of perspective: by reading resilience through the attributes of the capital a firm draws on, and by folding patient capital into the explanatory set, the paper widens the analytical aperture on what makes chains resilient. The second is one of measurement: rather than relying on debt maturity or a single holder's tenure, a composite patient-capital index is assembled from strategic equity holdings, identifying long-horizon investors jointly by how long and how steadily they hold. The third is one of mechanism: having pinned down the overall effect, ESG is introduced as a mediator to make explicit how patient capital can lift resilience by strengthening firms' sustainable-governance capabilities.

2. Literature review and research gaps

Two strands of scholarship bear on this question. The first interrogates the determinants of resilience, ranging across policy support [1], digital transformation [2], open public data [3], supply chain finance [4], and venture capital [5]. Read together, these studies converge on the view that the external institutional setting and a firm's own capability-building jointly decide how well a chain withstands shocks, recovers, and adapts. The second strand appraises the economic footprint of patient capital, documenting that it can keep innovation going [6], improve ESG performance [7], and refine governance [8], and that it contributes besides to long-run value creation and to the rise of new-quality productive forces [9].

Helpful as this body of work is, two openings persist. The first is empirical: evidence connecting patient capital directly to supply chain resilience remains scarce, and the channels carrying any such connection have seldom been taken apart with care. The second is one of construction: most available proxies for patient capital rest on long-term debt or on the tenure of one equity holder, and so give too little weight to the combined signature of long holding and stable ownership. There is, moreover, a conceptual reason to expect the relationship to operate through governance rather than funding alone: if patient capital matters chiefly because it changes how firms are monitored and how they treat stakeholders, then a sustainability-and-governance channel ought to carry a measurable share of the effect—an implication that prior funding-centred accounts leave untested. Responding to both, this paper identifies patient capital from a strategic-equity vantage point and proceeds to test ESG as the intervening route.

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Stepping back, the deeper limitation is that the two strands have largely run in parallel. Work on the determinants of resilience has treated capital, where it appears at all, as an undifferentiated input, while work on patient capital has tended to stop at outcomes such as innovation or governance without following the thread through to how firms hold up under disruption. Neither literature, in other words, has asked whether the very attributes that make capital patient—its long horizon, its tolerance for risk, its stake in enduring value—are what allow a firm to keep its supply chain intact. This paper joins the two by reading resilience explicitly as a function of capital attributes and by specifying a route, through sustainability and governance, along which patience can plausibly travel. Framing the question this way also yields a testable prediction the funding-centred view does not: if governance is doing real work, then a measurable portion of the effect should survive once the direct funding channel is accounted for. The empirical design that follows is built to put exactly that prediction to the test.

3. Theoretical analysis and research hypotheses

3.1. Patience capital and supply chain resilience

Resilience is accumulated rather than purchased outright. It grows out of sustained outlays on supply chain governance, on technological innovation, on inventory arrangements, on collaborative networks, and on risk buffers—commitments that are typically capital-intensive, slow to repay, and clouded by uncertainty. Precisely because they share these traits, such commitments are the first casualty when internal performance pressure mounts or when the short-termism endemic to capital markets reasserts itself. Patient capital, defined by its tolerance for long holding and its willingness to bear risk, is therefore well matched to the problem: once it has entered a firm it can reinforce resilience along at least three channels.

The first channel works through financing. Unlike short-dated money, patient capital can absorb temporary fluctuations and keep its attention on the slow accumulation of firm value, which makes it a steadier source of funds for reallocating capacity, diversifying the supplier base, advancing digital transformation, and attacking key technological bottlenecks. The mechanism is not simply that more money becomes available, but that its availability is less contingent on quarter-to-quarter outcomes, which is exactly the property that long-gestation resilience investments require.

The second channel works through governance. Long-horizon institutional owners, by participating in governance, monitoring information flows, and engaging management in strategic dialogue, are positioned to curb decisions that trade durable resilience for an immediate lift in reported profit. Because their payoff is realised over a longer arc, their incentives are aligned with the patient build-out of capability rather than with its sacrifice; in effect, patient capital lengthens the effective horizon over which managers are held to account.

The third channel works through relationships. A capital commitment that is visibly enduring transmits a credible signal to suppliers, customers, and lenders that the firm will still be there to honour its undertakings, which raises the firm's standing, deepens partner loyalty, and improves both coordination and shock resistance across the chain. Reliability of this kind is itself a form of resilience, since chains fracture not only under financial strain but when counterparties lose confidence. Taken together, these arguments yield the first hypothesis:

H1: Patient capital significantly bolsters a firm's supply chain resilience.

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3.2. Patience capital, ESG, and supply chain resilience

The influence of patient capital on resilience need not be wholly direct. A central conduit is the upgrading of a firm's Environmental, Social, and Governance (ESG) profile. Patient capital is congenial to the ESG logic because long-term money places a premium on lasting firm value, on reputation, and on the capacity to manage risk—an orientation that gives firms a sharper motive to improve environmental management, to discharge social obligations, and to reinforce internal governance. The alignment is more than rhetorical: investors who cannot exit cheaply have a direct stake in the non-financial risks that accumulate over time, and ESG is the language in which those risks are increasingly priced.

Better ESG outcomes, in turn, feed back into resilience through concrete operational margins. Tighter environmental compliance lowers the probability of penalties and forced production stoppages; fuller discharge of social responsibilities steadies relationships with employees, suppliers, and customers; and stronger governance widens transparency, eases agency frictions, and improves how resources are allocated. Each of these is a point at which a chain might otherwise break, so improvements at the ESG level translate fairly directly into fewer points of failure.

There is also a recovery dimension. ESG narrows the operational soft spots in a chain and shortens the time a firm needs to right itself after a shock. Where governance is sound and conduct responsible, external finance and policy backing are easier to secure and the confidence of partners easier to keep, so the chain is more likely to hold its shape amid uncertainty. On this reasoning, part of what looks like a direct effect of patient capital should in fact run through ESG, which motivates the second hypothesis:

H2: Patient capital enhances supply chain resilience by improving corporate ESG performance.

4. Research design

4.1. Sample selection and data sources

The analysis is built on firm-year records for Chinese A-share companies traded in Shanghai and Shenzhen from 2020 to 2024, with the firm-level information drawn mainly from CSMAR, CNRDS, and the RuiSi database. From the raw data, the estimation sample is constructed in three steps. Financial-sector firms are first removed, along with any carrying the ST, *ST, or PT designation, since their reporting and trading behaviour are not comparable with the rest. Observations missing any of the key variables are then dropped. Finally, to keep extreme values from driving the results, every continuous variable is winsorized at the 1st and 99th percentiles. The procedure leaves a balanced working panel of 15,525 firm-year observations, a span wide enough to support the fixed-effects design that follows.

4.2. Variable definitions

The outcome variable is supply chain resilience (Resil). In keeping with the established literature, a five-facet indicator system is set out—adaptability, resistance, recovery, human capital, and government support—and compressed into a single composite by the entropy method [10], which lets the data rather than the analyst fix the weights. The focal regressor is patient capital (PC): treating strategic equity holdings as the primary basis, strategic institutional investors are identified by both the duration and the stability of their stakes and, on that footing, a composite patient-capital index is assembled [11-13]. The mediator is ESG performance, proxied by the Huazheng ESG

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rating, whose nine grades from C through AAA are scored 1 to 9 [14]. The control set comprises firm size, the debt-to-equity ratio, return on total assets, the cash-flow ratio, the fixed-asset ratio, and Tobin's Q [13, 14]; these variables capture, respectively, scale, leverage, profitability, internal liquidity, asset rigidity, and growth opportunity—each of which could independently bear on a firm's capacity to keep its chain intact.

Table 1. Main variable definitions

Variable	Symbol	Variable Name	Description
Dependent variable	Resil	Supply Chain Resilience	Comprehensive Score Based on the Entropy Method of the Five-Dimensional Indicator System
Explanatory variable	PC	Patience Capital	Comprehensive Index for Strategic Equity
Mechanism variable	ESG	ESG Performance	CSI ESG Rating Scores (1–9)
Control variable	Size	Company Size	Natural Logarithm of Total Assets
Control variable	ALR	Debt-to-Equity Ratio	Total Liabilities / Total Assets
Control variable	Roa	Return on Total Assets	Net Income / Total Assets
Control variable	Cashflow	Cash Flow Ratio	Net Operating Cash Flow / Total Assets
Control variable	Fixassrt	Fixed Asset Ratio	Net Fixed Assets / Total Assets
Control variable	Tbq	Tobin's Q	Market Capitalization / Total Assets

5. Empirical results and analysis

5.1. Descriptive statistics

The summary statistics point to considerable dispersion across firms. Resilience averages 2.2123 with a standard deviation of 1.5951, so the capacity to keep a chain intact differs widely from one firm to the next. Patient capital records a mean of 2.1936 against a standard deviation of 1.3232, which again signals sizeable gaps in how much stable, long-horizon backing firms actually attract. Turning to the controls, mean firm size is 22.4580, the average debt-to-asset ratio is 0.4346, and mean Tobin's Q is 1.6144—figures that sit comfortably within the range one expects of listed A-share firms. Crucially for what follows, the breadth of variation in the focal variables is what makes the regressions informative: with so much cross-firm spread, the design has the leverage needed to separate the influence of patient capital from that of the other firm attributes.

Table 2. Descriptive statistics

Variable	count	mean	sd	min	max
Supply Chain Resilience	15525	2.2123	1.5951	0.1329	5.7087
Patience Capital	15525	2.1936	1.3232	0.1330	6.0629
Company Size	15525	22.4580	1.2358	20.1526	26.5216
Debt-to-Equity Ratio	15525	0.4346	0.1955	0.0628	0.8965
Return on Total Assets	15525	2.8705	6.7399	-20.8267	23.1784
Cash Flow Ratio	15525	0.0516	0.0636	-0.1288	0.2414
Fixed Asset Ratio	15525	20.5117	14.9026	0.1769	65.5225
Tobin's Q	15525	1.6144	1.3246	0.0993	7.6874

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5.2. Baseline regression results

Table 3 follows the patient-capital effect across three nested specifications. In column (1), which carries the focal regressor alone, the coefficient registers 0.0308 and clears the 1% threshold. Bringing in the firm-level controls in column (2) trims the estimate to 0.0195, still reliable at 5%. Layering province and year fixed effects on top in column (3) raises it once more, to 0.105, again significant at 1%. The progression matters as much as any single number: that the coefficient holds its sign and significance as the specification is enriched is precisely what one would expect if the relationship is structural rather than an artefact of omitted controls or of unobserved provincial and yearly conditions. On this reading, Hypothesis H1 is supported.

The controls themselves behave in interpretable ways. Firm size and Tobin's Q both load positively, consistent with the idea that scale and growth prospects give firms more room to invest in resilience. The debt-to-equity and fixed-asset ratios enter negatively, which fits the intuition that heavy leverage and an asset-heavy structure leave a firm less nimble in the face of disruption and thinner in its risk-buffering capacity. The cash-flow ratio is also negative—a sign most plausibly tied to differences in capital-allocation strategy or to industry-specific operating rhythms, and one whose economic reading therefore calls for restraint. ROA is flat in the bare model but turns negative once fixed effects are present, which suggests that the profitability–resilience link is sensitive to regional or temporal heterogeneity and should not be over-read.

Table 3. Baseline regression results

Variable	(1)Resil	(2)Resil	(3)Resil
Patience Capital	0.0308***	0.0195**	0.105***
	(0.00967)	(0.00962)	(0.00723)
Company Size		0.284***	0.229***
		(0.0126)	(0.00954)
Debt-to-Equity Ratio		-0.542***	-0.853***
		(0.0779)	(0.0583)
Return on Total Assets		-0.000317	-0.00791***
		(0.00234)	(0.00177)
Cash Flow Ratio		-0.780***	-0.867***
		(0.231)	(0.172)
Fixed Asset Ratio		-0.0106***	-0.00687***
		(0.000863)	(0.000659)
Tobin's Q		0.215***	0.120***
		(0.0113)	(0.00844)
Constant	2.145***	-4.061***	-2.274***
	(0.0248)	(0.277)	(0.212)
Province fixed effects	No	No	Yes
Year fixed effects	No	No	Yes
Observations	15525	15525	15525
R^2	0.001	0.058	0.488

Standard errors in parentheses

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$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

5.3. Mediating effect test of ESG

Table 4 sets out the mediation test organised around ESG, following the standard three-equation logic. Regressing ESG on patient capital returns a coefficient of 0.00607, significant at 1%, which establishes the first leg: firms holding more patient capital do post stronger ESG records. Folding ESG into the resilience equation then yields an ESG coefficient of 0.0892 (significant at 5%), while patient capital retains a coefficient of 0.0190, still significant at 5%. Because the direct path stays significant once the mediator is present, ESG is acting as a partial rather than a full conduit—it carries some of the effect of patient capital onto resilience without displacing the remainder. Hypothesis H2 is thus borne out.

The economic reading is worth drawing out. Two things emerge from the finding that the patient-capital coefficient falls only modestly when ESG enters: ESG is a genuine part of the story, but it is not the whole of it, and a meaningful share of the effect must travel through the financing and relational channels set out in Section 3.1 rather than through sustainability conduct alone. The mediated portion, for its part, says that patient capital does more than enlarge the pool of stable funds—it nudges firms toward better environmental stewardship, fuller social responsibility, and tighter internal governance, and improvements of that kind strengthen trust and coordination among firms, their chain partners, investors, and regulators, leaving firms better able to dampen operational uncertainty and to hold their chains steady when conditions turn adverse.

Table 4. Mediating effect of ESG

Variable	(1)Resil	(2)ESG	(3)Resil
ESG			0.0892**
			(0.0348)
Patience Capital	0.0195**	0.00607***	0.0190**
	(0.00962)	(0.00222)	(0.00962)
Company Size	0.284***	0.0274***	0.282***
	(0.0126)	(0.00292)	(0.0127)
Debt-to-Equity Ratio	-0.542***	0.0290	-0.545***
	(0.0779)	(0.0180)	(0.0779)
Return on Total Assets	-0.000317	0.00422***	-0.000694
	(0.00234)	(0.000539)	(0.00234)
Cash Flow Ratio	-0.780***	0.186***	-0.796***
	(0.231)	(0.0534)	(0.232)
Fixed Asset Ratio	-0.0106***	0.00439***	-0.0110***
	(0.000863)	(0.000199)	(0.000876)
Tobin's Q	0.215***	-0.0129***	0.216***
	(0.0113)	(0.00260)	(0.0113)
Constant	-4.061***	2.645***	-4.297***
	(0.277)	(0.0638)	(0.292)
Observations	15525	15525	15525
R^2	0.058	0.066	0.058

DOI: 10.54254/2754-1169/2026.BL35338

Standard errors in parentheses

$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

5.4. Robustness analysis

Two features of the design already guard against the most obvious threats to the baseline reading. The inclusion of province fixed effects sweeps out any time-invariant regional conditions—differences in local industrial structure, factor endowment, or institutional environment—that might jointly shape both the supply of patient capital and the resilience of firms headquartered there. The year fixed effects, in parallel, absorb macroeconomic and policy shocks common to all firms in a given year, so that the estimated effect is not confounded by, say, a nationwide credit cycle or a common external disruption.

More to the point, the central concern in a setting like this is the interaction between provincial heterogeneity and shocks that hit in a particular year; allowing both sets of effects to enter simultaneously is what addresses it. Column (3) of Table 3 is the relevant specification, and there the patient-capital estimate remains positive and significant under these joint controls, with the substantive conclusion unchanged. The fact that the coefficient not only survives but strengthens as the fixed effects are added is itself reassuring, since a result generated by regional or cyclical confounding would be expected to weaken, not firm up, once those dimensions are absorbed. Therefore, the finding is regarded as robust, while noting that establishing strict causal identification would call for exogenous variation of the kind a future design might supply.

6. Research conclusions and policy implications

Drawing on Shanghai- and Shenzhen-listed A-share firms over 2020–2024, this study has examined how patient capital bears on corporate supply chain resilience and has tested ESG as the mediating route. Three conclusions stand out. Patient capital meaningfully strengthens resilience; ESG transmits part of that effect; and both findings hold once province and year fixed effects are controlled. The combination suggests that the contribution of patient capital is dual in nature—part of it operates by relaxing the funding and monitoring conditions under which resilience is built, and part by reshaping the firm's sustainability and governance conduct.

Several implications follow, each addressed to a different actor. For firms, the lesson is to refine ownership structure and to draw in stable, long-horizon strategic institutional investors, both to ease financing constraints and to lift the burden of short-term performance targets while a chain is being built out; embedding ESG into supply chain governance can, in the same motion, sharpen upstream–downstream coordination, risk management, the discharge of responsibilities, and environmental compliance. For institutional investors, the case is for a genuinely long-term philosophy—one that resists the pull of high-frequency trading and quick gains and instead attends to supply chain security, digital capability, and the potential for value creation over time, using governance engagement to steer firms toward resilience-building uses of resources. For government, the task is to keep refining the channels that draw long-term funds into the market and that cultivate patient capital: tax incentives, disclosure requirements, and risk-compensation arrangements can route more long-term money toward firms with high growth potential and acute resilience needs, while continued improvement in ESG evaluation and disclosure narrows the information gap between capital providers and firms. Measures along these lines would help convert the latent advantages of patient capital into working capabilities that underpin the stability and security of industrial and supply networks.

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