Institution-Based Asset Pricing: A Generalization of Consumption- and Production-Based Models

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Abstract

Standard asset pricing models, whether consumption-based (CCAPM) or production-based (PCAPM), treat institutions—such as property rights, contract enforcement, and rule of law—as exogenous, stable, and frictionless. This assumption collapses under empirical scrutiny in a world where institutional deterioration, geopolitical conflict, and strategic coercion shape both economic fundamentals and financial markets. We develop a new framework of Institution-Based Asset Pricing (IBAP) in which institutions are modeled as a dynamic, investable capital stock. Agents optimally allocate resources not only to consumption and physical capital, but also to institutional investment, which sustains enforcement mechanisms and mitigates systemic risk. Institutional quality enters both the production function and the utility function, directly affecting the stochastic discount factor and asset risk premia. Our model explains fundamental differences in asset pricing mechanisms across political regimes—for instance, between China's extractive, state-controlled financial system and the liberal, rules-based system of the United States. We show that shocks to institutional depreciation, underinvestment, or coercive disruption (e.g., rare earth embargoes, chip sanctions, or capital controls) propagate into asset prices, volatility, and returns. By endogenizing institutions, this paper offers a unified theory of growth, risk, and valuation under institutional uncertainty—one that is urgently needed in today's multipolar and unstable global order.

Keywords: Asset Pricing; Institutions; Consumption-Based Capital Asset Pricing Model; Production-Based Asset Pricing Model; Political Risk; Institutional Volatility; Endogenous Institutions; Macro-Financial Resilience

1 Introduction

Standard asset pricing theory—whether based on intertemporal consumption (Lucas, 1978; Breeden, 1979; Mehra and Prescott, 1985) or production (Brock, 1982; Cochrane, 1991, 1996; Jermann, 1998)—relies on the crucial but rarely questioned assumption that institutions are exogenous, stable, and frictionless.

These frameworks treat the legal, political, and coercive architecture underlying markets as manna from heaven: property rights exist, contracts are enforceable, and production takes place within a rules-based environment that neither decays nor requires defense. Asset prices in these models respond to consumption shocks, capital dynamics, and technological uncertainty, but not to the deterioration or weaponization of the institutional order itself.

This assumption is no longer tenable. In an era defined by institutional decay, authoritarian resurgence, geopolitical realignment, and strategic disruption of global production chains, institutions are neither fixed nor benign. They are endogenous, volatile, and strategically manipulated. The U.S.–China trade conflict, rare earth embargoes, semiconductor sanctions, and coercive capital controls are not mere policy shocks—they are manifestations of institutional divergence and contestation. These dynamics have profound implications for asset prices, volatility, and risk premia.

We propose a new framework—Institution-Based Asset Pricing (IBAP)—that endogenizes institutional capital as a priced, investable, and volatile asset. In our model, institutions are modeled as a dynamic stock $\mathcal{I}(t)$, subject to accumulation through investment, depreciation through neglect, and stochastic erosion via exogenous shocks (e.g., geopolitical subversion, legal uncertainty, state collapse). Institutional capital enters both the production function, augmenting output (as in the neoclassical growth tradition), and the utility function, enhancing the value of consumption by providing security and predictability.

Our model generalizes and unifies the canonical asset pricing frameworks. The consumption-based capital asset pricing model (CCAPM) assumes institutional frictionlessness; our model embeds institutions directly into the intertemporal marginal rate of substitution. Production-based asset pricing models (PCAPM) assume technology and capital operate atop a reliable institutional framework; our model recognizes that production collapses in lawless or extractive regimes. Unlike Pastor and Veronesi (2012, 2013), who study political uncertainty as an exogenous shock to beliefs, or Kelly et al. (2016), who price disaster risk from observable political events, our model makes institutional dynamics endogenous to agents' investment decisions and directly embedded in the stochastic discount factor (SDF).

The core mechanism is simple but powerful: investing in institutions lowers future volatility and raises future productivity. Failing to invest leads to institutional decay, raising future risk premia and amplifying consumption volatility. As such, institutional capital functions as both a production input and a stabilizing asset—a unique dual role overlooked in traditional asset pricing theory.

This framework enables us to explain several real-world anomalies. Why do autocracies like China exhibit high investment and growth yet persistently low equity returns and high risk premia? Why do liberal democracies suffer asset price fragility when they underinvest in institutional protection (e.g., cybersecurity, rule of law enforcement, cross-border contract integrity)? Why do international trade shocks cause asymmetric equity responses depending on institutional exposure?

Section 4 shows how our model accounts for the deep institutional asym-

metries between the Chinese and American stock markets. The U.S. market reflects decentralized private ownership embedded in a liberal legal regime. In contrast, China's market functions as a tool of authoritarian extraction and macro-control. Chinese investors colloquially refer to themselves as "chives to be harvested"—an implicit recognition that the market is subordinated to party-state priorities. Our model interprets this not as noise or behavioral bias but as rational expectations in a coercive institutional environment. Similarly, the trade war and the weaponization of production chains (e.g., tariffs, rare earths, and chip bans) become institution-induced asset pricing shocks—manifestations of strategic investment and degradation of institutional capital across borders.

In sum, we advance a theory of asset pricing in which institutions are capital—accumulated, defended, and priced like any other productive asset. This institutional turn in asset pricing is no longer optional. It is required to understand risk, valuation, and capital allocation in a world where the rule of law is not a constant but a variable—subject to collapse, conflict, and strategic manipulation.

2 Model Setup

This section develops a continuous-time dynamic model in which institutional quality evolves endogenously as an investable state variable, alongside physical capital and consumption. The framework generalizes the classic consumption-based capital asset pricing model (CCAPM) introduced by Lucas (1978), Breeden (1979), and Hansen and Singleton (1983), as well as the production-based asset pricing models of Brock (1982), Cochrane (1991, 1996), and Jermann (1998).

In conventional CCAPM, the representative agent derives utility solely from consumption, and institutions are treated implicitly as perfectly credible scaffolding enabling frictionless intertemporal exchange. Production-based models expand this setup by explicitly modeling firms' investment in physical capital but continue to assume that property rights, enforcement, and legal frameworks are exogenously secure and costless to maintain. Even extensions incorporating habit formation (Campbell and Cochrane, 1999), recursive preferences (Epstein and Zin, 1989), or time-varying policy uncertainty (Pastor and Veronesi, 2012, 2013) do not endogenize institutions as accumulable and erodible assets.

In contrast, this model recognizes that institutions themselves are a form of capital, requiring deliberate allocation of resources to sustain their credibility and effectiveness. Accordingly, the economy at each instant is characterized by three endogenous state variables:

- $C(t)$: Aggregate consumption at time t.
- $K(t)$: The stock of physical capital.
- $\mathcal{I}(t)$: The stock of institutional capital, representing the strength of property rights, contract enforcement, and regulatory stability.

Production is governed by a Cobb-Douglas function in which institutional quality augments the productivity of physical capital:

$$Y(t) = A \cdot K(t)^{\alpha} \cdot \mathcal{I}(t)^{\beta},$$

where A > 0 is total factor productivity, $\alpha \in (0, 1)$ denotes the elasticity with respect to capital, and $\beta > 0$ captures the contribution of institutions. Unlike standard PCAPM approaches, in which output depends only on capital accumulation, this formulation implies that production collapses if institutions are neglected ($\mathcal{I} \to 0$), consistent with evidence from comparative development (Acemoglu, Johnson, and Robinson, 2001; North, 1990).

Physical capital evolves as in neoclassical production models (Brock, 1982; Cochrane, 1991):

$$dK(t) = \big[I_K(t) - \delta_K K(t)\big]\, dt,$$

where $I_K(t)$ is gross investment and $\delta_K > 0$ is the depreciation rate.

By contrast, institutional capital is modeled as a distinct stock with its own accumulation process:

$$d\mathcal{I}(t) = \big[I(t) - \delta_{\mathcal{I}}\, \mathcal{I}(t)\big]\, dt \quad + \quad \sigma_{\mathcal{I}}\, dW_{\mathcal{I}}(t),$$

where:

- $I(t)$ is investment in institutional capacity, chosen endogenously.
- $\delta_{\mathcal{I}} > 0$ represents depreciation of institutions through corruption, erosion of enforcement, or political decay.
- $\sigma_{\mathcal{I}} > 0$ captures volatility from exogenous shocks, such as geopolitical interference or policy reversals (Bekaert et al., 2016; Kelly et al., 2016).
- $W_{\mathcal{I}}(t)$ is a standard Brownian motion.

This specification generalizes traditional production models by recognizing that institutions are subject to both endogenous accumulation and exogenous uncertainty.

At each point in time, output is allocated among consumption, investment in physical capital, and investment in institutional capital:

$$Y(t)\, dt = C(t)\, dt + I_K(t)\, dt + I(t)\, dt.$$

Preferences are modeled as time-separable expected utility over consumption and institutional quality:

$$U\big(C(t), \mathcal{I}(t)\big) = \frac{C(t)^{1-\gamma}}{1-\gamma}\, \mathcal{I}(t)^{\theta},$$

where $\gamma > 0$ denotes the coefficient of relative risk aversion and $\theta > 0$ measures the direct welfare contribution of institutions. This formulation departs from both CCAPM and PCAPM in that institutions not only enable production but also enter directly into the utility derived from consumption, capturing the idea that secure and predictable environments enhance well-being beyond their impact on material output (North, 1990; Williamson, 2000).

The representative agent's problem is to choose paths $\{C(t), I_K(t), I(t)\}$ to maximize expected discounted utility:

$\max_{C,I_K,I} \quad E\left[\int_0^\infty e^{-\rho t}\, \frac{C(t)^{1-\gamma}}{1-\gamma}\, \mathcal{I}(t)^\theta\, dt\right]$,

subject to:

- The budget constraint,
- The capital accumulation equation,
- The institutional dynamics.

This setup nests canonical frameworks as special cases. Only when $\mathcal{I}(t)$ evolves endogenously through choice and shock does the framework generate novel predictions about institutional betas, time-varying discount rate volatility, and the risk premia associated with institutional decay and underinvestment.

This modeling innovation—treating institutions as dynamic, investable capital—provides the foundation for understanding how economies accumulate the legal and administrative capacity necessary to sustain consumption and production, and why their neglect or strategic erosion leads to valuation discounts and heightened macroeconomic risk.

3 Solution and Characterization of Equilibrium

To characterize the optimal dynamic allocation of consumption, physical investment, and institutional investment, we derive the Hamilton-Jacobi-Bellman (HJB) equation associated with the representative agent's problem. Let $V(K, \mathcal{I})$ denote the value function, representing the maximal expected discounted utility achievable from any current state $(K, \mathcal{I})$.

The Bellman principle implies that this function satisfies:

$$\rho V(K,\mathcal{I}) = \max_{C,\, I_K,\, I} \Big\{ \frac{C^{1-\gamma}}{1-\gamma}\, \mathcal{I}^\theta \quad + \quad V_K \left[I_K - \delta_K K\right] \quad + \quad V_{\mathcal{I}} \left[I - \delta_{\mathcal{I}} \mathcal{I}\right] \quad + \quad \frac{1}{2}\, \sigma_{\mathcal{I}}^2\, V_{\mathcal{I}\mathcal{I}} \Big\},$$

subject to the resource constraint:

$$C + I_K + I = A\, K^\alpha\, \mathcal{I}^\beta.$$

This formulation extends the HJB equations familiar from neoclassical growth models (Brock, 1982; Jermann, 1998) by introducing the additional control variable I, which governs the endogenous accumulation of institutional capital. Whereas in production-based models the accumulation of physical capital alone suffices to characterize the growth path of the economy, here the optimal path depends on how the agent allocates resources between maintaining productive capacity and sustaining the institutional infrastructure necessary to protect it.

Differentiating the HJB equation with respect to consumption yields the first-order condition:

$$C^{-\gamma}\, \mathcal{I}^\theta = \lambda,$$

where λ is the Lagrange multiplier associated with the budget constraint and coincides with the marginal value of wealth, V_K. This condition equates the

marginal utility of consumption to the marginal value of an additional unit of resources allocated to capital or institutions.

Differentiation with respect to physical investment gives:

$$V_K = \lambda.$$

Differentiation with respect to institutional investment yields:

$$V_{\mathcal{I}} = \lambda = V_K.$$

These expressions show that the agent perceives resources as fungible across consumption, capital accumulation, and institutional investment, so long as the marginal value is equated at the optimum. This condition is absent from all prior asset pricing frameworks: in CCAPM (Lucas, 1978; Mehra and Prescott, 1985), there is no comparable state variable $\mathcal{I}(t)$ to invest in; in production-based models (Cochrane, 1991, 1996), institutions are treated as exogenous, removing the strategic trade-off between investing in productive capital and protecting the institutional environment.

The evolution of the stochastic discount factor $M(t)$ follows from the intertemporal marginal rate of substitution:

$$M(t) = e^{-\rho t}\, C(t)^{-\gamma}\, \mathcal{I}(t)^{\theta}.$$

Applying Itô's Lemma gives:

$$\frac{dM(t)}{M(t)} = -\rho\, dt \quad - \quad \gamma\, \frac{dC(t)}{C(t)} \quad + \quad \theta\, \frac{d\mathcal{I}(t)}{\mathcal{I}(t)}.$$

In this expression, the final term is unique to our framework: institutional volatility enters directly into the dynamics of the discount factor, creating a priced risk factor not present in conventional CCAPM or PCAPM models. In other words, shocks to institutional capital propagate into marginal utility and risk premia in a way that cannot be captured by consumption volatility or production uncertainty alone.

The dynamics of the state variables are governed by:

$dK(t) = \big[I_K(t) - \delta_K K(t)\big]\, dt,$

$d\mathcal{I}(t) = \big[I(t) - \delta_{\mathcal{I}} \mathcal{I}(t)\big]\, dt + \sigma_{\mathcal{I}}\, dW_{\mathcal{I}}(t).$

The equilibrium of the model requires that the agent chooses $\{C(t), I_K(t), I(t)\}$ to satisfy:

1. The Euler equation for consumption:

$C^{-\gamma}\, \mathcal{I}^{\theta} = V_K.$

2. Equality of marginal values of capital and institutional investment:

$V_{\mathcal{I}} = V_K.$

3. The budget constraint:

$C + I_K + I = A\, K^{\alpha}\, \mathcal{I}^{\beta}.$

4. The stochastic laws of motion for capital and institutions.

The combination of these conditions implies the intertemporal allocations in which the agent continuously trades off the value of immediate consumption, productive capacity, and institutional quality.

From an asset pricing perspective, this structure leads to several distinctive predictions. Because the stochastic discount factor depends directly on $d\mathcal{I}(t)$, any asset whose cash flows covary with institutional shocks will exhibit a nonzero institutional beta. Unlike habit-formation CCAPM (Campbell and Cochrane, 1999) or production-based models (Cochrane, 1996), where risk premia are driven solely by consumption or investment volatility, this framework shows that time-varying institutional volatility and decay can explain cross-sectional and temporal variation in expected returns.

Formally, any tradable asset with payoff $dQ(t)$ satisfies:

$$E_t\big[M(t+dt)\,dQ(t)\big] = 0.$$

This pricing equation implies that in addition to traditional consumption and production risk, investors demand compensation for bearing exposure to institutional shocks. The dependence of $M(t)$ on $\mathcal{I}(t)$ generates valuation discounts for assets whose payoffs deteriorate when institutions weaken—a mechanism not accounted for by prior models, regardless of how sophisticated their preference specifications may be (Epstein and Zin, 1989; Campbell and Cochrane, 1999).

Altogether, this characterization demonstrates that when institutions are treated as endogenous, accumulable capital stocks, their dynamics are inseparable from consumption smoothing, capital accumulation, discount rate volatility, and the pricing of macroeconomic risk. This generalization of CCAPM and PCAPM frameworks provides a richer foundation for understanding persistent valuation discounts, the macro-financial consequences of institutional decay, and the endogenous risk premia arising from strategic geopolitical competition over the institutional environment itself.

4 Empirical Predictions and Applications

The institution-based asset pricing model offers a novel set of empirical predictions that depart significantly from those implied by the canonical consumption-based and production-based paradigms. It posits that institutional capital is a priced and investable asset whose dynamics—accumulation, depreciation, and volatility—affect both discount rates and production possibilities. These predictions can be tested across time, across sectors, and across political regimes.

First, the model predicts that observable institutional investment—measured through spending on legal infrastructure, contract enforcement, regulatory quality, and coercive stability—should forecast future output growth and consumption. Economies that underinvest in institutional maintenance should experience higher discount rates, lower productivity, and increased macro-financial fragility. These predictions align with historical episodes of state failure and are consistent with modern evidence on political risk and valuation discounts (Bekaert et al., 2016; Kelly et al., 2016).

Second, institutional depreciation and volatility (e.g., through political instability, authoritarian consolidation, or geopolitical conflict) generate a distinct source of systematic risk. As institutional shocks propagate through the stochastic discount factor, firms and sectors that rely heavily on cross-border rule of law and supply chain predictability will exhibit higher expected returns (institutional betas), particularly during periods of geopolitical stress.

Third—and more profoundly—this model provides a theoretical foundation for explaining cross-country differences in asset pricing mechanisms, especially between divergent political regimes. In the United States, stock markets operate under relatively liberal institutions: credible rule of law, decentralized private ownership, and enforceable contracts. In China, by contrast, the stock market is embedded within a party-controlled institutional structure that prioritizes state control, policy-driven market interventions, and political loyalty. The result is a socialist equity market that operates not as a price discovery mechanism but as a coercive fiscal instrument and propaganda device. Chinese retail investors often refer to themselves as chives to be harvested, highlighting widespread awareness that the market is manipulated by the party-state to extract and redistribute capital for regime goals.

Fourth, the model offers a rigorous framework to interpret the escalating economic conflict between China and the United States. The U.S.-China trade war is not merely a matter of comparative advantage or tariffs; it is a conflict between fundamentally incompatible institutional systems. The U.S. system is built on liberal, rules-based reciprocity. The Chinese system is grounded in party-state discretion, surveillance, and mercantilist exploitation. The weaponization of institutional asymmetries—through tariffs, export controls, rare earth restrictions, semiconductor bans, and forced technology transfers—has created an institution-induced shock to global asset pricing. The resulting uncertainty about institutional durability and cross-border contract enforcement raises discount rates, compresses valuations, and reprices risk across industries reliant on transnational rule of law.

Fifth, the model implies that cross-country and historical asset pricing comparisons must control for institutional dynamics. Traditional empirical approaches that abstract from institutional quality will systematically misprice assets, misestimate risk premia, and misdiagnose the sources of financial volatility. The model suggests that empirical strategies must now incorporate institutional volatility as a measurable and priced state variable, much like consumption growth or total factor productivity.

In sum, the institution-based asset pricing model creates a robust theoretical bridge between political economy and financial economics. It enables researchers and policymakers to interpret asset prices not merely as reflections of consumption preferences or capital productivity, but as forward-looking indicators of institutional capacity, geopolitical competition, and strategic regime behavior. For related macroeconomic models exploring the role of institutions in growth and development, see Liang and Zou, 2024; Zhan, Zhao, and Zou, 2024; Zhan and Zou, 2024, 2025; Sun and Zou, 2025; and Zou, 2025.

5 Conclusion

This paper has presented a new approach to asset pricing in which institutions are modeled as an endogenous capital stock rather than as an exogenous, immutable backdrop. By embedding institutional quality directly into the production function, the utility function, and the stochastic discount factor, this framework offers a comprehensive generalization of both the canonical Consumption-Based Capital Asset Pricing Model (Lucas, 1978; Breeden, 1979; Mehra and Prescott, 1985) and Production-Based Asset Pricing Models (Brock, 1982; Cochrane, 1991, 1996; Jermann, 1998).

In contrast to these earlier models—which assume perfectly credible institutions that never depreciate or require maintenance—our approach shows that the sustainability of property rights, enforcement, and regulatory stability depends on purposeful and continuous investment. This modeling choice is not merely a refinement but a foundational shift. Treating institutions as an endogenous, accumulable asset explains how economies can experience sudden collapses in output and consumption when institutional capital decays, why valuation discounts can persist in high-growth economies with weak institutional maintenance, and how geopolitical competition can propagate institutional shocks across production and financial systems.

The model yields several distinctive predictions. First, it demonstrates that institutional investment is a forward-looking determinant of both consumption growth and production growth, offering a new set of observable indicators that traditional models ignore. Second, it establishes that institutional volatility and depreciation create a distinct component of discount rate variation, giving rise to institutional betas that help explain persistent differences in expected returns across firms, sectors, and countries. Third, it shows that the intertemporal trade-off between consumption and institutional investment is central to understanding risk premia and macroeconomic resilience. These predictions align with empirical findings from studies of political risk and valuation (Bekaert et al., 2016; Kelly et al., 2016) but extend them by providing a micro-founded theory of why such risks are endogenous and how they are priced.

In highlighting the importance of institutional dynamics, this framework offers an explanation for empirical regularities that have remained outside the scope of both CCAPM and PCAPM. Specifically, it shows why economies that systematically underinvest in institutions—even while accumulating physical capital—remain exposed to recurrent episodes of discount rate volatility and valuation instability. It also provides a rigorous account of how strategic geopolitical rivalry and coercion can generate systemic macro-financial risk through institutional decay.

Future research can build on this foundation in several directions. One avenue is to calibrate the model quantitatively using cross-country and historical data on institutional investment and volatility, evaluating how much of the variation in consumption, production, and returns can be attributed to endogenous institutional dynamics. Another is to incorporate heterogeneous agents and political competition over institutional investment, connecting this framework to

theories of collective action and governance. A further direction is to explore how institutional betas can be measured in practice and incorporated into asset pricing models alongside conventional consumption and production risk factors.

By treating institutions as an asset—subject to accumulation, depreciation, and shocks—this paper provides a richer theoretical basis for understanding how economies create and sustain the conditions for prosperity, and why failure to maintain institutional capital remains one of the most persistent and consequential sources of financial and macroeconomic fragility. In doing so, it bridges gaps between asset pricing, macroeconomics, and institutional political economy, laying the groundwork for a new generation of research on the valuation of economies themselves.

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