A Quantitative Analysis of the Equity Return Consequences of Sovereign Default Risk

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Abstract

This paper evaluates the extent to which standard quantitative sovereign default models exhibit equity return responses around default risk spikes comparable to the data. It finds that they largely do not. Hébert and Schreger (2017) employ a high-frequency event study around legal rulings and report a 10% increase in default risk causes a 6% decline in firms' market value. A workhorse sovereign default model augmented with capital accumulation delivers only a 0.2% equity value drop. Several shortcomings explain this disconnect: during default, the absence of capital outflows and trade surpluses, dividend suspension, and the nominal depreciation, given Argentina's sizable devaluation.

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Sovereign default is one of the most disruptive events in international macroeconomics, yet mapping its economic costs into quantitative model predictions remains a fundamental challenge. A growing literature argues that the costs associated with default—including reputational damage, output loss, and financial market exclusion—are the primary forces that incentivize sovereigns to honor their external debt obligations, absent legal enforcement mechanisms. Accurately measuring and structurally interpreting these costs is therefore central to understanding sovereign debt sustainability and the design of debt contracts. Among the various approaches to measuring default costs, firm valuation offers a particularly clean identification strategy: changes in firm equity prices around sovereign default events capture market participants' real-time assessment of how default affects the productive capacity of the economy.

Hébert and Schreger (2017) exploit this insight by using the 2014 U.S. Supreme Court ruling on Argentina's defaulted bonds as a quasi-natural experiment to estimate the causal effect of sovereign default risk on firm valuation. They find that a 10% increase in the probability of default leads to a 6% decline in the value of Argentine equities. Extrapolating their finding to a full default event, their estimate implies that approximately 60% of Argentine firm value would be wiped out at default. This evidence provides the benchmark estimate of firm valuation costs of sovereign default. A natural next step is to understand the structural channels through which sovereign default risk transmits to firm values, and to assess whether standard quantitative sovereign default models—the workhorse framework for analyzing sovereign debt dynamics—generate firm valuation responses of this magnitude. Identifying which specific model features are responsible for the gap between model and data is essential for guiding future model development.

This paper addresses these questions by developing a quantitative small open economy model with sovereign default risk and capital accumulation. A key feature of the model is the explicit pricing of firm equity under two polar opposite assumptions about equity holders: one in which firms are fully owned by risk-neutral international investors, and one in which firms are fully owned by domestic households whose stochastic discount factor reflects their consumption smoothing motive. This dual perspective allows us to measure firm valuation responses to sovereign default risk under alternative assumptions about who bears the cost, and to identify how the pricing kernel of each type of investor shapes the transmission of default risk to equity prices. We use the model to conduct two event studies. First, we analyze the dynamics of firm valuation around the 2001 Argentina sovereign debt crisis to assess the extent to which the model captures the behavior of equity prices during an actual default episode. Second, following the methodology of Hébert and Schreger (2017), we construct stochastic impulse response functions to an unanticipated sovereign default risk news shock, calibrated to the 2014 U.S. Supreme Court ruling, to examine how sovereign default risk transmits to firm equity values. By comparing the model's predictions to both the historical episode and the empirical estimates of Hébert and Schreger (2017), we provide a systematic mapping of the structural channels that drive firm valuation dynamics around sovereign default events.

This paper makes three contributions. First, we provide the first structural mapping of the channels through which sovereign default risk transmits to firm valuation in a quantitative sovereign default model. While a large literature has developed quantitative sovereign default models to match business cycle moments and default frequencies, the implications of these models for firm valuation have received little attention. Our analysis reveals that the model generates a 0.18% decline in international equity values per 10 percentage point increase in default probability, compared to the empirically estimated 6% of Hébert and Schreger (2017), and that this gap is not simply a matter of calibration but rather it reflects specific and identifiable structural features of the standard framework. Extrapolating to a full default event, the model implies only a 1.8% decline in firm values compared to the 60% estimate of Hébert and Schreger (2017). Importantly, a portion of this gap is attributable to the nominal exchange rate depreciation embedded in the dollar-denominated equity index used by Hébert and Schreger (2017), a feature of the data on which standard real models are silent.

Second, we pinpoint and quantify two real channels that are absent from standard sovereign default models but critical for generating large drops in firm equity during default episodes. The first operates through the trade balance: during default episodes, countries typically run large trade surpluses as the private sector experiences capital outflows, but the autarky assumption in standard models generates the opposite pattern, preventing a large contraction in consumption and the associated decline in firm equity demanded by domestic households. The second channel concerns dividend policy: the consumption smoothing motive in standard models leads firms to increase dividend payments during default by cutting investment more than output, whereas in practice Argentine firms suspended dividend payments during the 2002–2005 debt restructuring period. Together, these two missing channels account for the bulk of the gap between model-implied and empirically measured real firm valuation costs of sovereign default.

Third, we clarify the appropriate empirical benchmark for comparing model-implied firm valuation responses to the estimates of Hébert and Schreger (2017). Their event study relies on the MSCI Argentina index, which is denominated in U.S. dollars[1] and therefore

[1] The MSCI Argentina index is based on Argentine firms' American Depositary Receipts (ADRs) traded

captures both the real costs of sovereign default and the effects of nominal exchange rate depreciation. Quantitative sovereign default models abstract from nominal frictions and nominal exchange rate dynamics—a deliberate focus on real economic costs rather than a limitation, though several recent contributions relax this assumption.[2] This makes the peso-denominated S&P Merval index the more natural empirical counterpart. The S&P Merval index declined by only 13.5% during the 2001 crisis, compared to 55.3% for the MSCI Argentina index, with the divergence largely attributable to the depreciation of the Argentine peso following the collapse of the currency board in January 2002. Consistently, during the fourth quarter of 2001, when the currency board was still intact, both indices declined by similar magnitudes of 14.9% and 17.6% respectively. This evidence suggests that the two indices measure different objects: the MSCI index captures both real and nominal costs, while the S&P Merval index is closer to the real cost measure targeted by quantitative models. The divergence between the two indices is driven by nominal exchange rate depreciation, a channel that is absent from quantitative sovereign default models by construction—not only in the standard one-sector framework, but also in two-sector models, which generate real exchange rate dynamics but continue to normalize the nominal exchange rate to unity. Our model, which generates a 10.9% decline in domestically-priced equity, comes considerably closer to matching the S&P Merval benchmark.

Our model enables a structural decomposition of firm valuation costs into cashflow and discount rate channels. We document a novel asymmetry in the passthrough of sovereign default risk to equity prices across international and domestic equity markets. The passthrough of sovereign default risk to international equity prices is nearly complete at the news shock stage: 97% of the total default realization cost is reflected at impact—consistent with risk-neutral pricing that immediately and fully reflects the higher default probability upon impact. Domestic equity, by contrast, incorporates only 5% of the total cost at the news shock stage: a full default news shock generates only a 0.21% decline against a total default realization decline of 4.10%. This near-complete attenuation of the passthrough to domestic equity at the news shock stage reflects the precautionary saving motive of domestic households: under a news shock, households anticipate a future downturn but remain solvent today, so precautionary saving in firm equity nearly fully

in New York, while the Merval index tracks stock prices on the Buenos Aires Stock Exchange. The two indices therefore differ not only in currency denomination but also in trading venue and investor base.

[2]Notable extensions include Na et al. (2018) on currency pegs, exchange rate devaluations, and sovereign default; Arellano, Bai, and Mihalache (2026) on endogenous nominal exchange rates and inflation; Hur et al. (2018) on inflation and exchange rates in the presence of default; Galli (2020) on nominal debt; and Roldán (2025) on aggregate demand and sovereign default.

offsets the large negative cashflow channel, deferring the bulk of the price adjustment to the moment of actual default realization. Upon actual default realization, the output loss reduces household income, collapsing the precautionary saving demand and generating a large price decline. The structural decomposition establishes that this mechanism operates entirely through the discount rate channel, which is strongly positive under the news shock—nearly fully offsetting the large negative cashflow channel—before reversing sharply to negative at realization, driving the bulk of the total domestic equity price decline. This two-stage reversal of the discount rate channel is the dominant driver of the pronounced difference in passthrough across markets, a pattern starkly absent in international markets governed by risk-neutral pricing.

Our findings contribute to several strands of the literature. The paper is most directly related to work on measuring the costs of sovereign default. Hébert and Schreger (2017) provide the benchmark empirical estimate of firm valuation costs that we seek to structurally interpret and complement. Farah-Yacoub et al. (2024) document the long-lasting negative effects of sovereign default on economic growth, finding reductions in growth rates of 1.5% even ten years after default. Asonuma et al. (2024) show that post-default restructurings are associated with prolonged GDP contractions of approximately 6 percentage points relative to pre-restructuring trends over the first three years. Hassan et al. (2024) provide complementary cross-country evidence using textual analysis of earnings conference calls, documenting that increases in perceived sovereign risk are associated with significant declines in equity prices and widening CDS spreads across both developed and emerging economies. Our paper complements this empirical literature by providing a structural framework for understanding which economic mechanisms drive these large and persistent costs, and by offering guidance on which empirical measures are most directly comparable to quantitative model predictions.

Our model builds on the standard sovereign default framework pioneered by Eaton and Gersovitz (1981) and developed quantitatively by Aguiar and Gopinath (2006) and Arellano (2008). We incorporate long-term debt following Hatchondo and Martinez (2009) and capital accumulation following Gordon and Guerron-Quintana (2018). The inclusion of capital accumulation is important for our analysis because it allows us to distinguish between the effects of default risk on investment dynamics and firm valuation, channels that are conflated in models without physical capital. Park (2017) studies sovereign default with capital accumulation, focusing on how default incentives are shaped by the capital stock. Arellano et al. (2018) develop a two-sector sovereign default model in which default triggers sectoral reallocation of capital away from the traded sector, generating persistent output contractions that outlast the exclusion period. Alessandria et al. (2020)

introduce endogenous migration into a sovereign default model with capital accumulation, showing that labor and capital outflows jointly amplify default risk and generate more prolonged recessions than the standard framework predicts. A related and growing strand examines the interaction between sovereign default risk and private investment distortions, including Song and Mihalache (2026), who ask whether private investment is sufficient or excessive from the point of view of an impatient sovereign, and Esquivel (2024), who studies underinvestment and misallocation. None of these papers, however, examines the implications for firm valuation.

Our paper is also related to the empirical literature on firm-level costs of sovereign default. Andrade and Chhaochharia (2018) use stock market data to test cross-sectional implications of sovereign default theories, finding that firms vulnerable to financial intermediation disruption are particularly sensitive to changes in sovereign credit spreads, with structural estimation implying a 12% destruction of productive asset values for the most exposed firms. Jeanneret (2017) develops a two-country asset pricing model showing that sovereign credit risk depresses equity prices internationally and raises their volatility. Arellano, Bai, and Bocola (2026) combine a quantitative sovereign default model with firm- and bank-level data to measure the output costs of sovereign risk through the bank lending channel; unlike these studies, our paper focuses on the implications of sovereign default risk for firm equity valuation rather than firm-level output. Our paper complements this literature by embedding firm equity valuation directly into a quantitative sovereign default model, identifying the structural channels through which default risk transmits to equity prices, and clarifying which empirical equity index provides the appropriate counterpart for quantitative model comparison.

The remainder of the paper is organized as follows. Section 1 presents the model environment and recursive formulation, including the firm valuation framework under both international and domestic investor perspectives. Section 2 presents the calibration, quantitative results, event study analysis, and a cashflow and discount rate decomposition of firm valuation responses. Section 3 concludes.

1 Model

The model builds on the sovereign default framework of Gordon and Guerron-Quintana (2018), augmented to incorporate firm equity pricing under both international and domestic investor perspectives. The key departure from the standard framework is the explicit modeling of firm valuation as a function of sovereign default risk, which allows us to examine the structural channels through which default risk transmits to equity prices.

The sovereign acts as a benevolent social planner with full control over investment decisions through policy instruments such as investment subsidies and corporate taxes, following the tradition of centralized capital accumulation models in the sovereign default literature. We assume competitive, risk-neutral, and deep-pocketed international lenders.

1.1 Model environment

The production of the economy is determined by three factors: TFP productivity shocks z, capital stock K, and labor supply L. Output Y is determined by the Cobb-Douglas production function: $Y = zK^{\alpha}L^{1-\alpha}$, where α denotes capital's share of output. The transitory shock to productivity z follows an AR(1) Markov process:

$$\log(z') = \rho_z \log(z) + \epsilon_z, \quad \epsilon_z \sim \mathcal{N}(0, \sigma_z^2)$$

where $|\rho_z| < 1$ represents the persistence of transitory productivity shocks and ϵ_z is an i.i.d. draw from a normal distribution with mean 0 and standard deviation σ_z.

The period utility[3] for the private sector is: $u(c) = c^{1-\sigma}/(1-\sigma)$, where c is consumption and σ is the coefficient of relative risk aversion. For simplicity, we assume that the labor input is supplied inelastically and we normalize it to $L = 1$.

The quadratic adjustment cost for capital investment follows Gordon and Guerron-Quintana (2018): $\Theta(K, K') = \frac{\theta}{2}(K' - K)^2$, where θ is the coefficient for adjustment costs. Adjustment costs are necessary to discipline the sovereign's incentive to substitute borrowing for investment, as the sovereign would otherwise treat capital investment as a cheaper borrowing instrument due to its one-to-one conversion rate (Gordon and Guerron-Quintana, 2018).

There are two penalties for defaulting on sovereign debt. First, if the sovereign defaults, it is temporarily excluded from international financial markets. During autarky, the sovereign cannot borrow from international lenders and recovers financial market access with constant probability λ. Second, during autarky, the economy experiences depressed productivity, captured in reduced-form by the cost function following Chatterjee and Eyigungor (2012) and Gordon and Guerron-Quintana (2018): $h(z) = z - \max\{0, \iota_0 z +$

[3]We explored Epstein-Zin preferences in an earlier version of this paper. These results are available upon request. Despite the more flexible separation of risk aversion and intertemporal elasticity of substitution, equity price responses were quantitatively indistinguishable from the CRRA baseline. The intuition is straightforward: Epstein-Zin preferences amplify asset price responses primarily through the long-run risk channel (Bansal and Yaron, 2004), but the standard sovereign default framework features only transitory TFP shocks with no persistent growth component. In the absence of long-run risk, separating risk aversion from the intertemporal elasticity of substitution has negligible effects on equity pricing.

$\iota_1 z^2\}$, where $\iota_0 < 0$ and $\iota_1 > 0$ are coefficients of the output cost function. This output cost has asymmetric losses in which low productivity yields low output costs while high productivity yields larger output costs.

In each period, the timing of events follows this sequence: (i) after productivity shocks z are realized, the sovereign decides whether to default on its debt; (ii) conditional on repayment, the sovereign selects new issuance of bonds B'; (iii) the benevolent government decides capital investment K' and consumption C based on its borrowing and default decision; (iv) equity prices are determined in international and domestic equity markets given the government's decisions.

The exogenous state variable is today's total factor productivity z. The endogenous state variables are the capital stock K and sovereign debt B. During default, the sovereign has no debt outstanding, so the relevant state reduces to (z, K).

The Sovereign. The sovereign exclusively participates in international financial markets and decides whether to default on its debt. Conditional on repaying, the sovereign issues non-contingent, long-term bonds B' that stochastically mature with i.i.d. probability ϕ following Hatchondo and Martinez (2009). The sovereign pays debt service κ each period, which includes matured debt ϕ and coupon payment r. Let V be the benevolent government's value of good financial standing:

$$V(z, K, B) = \max_{d \in \{0,1\}} \left[(1-d) V^r(z, K, B) + d V^d(z, K) \right] \tag{1}$$

where V^r denotes the value of repayment, V^d is the value of default, and d is the default decision.

When the sovereign honors its debt obligation, it chooses a new debt position B' and allocates available resources to consumption C and capital investment K'.[4] Let V^r be the value of repaying debt:

$$V^r(z, K, B) = \max_{K', B'} \left\{ u(C) + \beta \mathbb{E}_{z'|z} V(z', K', B') \right\} \tag{2}$$

$$\text{s.t.} \quad C + K' + \Theta(K', K) + G = zK^\alpha + (1-\delta)K - \kappa B + q(z, K', B')[B' - (1-\phi)B]$$

where C denotes consumption, β is the discount factor, Θ is the capital investment ad-

[4] We abstract from the self-fulfilling debt crisis mechanism of Galli (2021), in which lenders price sovereign debt before capital allocations are determined, creating a feedback loop between pessimistic lender beliefs, fiscal austerity, and depressed investment. In our model, capital investment and debt issuance are determined simultaneously, ruling out this channel.

justment cost, G is government spending, κ is debt service, and q is the price schedule of sovereign long-term debt.

When the sovereign defaults, it is instantly excluded from international debt markets and loses a fraction of its output. It recovers good financial standing with constant probability λ and, after regaining market access, has no debt (full repudiation of defaulted debt). Let V^d be the value of default:

$$V^d(z, K) = \max_{K'} \left\{ u(C) + \beta \mathbb{E}_{z'|z} \left[(1-\lambda) V^d(z', K') + \lambda V(z', K', 0) \right] \right\} \tag{3}$$

$$\text{s.t.} \quad C + K' + \Theta(K', K) + G = h(z)K^\alpha + (1-\delta)K$$

where $h(z)$ denotes penalized TFP due to default.

International Financial Markets. International lenders are competitive, risk-neutral, and deep-pocketed, pricing sovereign debt at break-even relative to the risk-free rate r_f. Let q be the sovereign's long-term bond price schedule:

$$q(z, K', B') = \frac{1}{1+r_f} \mathbb{E}_{z'|z} \left[(1 - \mathcal{D}(z', K', B')) \left\{ \kappa + (1-\phi) q(z', K'', B'') \right\} \right] \tag{4}$$

where $B'' = \mathcal{B}(z', K', B')$, $K'' = \mathcal{K}^r(z', K', B')$, $\mathcal{D}$ denotes the sovereign's default policy, $\mathcal{B}$ denotes the sovereign's borrowing policy, and $\mathcal{K}^r$ is the sovereign's capital investment policy during repayment.

Recursive Markov Equilibrium. Given states (z, K, B), the recursive Markov equilibrium consists of government value functions $V(z, K, B)$, $V^r(z, K, B)$, $V^d(z, K)$, government policy functions for default $\mathcal{D}(z, K, B)$, borrowing $\mathcal{B}(z, K, B)$, investment $\mathcal{K}^r(z, K, B)$ and $\mathcal{K}^d(z, K)$, and bond price schedule $q(z, K', B')$, such that:

1. Given the bond price schedule and government value functions, government decision rules $\mathcal{D}$, $\mathcal{K}^r$, $\mathcal{K}^d$, $\mathcal{B}$ solve government problems (1), (2), (3).

2. Given the bond price schedule and government decision rules, government value functions V, V^r, V^d satisfy government problems (1), (2), (3).

3. Given government decision policies, the bond price schedule q satisfies international lenders' break-even condition (4).

1.2 Firm Valuation

The value of firm equity reflects two components: the stochastic discount factor of the equity holder, and the stream of expected future dividend payments. In Section 2.5, we exploit this structure to decompose equity price changes into cashflow and discount rate channels, using the sequential representation of equity prices to cleanly separate the contribution of dividend changes from the contribution of stochastic discount factor variation. By comparing equity prices under risk-neutral international investors and risk-averse domestic households, we isolate how the consumption smoothing motive of domestic households generates an asymmetric response to sovereign default risk news shocks relative to international markets.

The firm valuation framework is constructed to replicate the event study environment of Hébert and Schreger (2017). Specifically, at the end of the period after all borrowing and investment decisions have been completed, we introduce a one-time unanticipated sovereign default risk news shock that directly increases the one-period-ahead default probability by η. The resulting change in equity prices reflects solely the effect of higher default probability, holding resource allocation constant. This clean identification allows direct comparison of our model-implied firm valuation responses with the empirical estimates of Hébert and Schreger (2017).

International Firm Equity Markets. In the international firm equity markets, the value of a firm's equity is equivalent to the expected returns of holding firm equity discounted by the risk-neutral international investor's pricing kernel. Risk-neutral international investors hold firms' equity when expected returns satisfy the break-even condition relative to risk-free rates. The dividend paid to equity holders is determined by output net of labor costs and capital investment. Specifically, we denote by X^r and X^d the dividends paid during repayment and autarky periods respectively, defined as:

$$\begin{aligned} X^r(z, K, B) &= \alpha z K^\alpha + (1-\delta)K - K'_r - \Theta(K'_r, K) \\ X^d(z, K) &= \alpha h(z) K^\alpha + (1-\delta)K - K'_d - \Theta(K'_d, K) \end{aligned}$$

where $K'_r = \mathcal{K}^r(z, K, B)$, $K'_d = \mathcal{K}^d(z, K)$.

Let P_r be the international investor's price of firm equity when the sovereign repays its debt today:

$$P_r(z,K,B) = \frac{1}{1+r_f}\mathbb{E}_{z'|z}\Big[\mathcal{D}(z',K',B')\left\{X^d(z',K') + P_d(z',K')\right\}$$
$$+ (1-\mathcal{D}(z',K',B'))\left\{X^r(z',K',B') + P_r(z',K',B')\right\}\Big] \tag{5}$$

where $X^d(z',K') = \alpha h(z')K'^{\alpha} + (1-\delta)K' - K''_d - \Theta(K''_d, K')$, $X^r(z',K',B') = \alpha z' K'^{\alpha} + (1-\delta)K' - K''_r - \Theta(K''_r, K')$, $B' = \mathcal{B}(z,K,B)$, $K' = \mathcal{K}^r(z,K,B)$, $K''_d = \mathcal{K}^d(z',K')$, $K''_r = \mathcal{K}^r(z',K',B')$.

Let P_d be the international investor's price of firm equity when the sovereign defaults:

$$P_d(z,K) = \frac{1}{1+r_f}\mathbb{E}_{z'|z}\Big[(1-\lambda)\left\{X^d(z',K') + P_d(z',K')\right\}$$
$$+ \lambda\left\{X^r(z',K',0) + P_r(z',K',0)\right\}\Big] \tag{6}$$

Domestic Firm Equity Markets. In the domestic firm equity markets, the household fully owns the representative firm. The value of firm equity is equivalent to the expected returns from a share of the firm discounted by the domestic household's stochastic discount factor. The equity market clears when the household's stochastic discount factor satisfies $m_{r,r} = \beta u'(C^r(z',K',B'))/u'(C^r(z,K,B))$, and analogously for the other transition kernels, ensuring that the household's Euler equation holds with equality. The household discounts future payoffs using stochastic discount factors that depend on the transition between repayment and default states. We define four pricing kernels:

$$m_{r,r} = \beta\frac{u'(C^r(z',K',B'))}{u'(C^r(z,K,B))}, \quad m_{r,d} = \beta\frac{u'(C^d(z',K'))}{u'(C^r(z,K,B))}$$
$$m_{d,r} = \beta\frac{u'(C^r(z',K',0))}{u'(C^d(z,K))}, \quad m_{d,d} = \beta\frac{u'(C^d(z',K'))}{u'(C^d(z,K))}$$

where the first subscript denotes the current period's financial status (repayment r or autarky d) and the second subscript denotes the next period's financial status. The derivation of these pricing kernels from household optimization is provided in Appendix C. Using these kernels, let Q_r be the domestic households' price of firm equity when the sovereign repays its debt today:

$$Q_r(z,K,B) = \mathbb{E}_{z'|z}\Big[\mathcal{D}(z',K',B')\, m_{r,d}\left\{X^d(z',K') + Q_d(z',K')\right\}$$
$$+ (1-\mathcal{D}(z',K',B'))\, m_{r,r}\left\{X^r(z',K',B') + Q_r(z',K',B')\right\}\Big] \tag{7}$$

Let Q_d be the domestic households' price of firm equity when the sovereign defaults:

$$Q_d(z, K) = \mathbb{E}_{z'|z}\Big[(1-\lambda)\, m_{d,d} \left\{X^d(z', K') + Q_d(z', K')\right\} \\ + \lambda\, m_{d,r} \left\{X^r(z', K', 0) + Q_r(z', K', 0)\right\}\Big] \tag{8}$$

Sovereign Default Risk News Shock. We introduce a one-time unanticipated sovereign default risk news shock, denoted $\eta \in [0, 1]$, which directly increases the one-period-ahead default probability. This shock is designed to replicate the legal rulings that increased Argentina's default probability in Hébert and Schreger (2017). The shock arrives after the sovereign completes all decisions on borrowing, consumption, and investment, so it affects equity prices solely through the probability of default with no re-optimization of resource allocation. This framework allows direct quantification of the decrease in firm value when default probability increases, holding all other factors constant.

Let $\tilde{P}_r$ be the equity price after the sovereign default risk news shock in the international equity markets when the government repays:

$$\tilde{P}_r(z, K, B, \eta) = \frac{1}{1+r_f}\mathbb{E}_{z'|z}\Big[\tilde{\mathcal{D}}(z', K', B', \eta)\left\{X^d(z', K') + P_d(z', K')\right\} \\ + (1-\tilde{\mathcal{D}}(z', K', B', \eta))\left\{X^r(z', K', B') + P_r(z', K', B')\right\}\Big] \tag{9}$$

where $\tilde{\mathcal{D}}(z', K', B', \eta) = \min\{1, \mathcal{D}(z', K', B') + \eta\}$. The effect of the sovereign default risk news shock on firm valuation in international equity markets is measured by $\tilde{P}_r(z, K, B, \eta) - P_r(z, K, B)$.

The analogous expression for domestic equity markets is:

$$\tilde{Q}_r(z, K, B, \eta) = \mathbb{E}_{z'|z}\Big[\tilde{\mathcal{D}}(z', K', B', \eta)\, m_{r,d}\left\{X^d(z', K') + Q_d(z', K')\right\} \\ + (1-\tilde{\mathcal{D}}(z', K', B', \eta))\, m_{r,r}\left\{X^r(z', K', B') + Q_r(z', K', B')\right\}\Big] \tag{10}$$

The effect of the sovereign default risk news shock on domestic firm valuation is measured by $\tilde{Q}_r(z, K, B, \eta) - Q_r(z, K, B)$.

2 Quantitative Analysis

We calibrate the model parameters to Argentine data from 1993Q1 to 2001Q4 and analyze how the model captures the effects and dynamics of sovereign default events compared to the 2001 Argentina sovereign debt crisis. We then examine how sovereign default risk news shocks affect the value of firms in international and domestic equity markets by constructing event analysis of the U.S. legal ruling on Argentina's defaulted bonds on June 16, 2014.

2.1 Calibration

We calibrate the model to quarterly Argentine data from 1993Q1 to 2001Q4, a period that captures the pre-default dynamics of the Argentine economy while avoiding the structural break associated with the 2001 crisis (December 26, 2001). The calibration strategy follows two steps. First, we set parameters that can be directly identified from the data or from standard values in the literature. Second, we jointly calibrate the remaining parameters to match key business cycle and sovereign default moments of the Argentine economy. Table 1 summarizes the directly calibrated parameters and Table 2 presents the jointly calibrated parameters alongside their target moments.

Following the common value used in the literature, the coefficient of relative risk aversion σ is set to 2.0 and the capital depreciation rate δ to 0.02. The constant probability of regaining market access from autarky λ is set to 0.05, corresponding to a 5-year average exclusion period (Tomz and Wright, 2013). The fraction of maturity ϕ is set to 0.05 for a 5-year Macaulay duration, the value from Chatterjee and Eyigungor (2012). The risk-free rate r_f is set to 0.01 from the U.S. government bond yield. The constant government expenditure G is set to 0.14 to match the G/Y ratio (0.13). The capital income share α is 0.56, consistent with the share of labor compensation in GDP of 0.44 from the Penn World Table, version 10.01.

We estimate the productivity parameters for the period 1993Q1 to 2001Q4 using Argentina's GDP and capital stocks from the IMF's Investment and Capital Stock Dataset (ICSD). From this estimation, the standard deviation of innovation to transitory shocks σ_z is 0.02 and the persistence of transitory shocks ρ_z is 0.90.

The discount factor β, the coefficient for capital adjustment costs θ, and the coefficients for the quadratic penalty functions ι_0 and ι_1 are jointly selected to match four Argentine target moments: the investment-to-GDP ratio (0.19), the relative volatility of investment to output (2.84), the debt-to-GDP ratio (0.25), and the mean of sovereign spreads (8.17). The resulting parameter values are as follows: the discount factor β is set to 0.96, the coefficient for capital adjustment costs θ is set to 0.9, and the penalty function coefficients ι_0 and ι_1 are set to -0.61 and 0.69, respectively.

	Value	Description
Preference		
σ	2.0	CRRA
Fiscal policy and international markets		
G	0.14	Mean public spending to GDP
r^f	0.01	International risk-free rate
ϕ	0.05	Macaulay duration of debt
λ	0.05	International market exclusion
κ	$\phi + r^f$	Normalization, $q^f = 1$
Production and productivity		
α	0.56	Income shares
δ	0.02	Capital depreciation
ρ_z	0.90	Persistence of TFP
σ_z	0.02	Volatility of TFP

Table 1: Parameters Set Externally

	Value	Target	Data	Model
β	0.96	Investment to GDP	0.19	0.19
θ	0.90	Relative volatility of investment	2.84	2.84
ι_0	-0.61	Debt to GDP	0.25	0.26
ι_1	0.69	Bond yield spread	8.17	8.21

Table 2: Parameters Set Internally

2.2 Results

We solve the model using the taste shock augmentation proposed by Dvorkin et al. (2021) and Mihalache (2020) to resolve the convergence issues associated with long-term debt models documented by Chatterjee and Eyigungor (2012). The computational details are provided in Appendix A. To construct model moments, we simulate the model for 1,000,000 periods and discard the first 1,000 periods. We then calculate moments based on all periods of good financial standing, excluding the 5-year recovery periods following default events. We exclude these recovery periods because our model abstracts from debt restructuring and assumes full debt repudiation, generating an unusually negative trade balance during the initial periods after regaining market access. Table 3 reports the model moments alongside the corresponding data moments.

The model successfully replicates the key business cycle and sovereign default moments of the Argentine economy. The consumption-output ratio is 0.66, close to the actual

Moment	Data	Model
Ratios to GDP		
Debt	0.25	0.26
Capital stock	—	2.31
Consumption	0.69	0.66
Investment	0.19	0.19
Yield spread and default (%)		
Mean spread	8.17	8.21
St dev spread	4.89	3.56
Default probability	—	5.85
Standard deviations, relative to GDP		
Consumption	1.11	0.97
Investment	2.84	2.84
Correlations with GDP		
Consumption	0.97	0.97
Investment	0.99	0.76
Trade balance	−0.58	−0.20
Spread	−0.61	−0.40

Table 3: Model Statistics

NOTES: Data moments are mean values of Argentina 1993Q1–2001Q4. Model moments are constructed from 1,000,000 simulated periods excluding default and 5-year recovery periods.

data ratio of 0.69, and the model shows procyclical consumption and capital investment and countercyclical spreads and trade balance, consistent with the data. The model also closely matches the mean and standard deviation of sovereign spreads. These results provide confidence that the model captures the salient features of the Argentine economy relevant for our event study analysis.

2.3 2001 Argentina Sovereign Debt Crisis

We begin our event analysis by examining the dynamics of firm valuation around the 2001 Argentina sovereign debt crisis. This episode provides a natural benchmark for assessing the model's ability to capture the behavior of equity prices during an actual default, as it features sharp declines in firm equity, large macroeconomic disruptions, and significant currency depreciation. Zhang (2003) documents that 1-year risk-neutral default probabilities of Argentine sovereign debt remained below 10% in the first quarter of 2001, rose to 50% on December 5, 2001, and reached 100% with the default announcement on December 26, 2001.

We construct a panel of 2,017,959 units for 10-year periods (40 periods) selected from the 200,000,000-period simulated series. In each unit, the sovereign honors its debt obligation during the first five years (20 periods) and then defaults at the beginning of year 6 (period 21). We measure percentage changes in model moments from one year before default events to the period of default, corresponding to 2001Q1–2002Q1 in Argentina. To align with the 15.2% output decline during the 2001 sovereign default crisis, we select 12,243 units with similar output changes. Table 4 reports the results. Appendix B reports the unconditional average across all 2,017,959 default episodes as a robustness check, confirming that the 2001 Argentina episode represents a severe tail realization rather than the typical default in the model.

Moment	Data	Model	Div. Susp.
Business cycles (%)			
GDP	−15.2	−15.2	−15.2
Consumption	−17.3	−3.9	−17.3
Investment	−45.0	−49.6	−49.6
Dividend	—	6.4	−20.1
Equity prices (%)			
International market	−55.3	−3.4	−6.4
Domestic market	−13.5	−10.9	−34.0
Ratios to GDP (percentage point)			
Consumption	−1.7	8.5	−1.6
Investment	−6.0	−9.6	−9.6
Trade balance	8.4	−1.0	9.2

Table 4: 2001 Argentina Debt Crisis

NOTES: The "Data" column reports percentage changes from Q1.2001 to Q1.2002. Model moments are constructed by means of 12,243 simulation samples with 10 years. Changes in model variables are measured from period 17 to period 21. The "Div. Susp." column reports a partial equilibrium counterfactual in which dividends paid to equity holders during default are reduced by 25%, calibrated to match the 17.3% consumption decline observed in the data. All other equilibrium objects—output, investment, and the sovereign's decision rules—are held fixed at their baseline values; only the dividend payout and household consumption are adjusted. By the national accounting identity $TB/Y = 1 - (C + I + G)/Y$, holding output, investment, and government spending fixed, the reduction in household consumption directly reduces domestic absorption and thereby improves the trade balance. Argentina's exchange controls imposed in late 2001 severely curtailed firms' ability to distribute earnings to shareholders throughout the debt restructuring period (International Monetary Fund, 2003).

The event analysis yields two sets of findings. The first concerns what the model matches: the investment collapse is replicated precisely (-49.6% in the model against -45.0% in the data), confirming that the model's real-side mechanics—the interaction of output costs, capital adjustment costs, and the sovereign's intertemporal optimization—correctly account for the investment dynamics during the default episode. This is a non-trivial result given that the model was not calibrated to default-period investment behavior.

The second set of findings concerns the systematic divergence between model and data for consumption, the trade balance, and dividend payments. Crucially, these divergences are not random but exhibit a coherent pattern that directly identifies two missing structural channels. We document these findings in turn, as each provides diagnostic evidence for the extensions needed to bring the model closer to the data.

The first finding concerns the trade balance and consumption. In the data, the trade balance-to-GDP ratio increased by 8.4 percentage points during the default, reflecting large capital outflows by the private sector. In the model, the trade balance-to-GDP ratio falls by 1.0 percentage points—an opposite-sign prediction. This systematic reversal is a direct and transparent implication of the autarky assumption: by cutting off access to international financial markets at default, the model eliminates the capital outflow channel entirely. The downstream consequence is equally stark: consumption rises by 3.9% in the model while it falls by 17.3% in the data. This opposite-sign prediction for consumption is itself a finding of independent interest, as it reveals that the standard autarky assumption does not merely attenuate the consumption response to default—it reverses its sign. The domestic household equity demand that depends on this consumption contraction is therefore fundamentally absent from the standard framework. Incorporating private sector access to international capital markets—as in the sudden stop literature following Mendoza (2010)—would be required to generate endogenous capital outflows and the associated consumption contraction during default. We leave this extension to future work, as it requires a fundamentally different model architecture.

The second finding concerns dividend policy. The consumption smoothing motive in the model leads firms to cut investment more than output during default, generating a 6.4% increase in dividends. This stands in direct contrast to the dividend suspensions widely observed among Argentine firms during the 2002–2005 debt restructuring period, a period characterized by severe financial distress and capital controls that sharply curtailed firms' ability to distribute earnings (International Monetary Fund, 2003). To assess the quantitative contribution of this channel, we construct a partial equilibrium dividend suspension counterfactual. Holding the sovereign's equilibrium decision rules and all other allocations fixed, we reduce dividends paid to equity holders during default by 25%. This value is calibrated so that the implied reduction in household consumption matches the 17.3% decline observed in the data. By the national accounting identity $TB/Y = 1 - (C + I + G)/Y$, holding output, investment, and government spending fixed, the reduction in household consumption directly reduces domestic absorption and thereby improves the trade balance. Under this counterfactual, dividends fall by 20.1%, the consumption-to-GDP ratio declines by 1.6 percentage points, and the trade balance-to-GDP ratio improves by 9.2 percentage points—close to the 8.4 percentage point increase observed in the data. The international equity price declines by 6.4%, roughly double the baseline model's 3.4%, while the domestic equity price falls by 34.0%. We note that the 34.0% decline in domestically-priced equity is large relative to the 13.5% S&P Merval benchmark, reflecting the fact that this partial equilibrium counterfactual is calibrated to match the full 17.3% consumption decline in the data—a severe realization that pushes the domestic pricing kernel to an extreme. The counterfactual should therefore be interpreted as an illustrative upper bound rather than a precise quantitative prediction. Nevertheless, the exercise establishes that the dividend suspension channel can meaningfully amplify declines in both international and domestic equity prices beyond what the baseline model generates, and that domestic equity is particularly sensitive to this channel through the consumption-based pricing kernel.

Regarding equity price responses, the appropriate comparison depends critically on the currency denomination of the index. For domestically-priced equity, the baseline model generates a 10.9% decline against a 13.5% decline in the peso-denominated S&P Merval index, a gap that is largely attributable to the two real channels identified above. For internationally-priced equity, a direct comparison of the model's 3.4% decline with the MSCI Argentina index's 55.3% decline would suggest a far larger discrepancy. However, a substantial portion of the MSCI Argentina decline is caused by the nominal depreciation of the Argentine peso rather than real economic costs.

The close relationship between the MSCI–Merval divergence and the nominal exchange rate is evident throughout the sample. Under the currency board regime, the nominal exchange rate was fixed and both indices moved together: during the fourth quarter of 2001, the MSCI Argentina index and the S&P Merval index declined by comparable magnitudes of 14.9% and 17.6% respectively.[5] It was only after the collapse of the currency board in January 2002—when the Argentine peso depreciated sharply—that the two indices diverged dramatically. The dollar-denominated MSCI index absorbed the full nominal depreciation, while the peso-denominated S&P Merval did not. This

[5] Both indices are converted to real terms using their respective CPIs: the U.S. CPI for the MSCI Argentina index and the Argentine CPI for the S&P Merval index.

pattern strongly supports the interpretation that the MSCI–Merval gap reflects nominal, rather than real, cost differences. This interpretation is further corroborated by the correlation between quarterly nominal exchange rate changes and equity returns over the post-currency-board period 2002–2019. The correlation between peso depreciation and MSCI Argentina returns is -0.40, whereas the corresponding correlation with S&P Merval returns is essentially zero at $+0.03$, consistent with the interpretation that the dollar-denominated index mechanically incorporates nominal exchange rate movements that the peso-denominated index does not. The S&P Merval index, therefore, provides the appropriate benchmark for model comparison, and against this benchmark the model performs considerably better.

Taken together, the event analysis of the 2001 crisis delivers three findings that structure the remainder of the paper. First, the model accurately replicates the real investment collapse, validating its core mechanics. Second, the opposite-sign predictions for consumption and the trade balance directly identify the autarky assumption as the source of a missing capital outflow channel, with quantitatively large implications for equity demand. Third, the model's endogenous prediction of rising dividends identifies a missing dividend suspension channel whose direction is systematically opposite to what Argentine firms did during the restructuring period.

2.4 2014 U.S. Supreme Court Legal Ruling

Having established the structural channels through which the model and data diverge during an actual default episode, we now turn to the central quantitative experiment of the paper: examining how an unanticipated sovereign default risk news shock transmits to firm valuation, in the spirit of Hébert and Schreger (2017). On June 16, 2014, the U.S. Supreme Court denied Argentina's appeals regarding its obligations to holdout creditors including NML Capital, increasing Argentina's probability of default. The 2014 ruling provides an ideal event for this analysis because it represents a shock to default probability that is plausibly exogenous to the underlying economic fundamentals of Argentina, allowing clean identification of the default risk channel in both the data and the model.

We construct stochastic impulse response functions (IRFs) to a sovereign default risk news shock following the method of Koop et al. (1996). We simulate a panel of 100,000 independent countries ("units") for 110 years. During the first 100 years, the economy follows its underlying Markov chain process without sovereign default risk news shocks, allowing the cross-sectional distribution to converge to the model's ergodic distribution. At the end of year 100 (the impact period, normalized to 0), we expose all units of the panel to a sovereign default risk news shock calibrated to a 10 percentage point increase in the one-period-ahead default probability. The shock occurs after all borrowing and investment decisions are made, so there is no opportunity for re-optimization; the resulting drop in asset prices at the end of year 100 is solely due to the increased default risk. From year 101 onward, the economy follows the Markov process without further disturbance. Table 5 reports the results.

	Data ($\eta = 10\%$)	Model ($\eta = 10\%$)	Model ($\eta = 100\%$)
Equity prices (%)			
International market	−6.0	−0.18	−1.79
Domestic market	—[a]	−0.02	−0.21

Table 5: 2014 U.S. Supreme Court Legal Ruling

NOTES: The "Data" column reports the estimation from Hébert and Schreger (2017), based on a 10 percentage point increase in default probability. The $\eta = 10\%$ model column is directly comparable to the data column. The $\eta = 100\%$ model column reports the equity price response to a news shock that increases the one-period-ahead default probability to certainty, and is comparable to the 60% figure implied by extrapolating the estimate of Hébert and Schreger (2017). The changes in firm value in the model are constructed by means of units of the panel, restricting to units with no default during the 5 years preceding the impact year.

[a] The natural empirical counterpart for the domestic equity response would be the peso-denominated S&P Merval index around the June 16, 2014 ruling. Replicating the event study of Hébert and Schreger (2017) using the S&P Merval requires access to their dataset, which was not available to us.

The impulse response functions to the sovereign default risk news shock produce only marginal effects on firm valuation in both international and domestic equity markets. In the international equity market, firm value at the impact period drops by 0.18% per 10 percentage point increase in default probability, against the 6% decline estimated by Hébert and Schreger (2017) for the same magnitude of shock. Extrapolating a full default event—a 100 percentage point increase in default probability—the model implies only a 1.8% decline in firm values, far below the 60% implied by the extrapolation of the data estimates. In the domestic equity market, firm value falls by only 0.02% per 10 percentage point increase in default probability, on impact.

Regarding the gap between the model-implied 0.18% decline per 10 percentage point increase in default probability and the empirically estimated 6% decline of Hébert and Schreger (2017), the structural analysis of Section 2.3 provides a coherent account. Two complementary explanations are relevant. First, the two structural channels identified in the 2001 episode—the absence of capital outflow dynamics and the endogenous increase in dividends—imply that the model does not generate the large real economic disruptions that markets likely anticipated when pricing Argentine firm equity after the 2014 ruling. Markets pricing the MSCI Argentina index in 2014 would have been pricing in the anticipated real costs of a potential default episode of the kind observed in 2001, including the consumption contraction associated with capital outflows and dividend suspensions—precisely the channels the standard model lacks. Second, the 6% estimate of Hébert and Schreger (2017) is based on the MSCI Argentina index, a dollar-denominated measure that incorporates nominal exchange rate effects. As documented in Section 2.3, the nominal depreciation of the Argentine peso was the primary driver of the large divergence between dollar- and peso-denominated equity indices during the 2001 default episode. To the extent that markets in 2014 anticipated a devaluation of the peso alongside a potential default, the MSCI Argentina index would reflect both the real costs of default and the expected nominal depreciation. Since quantitative sovereign default models normalize the nominal exchange rate to unity, the 6% estimate captures a broader set of costs than what the model is designed to measure.

Passthrough asymmetry. Beyond the overall magnitude of the gap, a central finding of this section is the different passthrough of sovereign default risk to equity prices across the two markets. To quantify this, we compare the news shock effect to the total price decline at default realization within the same experimental framework: in the period immediately following the news shock, the default probability is set to unity so that every unit in the panel defaults with certainty regardless of its state. The total price decline from the pre-shock level to this realization period—capturing the combined effect of the news shock and its realization—serves as the benchmark against which the news shock effect is measured. Table 6 reports the results.

For international equity, the full default news shock ($\eta = 100\%$) generates a 1.79% decline against a total default realization decline of 1.84%—a ratio of 0.97, indicating that the passthrough of sovereign default risk to international equity prices is nearly complete upon the arrival of the news shock alone. This near-complete passthrough is consistent with risk-neutral pricing: international investors discount future payoffs at a constant risk-free rate and thus incorporate the entire increase in expected default costs into current prices as soon as the probability of default rises.

For domestic equity, the difference is quite noticeable: the full news shock generates only a 0.21% decline against a total default realization decline of 4.10%—a ratio of 0.05, indicating that the passthrough of sovereign default risk to domestic equity prices is severely attenuated at the news shock stage, with only 5% of the total default cost reflected upon impact. The bulk of the price adjustment occurs only at default realization.

This sharp asymmetry in passthrough reflects the consumption smoothing motive of domestic households. Under a news shock, the household anticipates a future downturn but remains solvent today; the precautionary saving motive elevates demand for firm equity as a saving instrument, dampening the price decline. At default realization, the household's current income falls with the output loss, collapsing the hedging demand for firm equity. The pricing kernel $m_{r,d} = \beta u'(C^d)/u'(C^r)$ is high under a news shock (future consumption is expected to fall relative to current consumption), but at realization the household transitions to $m_{d,d}$ with low current consumption—increasing the marginal utility of consumption relative to equity holding and generating a large price decline. This mechanism implies that the domestic equity market is particularly insensitive to the anticipation of default costs, with the bulk of the price adjustment occurring only upon actual realization, a pattern starkly absent in international markets governed by risk-neutral pricing. Section 2.5 shows that this mechanism corresponds precisely to the sign reversal of the discount rate channel in the cashflow and discount rate decomposition: the news shock generates a positive discount rate channel that nearly fully offsets the negative cashflow channel, while actual default realization produces a large negative discount rate channel that drives the bulk of the total price decline.

	News shock	Default realization	Ratio
Equity prices (%)			
International market	−1.79	−1.84	0.97
Domestic market	−0.21	−4.10	0.05

Table 6: News Shock vs. Default Realization: Equity Price Declines

NOTES: The news shock column ($\eta = 100\%$) reports the equity price change at the end of year 100 (the shock period) relative to the pre-shock price, from Table 5. The default realization column reports the total equity price change from the pre-shock price to the period immediately following the shock, in which default is realized with certainty, capturing the combined effect of the news shock and its realization. The ratio is computed as the news shock effect divided by the default realization total effect, measuring the fraction of the total default realization cost that is incorporated into equity prices upon the arrival of the news shock alone. Both columns are constructed from the same simulated panel of 100,000 units, restricting to units with no default during the 5 years preceding the impact year.

Figure 1 illustrates these dynamics. International firm value drops immediately upon the arrival of the news shock and remains at the depressed level, consistent with risk-neutral pricing that fully reflects the higher default probability on impact. Domestic firm value, by contrast, exhibits virtually no response at the news shock stage, before dropping sharply at default realization as the output loss collapses household income and destroys the precautionary saving motive.

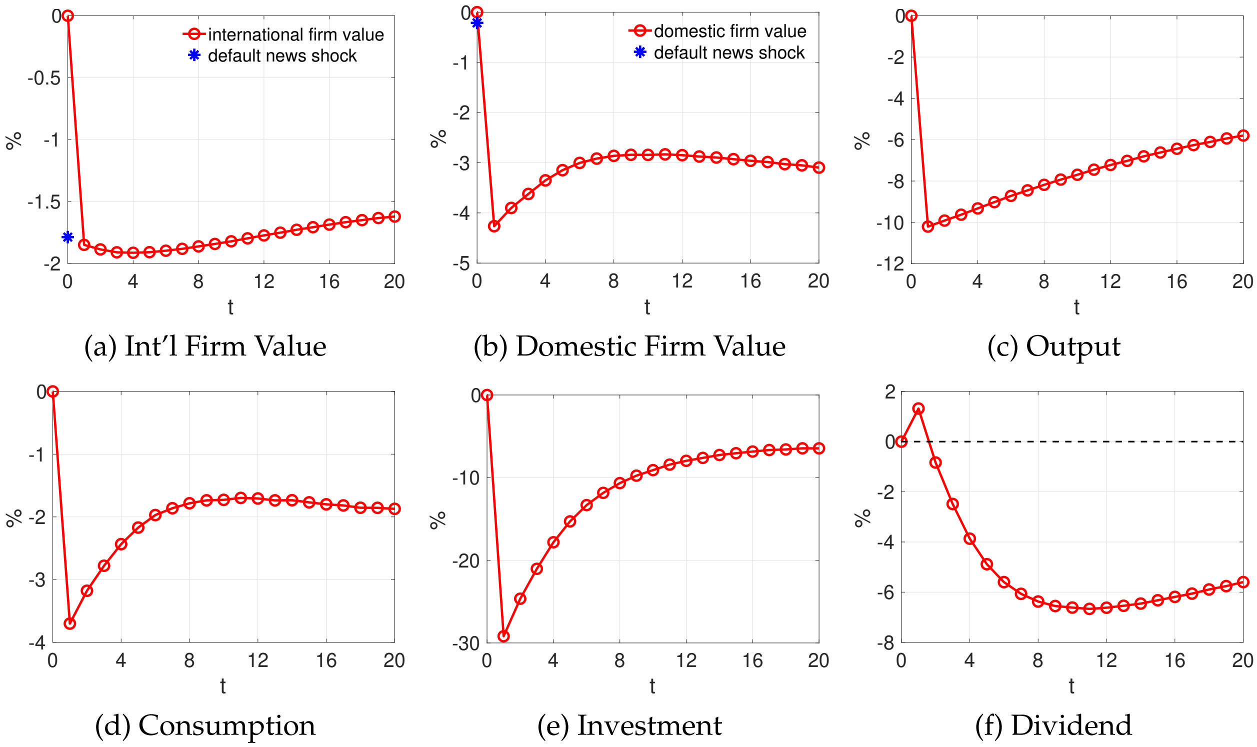

Figure 1: Stochastic Impulse Response Functions to Default Risk News

NOTES: The figure plots stochastic impulse response functions to a sovereign default risk news shock calibrated to a 100 percentage point increase in the one-period-ahead default probability, following the method of Koop et al. (1996). The shock arrives in period 0 after all borrowing and investment decisions are completed. Period 1 corresponds to actual default realization, in which default occurs with certainty. All variables are plotted as percentage deviations from the pre-shock level. The responses are constructed from a simulated panel of 100,000 units, restricting to units with no default during the five years preceding the impact period.

2.5 Cashflow and Discount Rate Decomposition

To further explore the asymmetric transmission of sovereign default risk documented in Section 2.4, we decompose domestic equity price changes into cashflow and discount rate channels following the spirit of Campbell and Shiller (1988). This decomposition is applied to the sovereign default risk news shock experiment, where the shock arrives after all resource allocation decisions are completed, providing a well-defined before/after comparison.

Sequential Representation. The international and domestic equity prices can be written as the present discounted value of all future dividends:

$$P_t^r = \sum_{s=1}^{\infty} \frac{1}{(1+r_f)^s} E_t\left[X_{t+s}\right] \tag{11}$$

$$Q_t^r = \sum_{s=1}^{\infty} E_t \left[M_{t,t+s} \cdot X_{t+s} \right] \tag{12}$$

where $M_{t,t+s} = \prod_{k=1}^{s} m_{t+k}$ denotes the cumulative stochastic discount factor from period t to period $t+s$, and X_{t+s} denotes the dividend at period $t+s$, which takes the value X_{t+s}^r during repayment and X_{t+s}^d during autarky. The key advantage of the sequential representation is that the equity price does not appear on the right-hand side, enabling a clean decomposition of price changes into their fundamental sources.

Decomposition. Throughout this section, we use superscripts $^-$ and $^+$ to denote pre-shock and post-shock values respectively: $M_{t,t+s}^-$ and X_{t+s}^- denote the cumulative SDF and dividend under the pre-shock default probability, and $M_{t,t+s}^+$ and X_{t+s}^+ denote the corresponding post-shock values. Consider a sovereign default risk news shock that generates changes in both expected dividends and the stochastic discount factor. Using the identity

$$M_{t,t+s}^+ X_{t+s}^+ - M_{t,t+s}^- X_{t+s}^- = X_{t+s}^+ \Delta M_{t,t+s} + M_{t,t+s}^- \Delta X_{t+s} \tag{13}$$

where $\Delta X_{t+s} \equiv X_{t+s}^+ - X_{t+s}^-$ and $\Delta M_{t,t+s} \equiv M_{t,t+s}^+ - M_{t,t+s}^-$ denote the changes in dividends and the cumulative stochastic discount factor induced by the shock, the change in domestic equity prices decomposes exactly as:

$$\Delta Q_t^r = \underbrace{\sum_{s=1}^{\infty} E_t \left[M_{t,t+s}^- \cdot \Delta X_{t+s} \right]}_{\Delta Q_t^{CF}} + \underbrace{\sum_{s=1}^{\infty} E_t \left[\Delta M_{t,t+s} \cdot X_{t+s}^+ \right]}_{\Delta Q_t^{DR}} \tag{14}$$

The cashflow channel ΔQ_t^{CF} captures the change in equity prices driven solely by revisions in expected future dividends, weighted by the pre-shock stochastic discount factor $M_{t,t+s}^-$. The discount rate channel ΔQ_t^{DR} captures the change in equity prices driven by revisions in the stochastic discount factor, weighted by the post-shock dividend X_{t+s}^+. This decomposition is exact, with no cross term, because the pre-shock SDF $M_{t,t+s}^-$ serves as the anchor for the cashflow channel.

For international equity prices, the risk-free rate r_f is constant by assumption, so the discount rate channel is exactly zero:

$$\Delta P_t^r = \underbrace{\sum_{s=1}^{\infty} \frac{1}{(1+r_f)^s} E_t \left[\Delta X_{t+s} \right]}_{\Delta P_t^{CF}} + \underbrace{0}_{\Delta P_t^{DR}} \tag{15}$$

The change in internationally-priced equity therefore provides a model-consistent measure of the cashflow channel, as risk-neutral pricing ensures that the change in internationally-priced equity reflects solely revisions in expected future dividends with no contribution from discount rate variation.

Table 7 reports the cashflow and discount rate channels for the news shock experiment calibrated to $\eta = 100\%$. The first row compares equity prices immediately before and after the news shock. The second row reports the realization increment—the additional price decline from the post-shock state to actual default realization, in which default occurs with certainty.[6] The third row reports the total effect—comparing the pre-shock price directly to the price at default realization—which captures the full impact of the sovereign default episode from the perspective of an investor who observed neither the intermediate news shock nor its timing.

	Domestic equity price change	Cashflow channel	Discount rate channel
News Shock ($\eta = 100\%$): pre-shock vs. post-shock			
Impact	-0.21	-3.83	$+3.62$
Realization increment: post-shock vs. default realization†			
Additional decline	-3.89	-0.01	-3.87
Total Effect: pre-shock vs. default realization			
Total decline	-4.10	-3.85	-0.25

Table 7: Cashflow and Discount Rate Decomposition

NOTES: All values are percentage changes. The "News Shock" row compares pre-shock and post-shock equity prices. The "Realization increment" row reports the additional price decline from the post-shock state to actual default realization. The "Total Effect (default realization)" row compares the pre-shock price directly to the default realization price, capturing the combined effect of the news shock and its realization. †The decomposition for default realization is approximate; see footnote 6 for details.

In the news shock experiment, the cashflow channel is strongly negative (-3.83%),

[6] For the default realization, we approximate the cashflow channel as $\Delta Q^{CF,\text{real}} \approx (Q^+_{t-1}/P^+_{t-1}) \cdot (P^+_t - P^+_{t-1})$, where $P^+_t - P^+_{t-1}$ is the change in internationally-priced equity at realization and Q^+_{t-1}/P^+_{t-1} is the post-shock ratio of domestic to international equity prices at $t-1$. This approximation replaces the horizon-specific cumulative discount factors $M_{t,t+s}$ with a single scaling factor. The approximation is reasonable for the following reason. The two largest SDF movements occur at the news shock stage and at the default realization stage. The news shock stage is handled exactly through the decomposition above. The realization stage is the object of interest itself, not a source of approximation error—we are measuring the price change at that moment, not approximating it. The approximation therefore applies only to the post-realization period, during which the economy enters autarky and consumption recovers gradually, so the period-by-period stochastic discount factor does not vary substantially across horizons. Moreover, the contribution of distant future periods to the current equity price diminishes as the discount factor accumulates, further limiting the approximation error. The discount rate channel is recovered as the residual.

reflecting the large revision in expected future dividends as default becomes certain.[7] The discount rate channel, however, is strongly positive (+3.62%), as domestic households respond to the anticipation of future economic deterioration by increasing precautionary saving in firm equity, nearly fully offsetting the negative cashflow channel. As a result, domestic equity prices fall by only 0.21%—far less than the cashflow channel alone would predict.

The pattern reverses markedly at default realization. The cashflow channel is negligible (−0.01%), reflecting that the dividend path was already fully priced in at the news shock stage. The discount rate channel, however, turns strongly negative (−3.87%), as the output loss collapses household income, destroys the precautionary saving motive, and drives the stochastic discount factor sharply downward. This generates a large additional decline in domestically-priced equity that dwarfs the cashflow effect.

In sum, the total decline of −4.10% is dominated by the discount rate channel: across the two experiments, the cashflow channel contributes −3.85% while the discount rate channel contributes only −0.25% in net, reflecting near-complete reversal from the large positive news shock effect and the large negative realization effect. The decomposition establishes that the discount rate channel is the dominant driver of the pronounced non-linearity between news shock and realization effects documented in Table 6. While the cashflow channel operates in the same direction across both experiments, the discount rate channel reverses sign—from positive under the news shock to strongly negative at realization—reflecting the two-stage adjustment of the domestic pricing kernel: the anticipation of future hardship first elevates the stochastic discount factor through precautionary saving, before the realization of current income loss collapses it.

3 Conclusion

This paper develops a quantitative small open economy model with sovereign default risk and capital accumulation to examine the structural channels through which sovereign default risk transmits to firm valuation. Using event studies of the 2001 Argentina sovereign debt crisis and the 2014 U.S. Supreme Court ruling on Argentina's defaulted bonds, we

[7]The domestic cashflow channel (−3.83%) is substantially larger in magnitude than the change in internationally-priced equity (−1.79%), even though both reflect the same dividend change ΔX_{t+s}. The difference arises because domestic households are more impatient than international investors: with $\beta = 0.96$ compared to $\frac{1}{1+r_f} \approx 0.99$, the pre-shock SDF $M^{-}_{t,t+s}$ places relatively more weight on near-term dividend changes than the risk-free discount factor. Following the shock, a decrease in dividend ΔX_{t+s} is concentrated in the initial periods and subsequently diminishes. This amplifies the domestic cash flow channel, which reacts more strongly to the dividend change compared to international investors.

provide a structural mapping of the channels that govern firm valuation dynamics around sovereign default events, and offer an interpretation of the empirical estimates of Hébert and Schreger (2017) that clarifies their appropriate structural counterpart.

Our central finding is that a sovereign default risk news shock calibrated to a 10 percentage point increase in the one-period-ahead default probability leads to only a 0.18% decline in internationally-priced firm equity in the model. Under the extrapolation implicit in the Hébert and Schreger (2017) estimation, a full default event would imply only a 1.8% decline in firm values in the model. We argue that this gap reflects two distinct sources. The first source is structural: standard sovereign default models lack two channels through which default affects firm valuation in the data. The autarky assumption generates opposite-sign predictions for both consumption and the trade balance during default—consumption rises by 3.9% in the model while it falls by 17.3% in the data, and the trade balance falls in the model while it rises sharply in the data—and these reversals trace directly to the elimination of private sector capital outflows. The consumption smoothing motive generates rising dividend payments during default, again opposite in sign to the dividend suspensions observed during Argentina's 2002–2005 restructuring. These two opposite-sign predictions are not arbitrary model failures; they are coherent, sign-reversing consequences of specific modeling assumptions that can be addressed in future work.

The second source concerns measurement scope. The 6% estimate of Hébert and Schreger (2017)—based on the MSCI Argentina index—captures both the real costs of sovereign default and the market's anticipation of nominal exchange rate depreciation. Typical quantitative sovereign default models normalize the nominal exchange rate to unity, making the peso-denominated S&P Merval index the more appropriate empirical counterpart. The S&P Merval index declined by only 13.5% during the 2001 crisis, and our model's 10.9% decline in domestically-priced equity comes closer to this benchmark, suggesting that the Hébert and Schreger (2017) estimate should be interpreted as measuring total costs inclusive of nominal depreciation expectations rather than exclusively real costs.

We further document a sharp asymmetry in the passthrough of sovereign default risk to equity prices across international and domestic equity markets. The passthrough to international equity is nearly complete at the news shock stage (97% of the total default realization cost), consistent with risk-neutral pricing that immediately and fully reflects the higher default probability. Domestic equity, by contrast, incorporates only 5% of the total cost at the news shock stage—a full default news shock generates only a 0.21% decline against a total default realization decline of 4.10%. This near-complete attenuation of the passthrough to domestic equity reflects the precautionary saving motive of domestic households, which nearly fully offsets the negative cashflow channel at the news shock stage before collapsing at default realization. The decomposition establishes that this mechanism operates entirely through the discount rate channel, which is strongly positive under the news shock before reversing sharply to negative at realization—a pattern starkly absent in international markets governed by risk-neutral pricing.

These findings point to two directions for future research. First, incorporating private sector access to international financial markets into sovereign default models would endogenously generate capital outflows and the associated reductions in dividend payments during default episodes, bringing model predictions closer to the empirical evidence on real firm valuation costs. Second, a growing literature incorporates nominal frictions into sovereign default models, including currency pegs and devaluations (Na et al., 2018) and endogenous nominal exchange rates and inflation (Arellano, Bai, and Mihalache, 2026). Extending the firm valuation analysis of this paper to these frameworks would allow researchers to directly account for nominal exchange rate depreciation alongside real default costs, enabling a cleaner structural decomposition of firm valuation costs into their real and nominal components and a more direct evaluation of the empirical estimates.

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A Quantitative Analysis of the Equity Return Consequences of Sovereign Default Risk

—Supplemental Material—

Ilhwan Song

A Computation Algorithm

The computation of models involving defaultable long-term debt is well-known to be quite challenging (Chatterjee and Eyigungor, 2012). In our model that incorporates capital investment, we address this complexity by utilizing discrete choice methods. For earlier applications of these methods in the context of default models, see Dvorkin et al. (2021) and Mihalache (2020). Additionally, Mihalache (2025) provides a more detailed treatment of this approach.

Augmenting the model with taste shocks We introduce choice probabilities over debt issuance and default decisions with Extreme Value Type I shocks associated with each $\mathcal{B}'$ and $\mathcal{D}$ option. The computational advantage of taste shocks delivers closed-form expressions for choice probabilities and expected values, a multinomial logit structure.

We add choice-specific taste shocks to the two options in equation (1), ϵ_d and ϵ_r, both following the Gumbel distribution. Let V be the benevolent government's ex-ante value of good financial standing before taste shocks are realized:

$$V(z,K,B) = \mathbb{E}_{\epsilon_r,\epsilon_d}\left[\max_{d\in\{0,1\}} \Big((1-d)\left[V^r(z,K,B) + \zeta_d\,\epsilon_r\right] + d\left[V^d(z,K) + \zeta_d\,\epsilon_d\right] \Big)\right] \quad (16)$$

$$\text{where } \epsilon_d \sim \text{Gumbel}(-\zeta_d\gamma_e, \zeta_d), \quad \epsilon_r \sim \text{Gumbel}(-\zeta_d\gamma_e, \zeta_d)$$

where ζ_d is the scaling parameter of taste shocks on default values, $\gamma_e = 0.57721566...$ is the Euler-Mascheroni constant.

The sovereign's ex-ante probability of choosing default is given by

$$\Pr(d=1|z,K,B) = \frac{\exp\frac{V^d(z,K)}{\zeta_d}}{\exp\frac{V^d(z,K)}{\zeta_d} + \exp\frac{V^r(z,K,B)}{\zeta_d}} \quad (17)$$

and the corresponding expected value is as follows.

$$V(z,K,B) = \overline{V}(z,K,B) + \zeta_d \log \left[\exp\left(\frac{V^d(z,K) - \overline{V}(z,K,B)}{\zeta_d} \right) + \exp\left(\frac{V^r(z,K,B) - \overline{V}(z,K,B)}{\zeta_d} \right) \right] \tag{18}$$

$$\text{where } \overline{V}(z,K,B) = \max\{\, V^d(z,K),\ V^r(z,K,B) \,\}$$

We add choice-specific taste shocks to new debt issuance in equation (2), ϵ_b, following Gumbel distribution. Let W be the benevolent government's repayment value of choosing B' without taste shocks:

$$W(z,K,B,B') = \max_{K'} \ u(C) + \beta \, \mathbb{E}_{z'|z} V(z',K',B') \tag{19}$$

$$\text{s.t. } C + K' + \Theta(K',K) = zK^{\alpha} + (1-\delta)K + q(z,K',B')\,[B' - (1-\phi)B] - \kappa B - G$$

Let V^r be the benevolent government's ex-ante value of repayment before the taste shocks are realized:

$$V^r(z,K,B) = \mathbb{E}_{\epsilon_b} \left[\max_{B'} \left(\, W(z,K,B,B') + \zeta_b \, \epsilon_b \, \right) \right] \tag{20}$$

$$\text{where } \epsilon_b \sim \text{Gumbel}(-\zeta_b \gamma_e, \zeta_b)$$

where ζ_b is the scaling parameter of taste shocks on borrowings.

The sovereign's ex-ante choice probability of debt issuance is given by

$$\Pr(B' = i | z,K,B) = \frac{\exp \frac{W(z,K,B,i)}{\zeta_b}}{\sum_j \exp \frac{W(z,K,B,j)}{\zeta_b}} \tag{21}$$

and its corresponding expected value is as follows.

$$V^r(z,K,B) = \overline{W}(z,K,B) + \zeta_b \log \left[\sum_j \exp\left(\frac{W(z,K,B,j) - \overline{W}(z,K,B)}{\zeta_b} \right) \right] \tag{22}$$

$$\text{where } \overline{W}(z,K,B) = \max_{B'}\{W(z,K,B,B')\}$$

International Lenders Let q be the break-even bond prices consistent with the sovereign's choice probabilities:

$$q(z, K', B') = \frac{1}{1+r_f}\mathbb{E}_{z'|z}\left[(1 - \Pr(d' = 1|z', K', B'))\right. \left.\left(\kappa + (1-\phi)\sum_j \Pr(B'' = j|z', K', B')q(z', K'', j)\right)\right] \tag{23}$$

$$\text{where } K'' = \mathcal{K}^r(z', K', B')$$

Computation algorithm The computation algorithm for the model is as follows.

1. Take initial guess of value functions (V_0, V_0^d), decision rules ($\mathcal{D}_0, \mathcal{B}_0, \mathcal{K}_0^r, \mathcal{K}_0^d$), and pricing functions (q_0)
2. Given the guess of government values (V_0, V_0^d), and decision rules ($\mathcal{K}_0^d$) and update government's default value (V_1^d) and decision rules ($\mathcal{K}_1^d$) using equation (3)
3. Given the new government's default value (V_1^d), the guess of value functions, decision rules, and price functions (V_0, $\mathcal{B}_0$, $\mathcal{K}_0^r$, q_0), update investment policy ($\mathcal{K}_1^r$) for every possible borrowing choice (B') by using equation (19)
4. Given new government's default value (V_1^d), new investment policy ($\mathcal{K}_1^r$), the guess of value functions, decision rules, and price functions (V_0, $\mathcal{B}_0$, q_0), construct government's repayment value (V^r) and update borrowing policy ($\mathcal{B}_1$) using equation (20)
5. Given new government's value functions (V_1^d, V^r), update the government's value of good financial standing (V_1) and default policy ($\mathcal{D}_1$) using equation (18)
6. Given new decision rules ($\mathcal{D}_1$, $\mathcal{B}_1$, $\mathcal{K}_1^r, \mathcal{K}_1^d$), and guess of bond prices (q_0), update bond price schedule (q_1) using equation (23)
7. Iterate steps (2)–(6) until the bond price function converges.

Our method involves augmenting the default ($\mathcal{D}$) and borrowing ($\mathcal{B}$) decisions with Extreme Value Type I taste shocks. We set the variance of these shocks to the smallest value consistent with convergence. The capital investment choice ($\mathcal{K}$) is not perturbed. Instead, we find the best K' for each possible B' using golden section search and linear interpolation. We discretize the shock process using 19 points for z, 250 for B, and 150 points for K, and allow interpolation over the K dimension. We experimented with grid sizes and location, to confirm the robustness of welfare measures and business cycle statistics.

B Robustness Check: All Default Episodes

Table 8 reports the unconditional average across all 2,017,959 default episodes in the simulated series. Compared to the 12,243 episodes selected to match the 15.2% output decline of the 2001 Argentina crisis, the average default episode features a much milder output contraction of 3.7%, a smaller investment decline of 28.0%, and equity price declines of 2.5% and 4.8% for international and domestic markets respectively. This comparison confirms that the 2001 Argentina episode represents a severe tail realization of the model's default distribution rather than a typical default event, validating the conditional sampling approach adopted in the main analysis.

Moment	Data	ARG 2001	All Default
Business cycles (%)			
GDP	−15.2	−15.2	−3.7
Consumption	−17.3	−3.9	6.7
Investment	−45.0	−49.6	−28.0
Dividend	—	6.4	−1.0
Equity prices (%)			
International market	−55.3	−3.4	−2.5
Domestic market	−13.5	−10.9	−4.8
Ratios to GDP (percentage point)			
Consumption	−1.7	8.5	7.2
Investment	−6.0	−9.6	−4.8
Trade balance	8.4	−1.0	−2.9

Table 8: All Default Episodes

NOTES: The "Data" column reports percentage changes from Q1.2001 to Q1.2002. The "ARG 2001" column reproduces the baseline results from Table 4. The "All Default" column reports the unconditional mean across all 2,017,959 default episodes in the 200,000,000-period simulated series. Changes in model variables are measured from period 17 to period 21.

C Domestic Equity Stochastic Discount Factors

In this appendix, we derive the stochastic discount factors used to price domestic equity in the main text. We introduce a representative household and a representative firm with no financial frictions between them: the firm distributes all net income as dividends each period and the household prices equity directly using its marginal utility. We show that the household's optimality conditions deliver exactly the pricing kernels $m_{r,r}$, $m_{r,d}$, $m_{d,r}$, and $m_{d,d}$ defined in Section 1.2. The household holds firms' equity a as the individual endogenous state variable.

Household The representative household chooses consumption c and equity holdings a' given labor income, dividends, resale values of firms' equity, and government transfers. Let h^r be the household's value when the government repays its debts:

$$h^r(a;z,K,B) = \max_{a'} \Big\{ u(c) + \beta \mathbb{E}_{z'|z} h(a';z',K',B') \Big\} \tag{24}$$
$$\text{s.t.} \quad c + Q_r(z,K,B)\, a' = w_r(z,K,B) + [X^r(z,K,B) + Q_r(z,K,B)]a + T_r(z,K,B)$$

where w_r is the wage, Q_r is the domestic equity price, X^r is the dividend, and T_r is the government lump-sum transfer during repayment. h denotes the household's ex-ante value during good financial standing.

Let h^d be the household's value when the government defaults:

$$h^d(a;z,K) = \max_{a'} \Big\{ u(c) + \beta \mathbb{E}_{z'|z} \Big[(1-\lambda) h^d(a';z',K') + \lambda h(a';z',K',0) \Big] \Big\} \tag{25}$$
$$\text{s.t.} \quad c + Q_d(z,K)\, a' = w_d(z,K) + [X^d(z,K) + Q_d(z,K)]a + T_d(z,K)$$

where w_d, Q_d, X^d, and T_d are the corresponding variables during autarky. The household's ex-ante value during good financial standing is:

$$h(a;z,K,B) = \mathcal{D}(z,K,B)\, h^d(a;z,K) + (1-\mathcal{D}(z,K,B))\, h^r(a;z,K,B) \tag{26}$$

Stochastic Discount Factors The first-order condition with respect to a' during repayment yields:

$$\begin{aligned} Q_r(z,K,B) \cdot u'(C^r) = \beta \mathbb{E}_{z'|z} \Big[& \mathcal{D}(z',K',B')\, u'(C^d) \{ X^d(z',K') + Q_d(z',K') \} \\ & + (1-\mathcal{D}(z',K',B'))\, u'(C^r) \{ X^r(z',K',B') + Q_r(z',K',B') \} \Big] \end{aligned} \tag{27}$$

Dividing both sides by $u'(C^r)$:

$$Q_r(z,K,B) = \mathbb{E}_{z'|z}\Big[\mathcal{D}(z',K',B')\, m_{r,d}\{X^d(z',K') + Q_d(z',K')\} \\ + (1-\mathcal{D}(z',K',B'))\, m_{r,r}\{X^r(z',K',B') + Q_r(z',K',B')\}\Big] \tag{28}$$

where the stochastic discount factors are defined as:

$$m_{r,r} = \beta\frac{u'(C^r(z',K',B'))}{u'(C^r(z,K,B))}, \quad m_{r,d} = \beta\frac{u'(C^d(z',K'))}{u'(C^r(z,K,B))}$$

The analogous first-order condition during autarky yields Q_d and the remaining pricing kernels:

$$m_{d,r} = \beta\frac{u'(C^r(z',K',0))}{u'(C^d(z,K))}, \quad m_{d,d} = \beta\frac{u'(C^d(z',K'))}{u'(C^d(z,K))}$$

Firm Since the stochastic discount factors are derived from household optimization, the firm discounts future payoffs directly using these kernels. Let f^r be the firm's value when the government repays:

$$f^r(k;z,K,B) = X^r(z,k,B) + \mathbb{E}_{z'|z}\Big[(1-\mathcal{D}(z',K',B'))\, m_{r,r}\, f^r(k';z',K',B') \\ + \mathcal{D}(z',K',B')\, m_{r,d}\, f^d(k';z',K')\Big] \tag{29}$$

$$\text{s.t.} \quad X^r = zk^\alpha + (1-\delta)k - w_r - k' - \Theta(k',k), \\ w_r = (1-\alpha)zk^\alpha, \quad k' = \mathcal{K}^r(z,K,B)$$

Let f^d be the firm's value when the government defaults:

$$f^d(k;z,K) = X^d(z,k) + \mathbb{E}_{z'|z}\Big[\lambda\, m_{d,r}\, f^r(k';z',K',0) + (1-\lambda)\, m_{d,d}\, f^d(k';z',K')\Big] \tag{30}$$

$$\text{s.t.} \quad X^d = h(z)k^\alpha + (1-\delta)k - w_d - k' - \Theta(k',k), \\ w_d = (1-\alpha)h(z)k^\alpha, \quad k' = \mathcal{K}^d(z,K)$$

The firm's ex-ante value during good financial standing is:

$$f(k;z,K,B) = \mathcal{D}(z,K,B)\, f^d(k;z,K) + (1-\mathcal{D}(z,K,B))\, f^r(k;z,K,B) \tag{31}$$

These four pricing kernels correspond exactly to those defined in Section 1.2, confirming that the domestic equity pricing equations Q_r and Q_d in the main text are grounded in household optimization. The equity market clears at $a = a' = 1$ in equilibrium.