

Introduction

Macroeconomics IV

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Caballero, R.J., "Macroeconomics after the Crisis: Time to deal with the Pretense-of-Knowledge Syndrome." JEP Fall 2010, 85-102.

Caballero, R.J. "A Caricature (Model) of the World Economy," MIT WP 10-17, November 2010.

The Pretense of Knowledge

“Of course, compared with the precise predictions we have learnt to expect in the physical sciences, this sort of mere pattern predictions is a second best with which one does not like to have to be content. Yet the danger of which I want to warn is precisely the belief that in order to have a claim to be accepted as scientific it is necessary to achieve more. This way lies charlatanism and worse. To act on the belief that we possess the knowledge and the power which enable us to shape the process of society entirely to our liking, knowledge which in fact we do not possess, is likely to make us do much harm.” Hayek (1974)

The Pretense of Knowledge

The subject of macroeconomics is immensely complex (both for researchers and economic agents!)

The core of the field (DSGE) has become so mesmerized with its own internal logic that it has begun to confuse the precision it has achieved about its own world with that it has about the real one

The periphery (intersection of macroeconomics and corporate finance) has been chasing many of the issues that played a central role during the current crisis...

We have a tension between a type of answer we aspire to but that has limited connection with reality (the core), and more sensible but incomplete answers (the periphery).

Solution? Do NOT abandon models... but understand their proper place... and incorporate complexity (in the sense of extremely complicated) into the analysis and its limitations

The aftermath of a huge global financial crisis has left us with a very confusing economic environment

I want to discuss one organizing framework that has helped me to navigate through some of this complexity

I will do this by presenting an extremely stylized model of the workings of a global economy, which I will integrate with a discussion of current events and facts

The basic perspective is one of the *macroeconomics of asset shortages*

Much of what I will say has a formal "micro-founded" model in the background but I do not make any major effort to draw those connections here. That's what the rest of the course is for

The key driving factor in this perspective is economic agents' continuous struggle to find assets to park financial resources

This struggle comes with euphoria and disappointments, as many of the "parking lots" are built too quickly or are not of the desired size

There are also global asymmetries, as some countries are endowed with more empty "land" and growth potential than others

I use this caricature of the world economy to describe several of the main driving forces behind recent global macroeconomic events

For now, I will focus on financial markets and flows, and downplay the important impact of these on the real side.

A "Model"

Time is continuous. At each instant:

$$C_t = \theta W_t. \quad (1)$$

There are two assets, A and B , in which to store wealth. There are β of the former and $1 - \beta$ of the latter

Agents want to hold a share α of their wealth in asset A and, $(1 - \alpha)$ in asset B

Differences between assets stem from agent's perception or tastes. This is just a "catch all" reduced form for the many factors that determine portfolio decisions in reality, that are not purely return-driven

Asset A is in *relatively short supply*: $\alpha > \beta$

Aggregate financial wealth is:

$$W_t = p_t^A x_t^A + p_t^B x_t^B. \quad (2)$$

In equilibrium:

$$\begin{aligned} x^A &= \beta \\ x^B &= 1 - \beta \end{aligned}$$

A "Model"

Aggregate output is exogenous and grows at rate g :

$$Y_t = Y_0 e^{gt}. \quad (3)$$

A fraction δ of this output is pledgeable (i.e., its present value can be used to produce assets) and the rest is not

Equilibrium in goods and financial markets require that:

$$\begin{aligned} C_t + \theta W_t &= Y_t \\ \frac{p_t^A}{p_t^B} \frac{\beta}{1-\beta} &= \frac{\alpha}{1-\alpha}. \end{aligned}$$

A "Model"

Solving out endogenous variables, we have:

$$\begin{aligned} p_t^A &= \frac{\alpha Y_t}{\beta \theta}, \\ p_t^B &= \frac{1 - \alpha}{1 - \beta} \frac{Y_t}{\theta}. \end{aligned} \tag{4}$$

The interest rates, r^A and r^B , that are consistent with these asset prices and the standard arbitrage condition are (from $r^i = (\delta Y + \dot{p})/p$)

$$\begin{aligned} r_t^A &= g + \delta \theta \frac{\beta}{\alpha} \\ r_t^B &= r_t^A + \lambda_t \end{aligned} \tag{5}$$

And the scarcity premium of asset A over asset B is:

$$\lambda_t = \frac{\delta \theta}{\alpha(1 - \alpha)} (\alpha - \beta) > 0$$

The distinction between type *A* and type *B* assets captures the fact that there are assets that seem scarcer than others

The reasons for these scarcities are complex and change over time.

- During the years between the Nasdaq crash and the recent financial crisis, type *A* assets were almost any AAA bond or tranche
- When the crisis hit, suddenly only AAA-bonds issued by sovereigns, especially the U.S., made the type *A* cut.
- On the other extreme, at times, commodities, real estate, or the NASDAQ may become type *A* assets

(All the examples in this section have some concept of risk in the background while the model has none! I apologize but move on...)

Disgression: Solow's insight...



Global Force 1: Gradual decline in δ * θ

There has been a sharp rise in the relative income of the largest EM economies and commodity producers, coupled with their enormous desire to save for a “rainy day.”

These are economies that have limited capacity to produce financial instruments (low δ) and most of them have a higher propensity to save than developed economies (low θ).

This pattern amounts to a decline in the global (income-weighted) δ and θ .

Recall that:

$$r_t^A = g + \delta\theta\frac{\beta}{\alpha} \quad (6)$$

$$r_t^B = r_t^A + \lambda_t$$

$$\lambda_t = \frac{\delta\theta}{\alpha(1-\alpha)} (\alpha - \beta) > 0 \quad (7)$$

Global Force 1: Gradual decline in $\delta^*\theta$

Three effects (present before the crisis):

- Very low equilibrium interest rates, r_t^A and r_t^B
- Risk compression (λ drops), as there is a proportional shift in demand for *all* assets which dilutes the *relative* scarcity of assets type *A*.
- Rise in asset prices ("bubbles," etc.), p_t^A and p_t^B

Global Force 1: Gradual decline in $\Delta \theta$

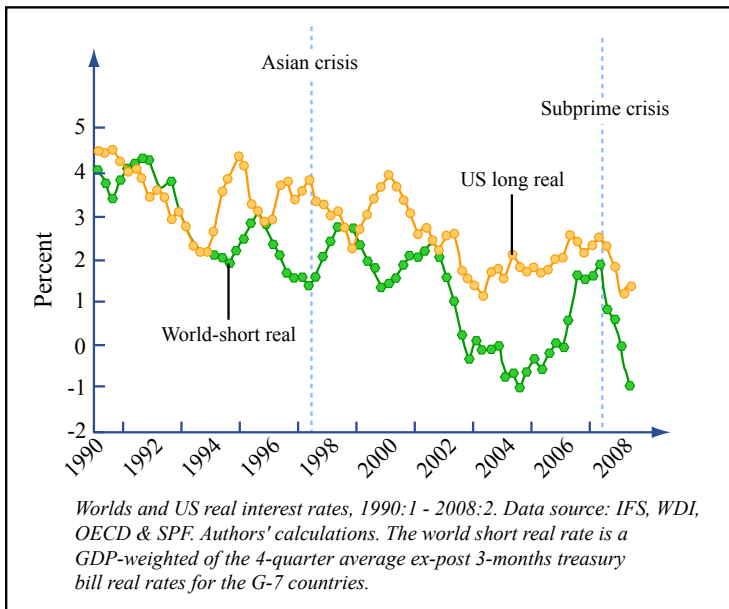


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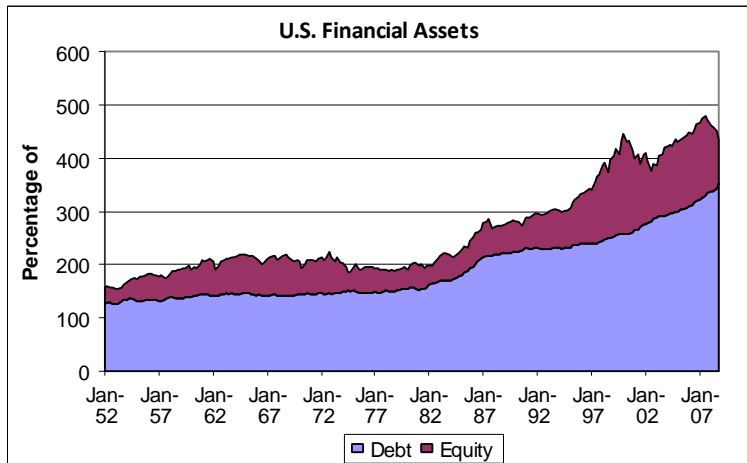
Global Force 2: Gradual rise in alpha

Not only has the net demand for assets risen over time but also this rise has been concentrated on AAA-assets (the type A assets of this episode)

In the model, the direct effect of a rise in α is an increase in the price of assets type A and a decrease in the price of assets of type B , and the opposite behavior for rates

The combination of forces 1 and 2 through this period led to a generalized rise in the cap value of both fixed (type A in that period) and variable income (type B in that period), but with a much stronger rise in the former

Global Force 2: Gradual rise in alpha

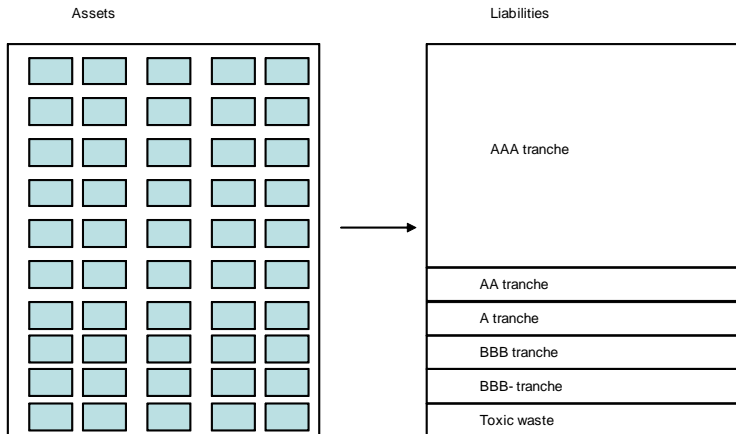


Global Force 3: Temporary (artificial?) rise in beta

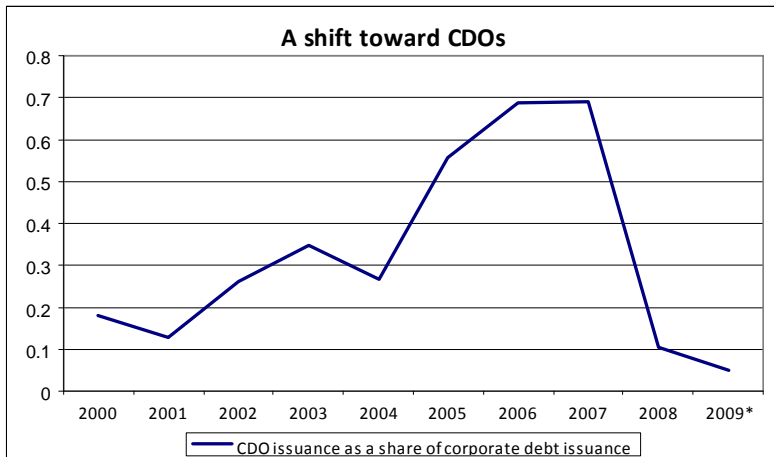
Forces 1 and 2 led to attempts to "arbitrage" λ by transforming B into A assets (and partly by transforming non-pledgeable assets into pledgeable ones). During much of the 1990s artificial assets were created in emerging markets until the sequence of crises starting with the Asian crisis destroyed a large share of these assets.

The pressure then moved to U.S. assets, and the Nasdaq in particular, which also culminated with a crash; to then be followed by the financial system's rapid rise in the production of AAA tranches from the securitization of lower quality loans. This also came to an abrupt end during the so called "subprime" crisis

Global Force 3: Temporary (artificial?) rise in beta



Global Force 3: Temporary (artificial?) rise in beta



Global Force 4: Spikes in alpha over beta

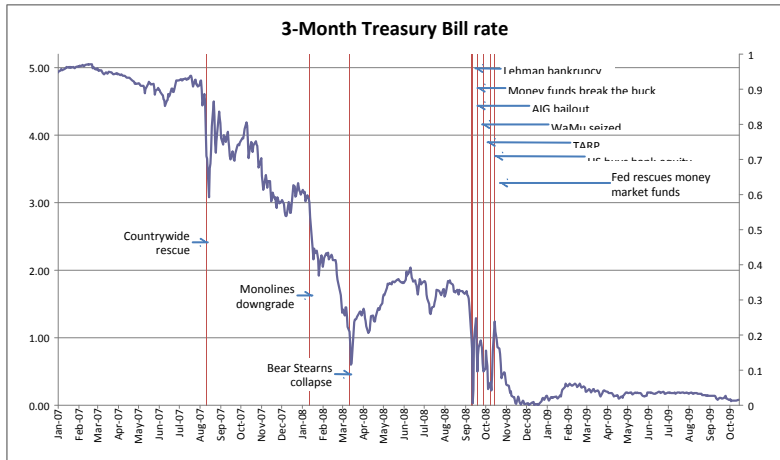
From a systemic point of view, this new-found source of triple-A assets was much riskier than the traditional single-name highly rated bond

The triggering event was the crash in the real estate “bubble” and the rise in subprime mortgage defaults that followed it. Confidence vanished and perceived complexity spiked. Eventually, even super-senior tranches were no longer perceived as invulnerable (A assets turned into B assets).

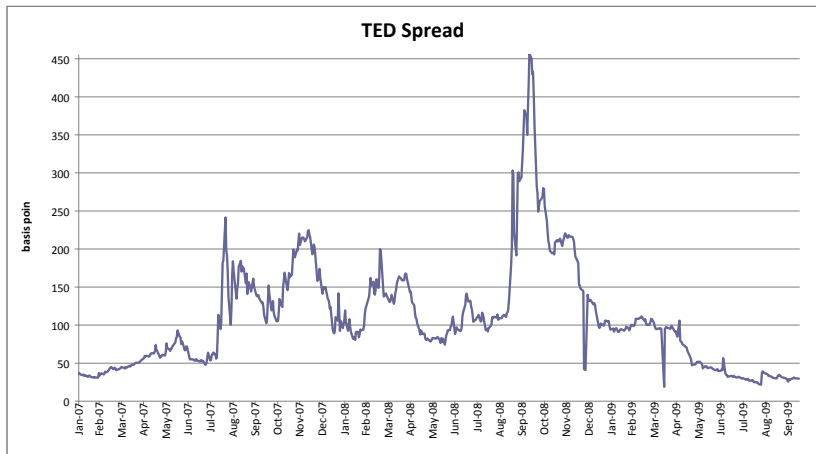
The underlying structural deficit of safe assets worsened as the newly found source of triple-A assets from the securitization industry dried up (β declined), and the spike in perceived uncertainty further increased demand for these assets (α increased).

During this episode safe interest rates plummeted to record low levels and all forms of risk-premia (λ s) skyrocketed

Global Force 4: Spikes in alpha over beta



Global Force 4: Spikes in alpha over beta



Global Force 4: Spikes in alpha over beta

Initially, the flight to quality was a boon for money market funds, which suddenly found themselves facing a herd of new clients. In order to capture a large share of this expansion in demand from these new clients, some money market funds began to invest in short-term commercial paper issued by the investment banks in distress (that is, they found their own temporary mechanism to transform B into A assets).

This strategy backfired after Lehman's collapse, when the Reserve Primary Fund "broke-the-buck" as a result of its losses associated with Lehman's bankruptcy. Perceived complexity reached a new level as even the supposedly safest private funds were no longer immune to contagion. Widespread panic ensued and led to an even more extreme rise in α/β .

There are limits to how far we can go without referring to the heterogeneity, both ex-crisis and post-crisis, in the world economy

Next I highlight some of these differences, pointing to their broad implications rather than focusing on the mechanics of global equilibrium

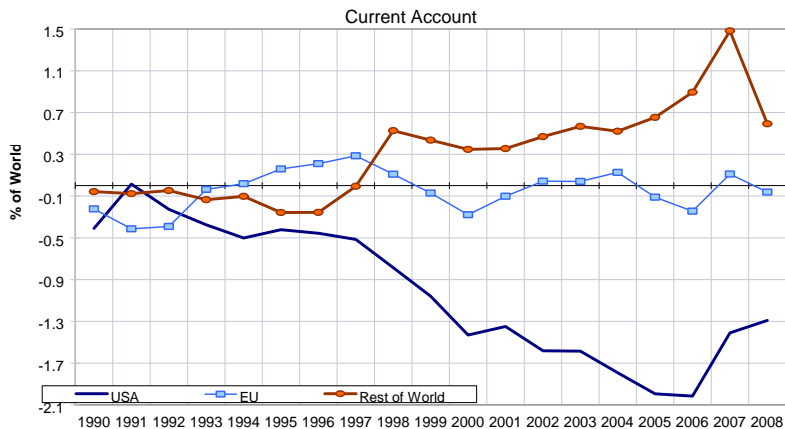
Force 5: Asymmetric δ * θ

One of the key differences between emerging and developed economies is the institutional development supporting financial markets and contracts. That is, δ is higher in developed economies than in emerging markets

The acute asset shortage in EMs is reinforced by the high propensity to save (low θ) of some EMs, in particular from Asia and some commodity producing economies

As is apparent in the model, these forces lead to lower pledgable return relative to asset demand in the "South" than in the "North", and hence justify the seemingly paradoxical direction of net capital flows from emerging markets to developed economies in recent years

Force 5: Asymmetric $\Delta\theta$



Force 6: Asymmetric alpha over beta

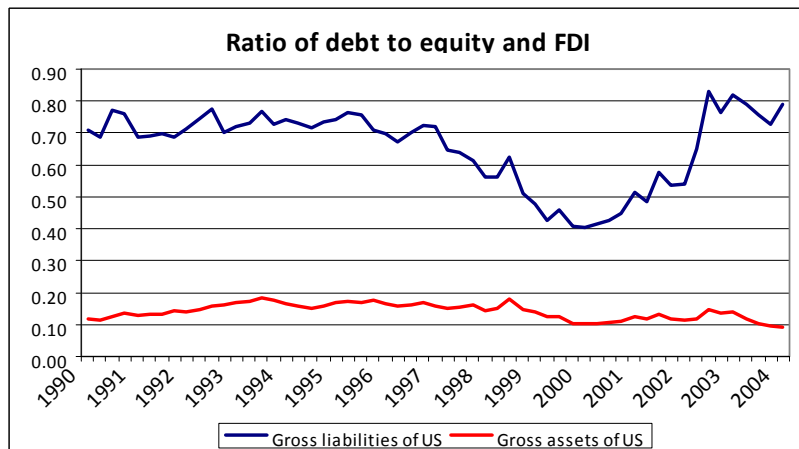
The relative weakness in financial development of emerging market economies is particularly severe in the production of type A assets

Other things equal, this asymmetry in α/β means that r^A is higher in developed economies while r^B is higher in emerging markets

Given net flows, this mechanism helps to explain why the typical gross capital flows pattern is one in which emerging markets buy "safe" assets from developed economies, while the latter buy "risky" assets from emerging markets

- The U.S. as a venture capitalist (Gourinchas and Rey)

Force 6: Asymmetric alpha over beta



Force 7: Asymmetric growth (decoupling)

While emerging markets typically grow at a faster pace than developed economies, this gap has become very pronounced in the post-crisis phase. This effect raises the expected return of all emerging market assets over those in developed economies.

This is probably a key factor behind the surge in capital flows to emerging markets until very recently (i.e., until the US began to look a lot better). (Reinforcing this effect, the many adjustments EMs made in response to their own crisis in previous decades paid off. Developed economy investors took notice and have begun to upgrade type *B* emerging market assets into type *A* assets.)

Force 7: Asymmetric growth (decoupling)

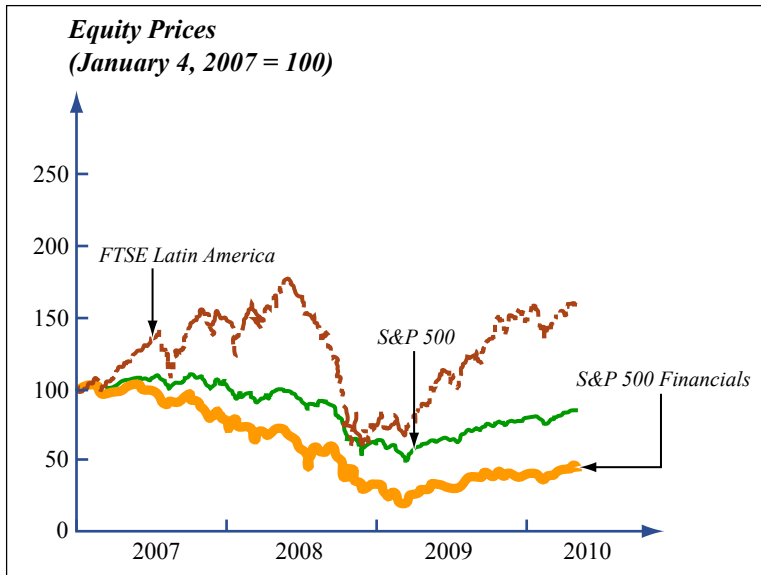


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Force 8: Transitions

In this new environment of safe assets scarcity, it makes a great difference to countries, and their sovereigns in particular, whether they are perceived as primarily type *A* or type *B* asset producers

- The PIIGS have seen the consequence of the bad transition, from *A* to *B*, while many emerging markets, such as Indonesia or Chile, are on the other side of the spectrum

These transitions, when involving a large group of countries, have global equilibrium consequences:

- The CHF and JPY appreciations owe much to the fall in expected return in other developed economies
- The surge in capital flows to many EMs owes much to the relative weakness of the developed world

These general equilibrium sources of capital flows are important to keep in mind when assessing strengths and weaknesses of particular recoveries

Force 8: Transitions

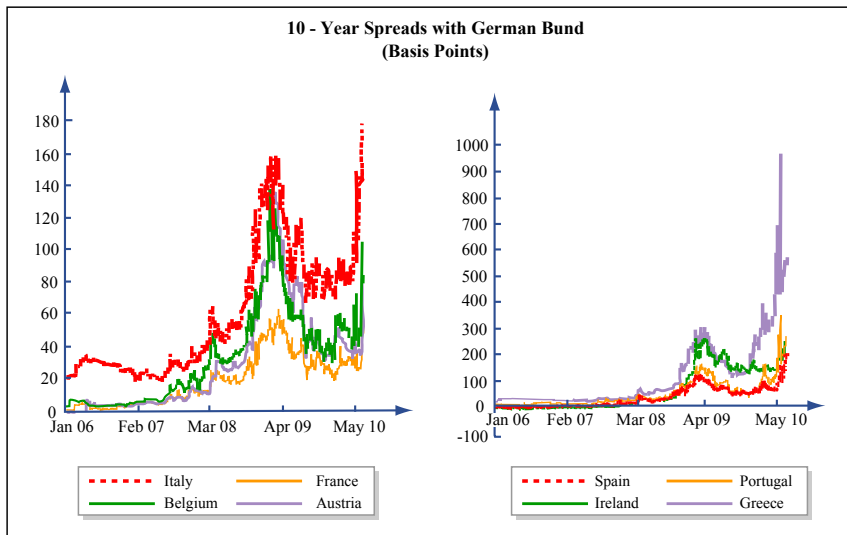


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The Irish guarantee.... and now the EFSF guarantee...

The ultimate financial goal of such a policy is to reduce r^B , as most private sector produced assets (borrowing by corporations and households) have a large component of type B assets

In the early stages of QE, r^B was targeted directly through the purchase of MBS and other distressed assets. This "credit-easing" policy was instrumental in stabilizing the economy, but as the recovery took hold, a series of political constraints and concerns brought that unorthodox strategy to an end

The faltering in the recovery during 2010 (post-Euro crisis) was not severe enough to make it politically feasible to go back to credit-easing policies, which left the FED and other central banks with the second best policy of lowering r^A (Treasury rates) and hoping that this would indirectly reduce r^B

Let $\beta\Delta$ denote the purchases of type A assets by the Fed, which reduces the net supply of these assets faced by the private sector from β to $\beta(1 - \Delta)$

It is easy to see in the stark model that QE targeted at assets type A have no effect on r^B : Since the share of income invested in assets type B is constant and the net supply of assets type B is not changed by QE, there is no effect of the policy on the price and return of this asset. Instead, all that happens is that p^A rises by (approximately) Δ percent, and r^A drops correspondingly:

$$p_t^{A, QE} = \frac{\alpha}{\beta(1 - \Delta)} \frac{Y_t}{\theta} \approx (1 + \Delta)p_t^A, \quad (8)$$

$$r_t^{A, QE} - r_t^A = -\delta\theta \frac{\beta}{\alpha} \Delta. \quad (9)$$

Thus, in order for QE to have an effect on r^B , there needs to be a leak out of demand for assets type A .

As r^A drops to extremely low levels, it triggers a search for yield process that lowers r^B . (The fear that this leak would lead to massive capital flows to EM led to heated debates!).

Assume that the minimum return investors are willing to accept for assets type A is $r^{A,\min}$.

Then, there is a maximum QE, Δ^{\max} , such that any further increase in QE:

$$p_t^{A,QE} = \frac{\alpha}{\beta(1 - \Delta^{\max})} \frac{Y_t}{\theta}; \quad r_t^{A,QE} = r^{A,\min}$$

and

$$p_t^{B,QE} = \frac{1 - \alpha + \beta(\Delta - \Delta^{\max})}{1 - \beta} \frac{Y_t}{\theta}; \quad r_t^{B,QE} = g + \delta\theta \frac{1 - \beta}{1 - \alpha + \beta(\Delta - \Delta^{\max})}.$$

Some of this search for yield is concerning, as agents that should not be holding certain risks begin to do it (this is what caused the demise of Reserve Primary Fund at the worst point of the subprime crisis).

Initially the search goes to marginally riskier assets, but as the progression continues the private sector loads increasing amounts of risks into its balance sheet

In fact, this pattern is already building up, as some pension funds that traditionally have invested in type A assets are now being forced to move into type B assets since r^A is too low for them to honor their future contingent liabilities

On net, a good policy, but it has risks... mostly because it pushes the private sector into taking more risks

The near future and some financial policy considerations

At the world level, g , δ , θ , β have declined while α has risen.

The most immediate consequence is an extremely low r^A for the few assets that are considered type A (a few sovereigns and corporations), and an enormous reluctance to hold macroeconomic risk (a sharp rise in λ).

It is not that interest rates are low in developed economies because central banks have decided to keep them there. The causality runs the other way around: they have to set low policy rates because the equilibrium rates are so low that if they didn't, the economy would experience strong deflationary forces (this is by Walras' Law, since an excess demand for assets must mean an excess supply of goods)

An extreme example of how tough it has gotten for type B assets is in the market for long-dated macro volatility

Currently, the price for insurance against "Black Swan" type events is so high, that is pricing in the possibility of an event worst than the great depression in the next few years

In the model, this price of insurance is exactly λ , once we think of B assets as those that are particularly exposed to a large systemic event.

The near future and some financial policy considerations

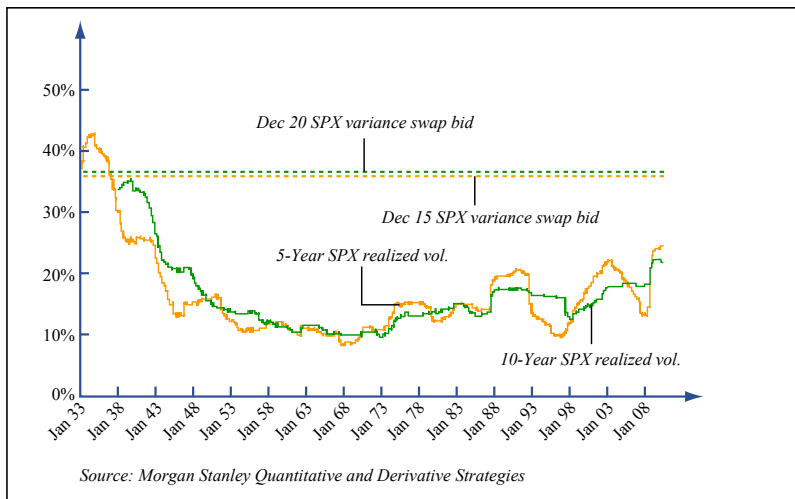


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- This situation is worrisome not only because it reflects a major dislocation, but also because it provides potentially dangerous incentives for the distribution of aggregate risk holding (a sort of AIG on steroids).

The counterpart of the tough environment for B assets is the enormous reward from being a type A asset producer, which is precisely what has maintained very low deficit funding costs for prime sovereigns.

The knee-jerk policy reaction after a crisis takes place is to attempt to prevent further private transformations from B to A

- For example, by increasing capital requirements

The near future and some financial policy considerations

Unfortunately that kind of policies ignores the structural deficit of type A assets that drives the perverse incentives...

There is a complementary policy reaction which is for the government to provide (paid) insurance against the panic component of systemic crises

This has the potential to expand the effective supply of A assets (i.e., β) and thereby reduce the λ that is behind much of the incentives to create macroeconomically fragile instruments. (TIC proposal)

When governments cannot offer any credible guarantee, the private sector has to build up a buffer to prevent panic-driven asset perception swings. But this is not an objective in itself, rather it is one of the many costs of chronic fiscal misbehavior.

The model has no nominal assets. Adding these would show that deflation is a complementary mechanism to restore equilibrium in financial markets when real interest rates do not converge quickly enough (although this Pigou mechanism may not be strong enough to pull the economy out of a recession)

What makes an asset type *A* or type *B*? This varies from time to time.

There are "super"-*A* assets that remain immutable through crises (such as U.S., German or Swiss treasuries). On the opposite extreme there are those that are type *B* par-excellence, such as the illiquid equity of small caps

The great majority of assets lies in between. "Bond vigilantes" and their relatives live from and in this region; while hawkish policy reactions are often motivated in terms of the distance from it. The soundest reforms are those that shrink the region of instability while maximizing the availability of *A* type assets. I'm not sure policymakers are giving much weight to the latter goal...

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14.454 Economic Crises

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