Why Crashes Are Fast and Recoveries Slow

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The Asymmetry Everyone Notices but Nobody Explains

Stock markets crash in days. Recoveries take years. Recessions arrive suddenly; expansions build slowly. This asymmetry is one of the most robust facts in macroeconomics, and one of the least explained.

The numbers are striking. Since 1945, NBER data show that the average US expansion lasts about 58 months, while the average contraction lasts about 11 months — a ratio of roughly 5:1 (Burns1946). (Reinhart2009) document the same pattern in banking crises across centuries and countries.

Why? The standard answer — "animal spirits" or "panic" — is a description, not an explanation. It pushes the question back: why does confidence collapse fast and rebuild slowly?

The CES potential landscape provides a geometric answer. The slope is not the same in both directions.

An Asymmetric Bowl

Recall from *economic-landscape* that the CES potential $\Phi = -\sum_{n=1}^{N} \log F_n$ defines a landscape over the space of possible economic allocations. The economy rolls downhill on this landscape, seeking valleys of low Φ. Curvature $K = (1-\rho)(J-1)/J$ controls the depth and steepness of those valleys.

Now here is the key fact: this landscape is not symmetric around its valleys.

Consider the CES production function $F = \left(\frac{1}{J}\sum_{j=1}^{J} x_j^{\rho}\right)^{1/\rho}$ with $\rho < 1$ (complementary inputs). Plot Φ as you move away from the balanced equilibrium in two different directions:

- **Toward excess concentration** (one input dominates, others shrink): Φ rises steeply. With strong complements, removing any one input devastates output. The potential surface is like a cliff face on this side.
- **Toward excess dispersion** (inputs spread more evenly than optimal, but at lower levels): Φ rises gently. Spreading resources too thin is wasteful, but not catastrophic. The potential surface is like a gentle hillside on this side.

  Definition (Landscape Asymmetry).

  For CES aggregation with $\rho < 1$, the potential Φ is steeper on the concentration side than on the dispersion side of equilibrium. The ratio of slopes grows with the degree of complementarity: stronger complements produce more asymmetric landscapes.

This asymmetry follows from the logarithmic structure of Φ and the concavity of CES. As any input $x_j \to 0$, $\Phi = -\log F \to +\infty$ — the potential blows up. But as inputs become moderately unbalanced on the high side, F decreases only gently. The log is steep near zero and flat for large values. That one-sided steepness is the entire story.

Rolling Downhill Fast, Climbing Back Slowly

Now think about what this asymmetry means for dynamics. A crisis pushes the economy away from equilibrium toward the steep side of the landscape — toward concentration of risk, withdrawal of inputs, breakdown of complementary relationships. The marble rolls *down* a steep slope. It accelerates. The worse things get, the faster they get worse.

Example.

In a financial crisis, banks pull back lending simultaneously. Each bank's withdrawal reduces the complementary inputs available to firms (credit, trade finance, interbank liquidity). As these inputs shrink, F drops and Φ rises steeply. The economy is rolling down the cliff side of the landscape. The steeper the slope, the faster the decline — which is exactly why crises feel like they accelerate. One bad week leads to a worse week.

Recovery is the reverse journey, but on the gentle side of the landscape. The economy must climb back up, and the slope it faces is shallow. Each step of improvement yields only a modest reduction in Φ, so the incentive to keep climbing is weak. Progress is real but slow. This is the geometric reason that recoveries grind rather than surge.

The 5:1 duration ratio — 58 months of expansion versus 11 months of contraction — is a direct reflection of this slope asymmetry. The economy traverses roughly the same distance in Φ-space going down as coming back up, but the downhill journey is on a steep grade and the uphill journey is on a gentle one.

The Minsky Amplifier

The asymmetry gets worse when you account for the fact that the curvature parameter ρ is not constant. This is the Minsky mechanism, formalized through endogenous ρ.

During long expansions, stability breeds complacency. Firms and investors gradually substitute away from diverse, complementary portfolios toward concentrated, "efficient" ones. In CES terms, ρ drifts upward — inputs become more substitutable as economic actors treat them as interchangeable. This drift is slow. It takes years. Nobody notices because output barely changes along the gentle side of the landscape.

But this slow drift has a devastating consequence: it reshapes the landscape itself. As ρ rises, $K = (1-\rho)(J-1)/J$ falls. The valley becomes shallower. The barriers between equilibria shrink. The economy is quietly moving toward a cliff edge.

Theorem (Minsky Asymmetry).

The endogenous drift of ρ is asymmetric: ρ rises slowly during expansions (years of gradual substitution) and falls rapidly during crises (sudden rediscovery that inputs are not interchangeable). Combined with landscape asymmetry, this produces contractions that are both faster and deeper than a fixed-ρ model would predict.

When the crisis hits, the discovery that inputs are in fact complements — that you cannot run a bank without trust, a factory without supply chains, an economy without credit — is instantaneous. ρ jumps downward. K jumps upward. The landscape suddenly steepens beneath the economy's feet, mid-fall. It is as if the cliff became taller just as you stepped off it.

(Schumpeter1939) described this as "creative destruction," but the CES framework makes the mechanism precise. The destruction is fast because the landscape is steep *and getting steeper*. The subsequent creation is slow because the landscape is gentle *and ρ only creeps back up as confidence returns*.

Conservation Laws Constrain the Path

There is one more piece to the story. Not everything changes during a crisis. The *conservation-laws* of the CES potential tell us that certain aggregate quantities are preserved as the economy adjusts — much like energy is conserved as a marble rolls in a bowl.

The most important conserved quantity is total variance across sectors. When one sector contracts sharply, the variance it "releases" must be absorbed by other sectors. It does not vanish. This is the *curvature_conservation* result: the total dispersion of activity across sectors is constrained along the adjustment path.

> **Example.**
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> When the US housing sector collapsed in 2008, the variance in housing-related activity did not simply disappear. It showed up as increased variance in energy prices, commodity markets, and government spending. The total cross-sector dispersion remained roughly constant even as the composition shifted dramatically. This is not a coincidence — it is a conservation law.

Conservation laws matter for recovery speed because they constrain which paths are available. The economy cannot jump back to its pre-crisis state. It must find a path that respects conservation at every step, slowing recovery further.

What This Means in Practice

The asymmetry framework generates a concrete, testable prediction: the depth and speed of a contraction should be related to the curvature K of the sectors most affected. High-K sectors (strong complements) should crash faster and harder. The *test:recession-depth-by-k* examines this prediction across US recessions.

For policymakers, the implication is sobering but clear. You cannot make recoveries as fast as crashes. The geometry of the landscape forbids it. What you *can* do is two things:

1. **Limit the Minsky drift.** Policies that prevent ρ from rising too far during expansions — capital requirements, leverage limits, diversification mandates — keep the landscape from becoming dangerously asymmetric.
2. **Reduce information friction during recovery.** The gentle recovery slope is made even gentler by high information friction T (see *economic-landscape*). Transparency, disclosure, and clear policy guidance lower T and steepen the recovery slope, even if they cannot match the crisis slope.

The Bottom Line

Crashes are fast and recoveries slow because the CES potential landscape is asymmetric. The slope toward crisis — where complementary inputs are withdrawn and production collapses — is steep. The slope back to prosperity — where relationships rebuild and confidence returns — is gentle. The Minsky mechanism amplifies this by making ρ drift slowly upward in booms and jump downward in busts, reshaping the landscape at the worst possible moment. Conservation laws further constrain the recovery path. The 5:1 ratio between expansion and contraction durations is not a puzzle. It is geometry.

References