

## Knightian uncertainty and its implications for the TARP

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*By Ricardo Caballero and Arvind Krishnamurthy*

Financial institutions specialise in handling *risk* but are not nearly as efficient in dealing with *uncertainty*. To paraphrase a recent Secretary of Defense, risk refers to situations where the unknowns are known, while uncertainty refers to situations where the unknowns are unknown. This distinction is not only linguistically interesting but also has significant implications for economic behaviour and policy prescriptions. There is extensive experimental evidence that economic agents faced with (Knightian) uncertainty become overly concerned with extreme, even if highly unlikely, negative events. Unfortunately, the very fact that investors behave in this manner, makes the dreaded scenarios all the more likely. This mechanism has played an important role in the financial crisis.

The main implication of rampant uncertainty for the TARP and its relatives, is that capital injections are **not** a particularly efficient way of dealing with the problem unless the government is willing to invest massive amounts of capital, probably much-much more than the current TARP. The reason is that Knightian uncertainty generates a sort of double- (or more) counting problem, where scarce capital is wasted insuring against impossible events.

A simple example makes the point: Suppose two investors, A and B, engage in a swap, and there are only two states of nature, X and Y. In state X, agent B pays \$1 to agent A, and the opposite happens in state Y. Thus, only \$1 is needed to honour the contract. To guarantee their obligations, each of A and B put up some capital. Since only \$1 is needed to honour the contract, an efficient arrangement will call for A and B *jointly* to put up no more than \$1. However, if our agents are Knightian, they will each be concerned with the scenario that their counterparty defaults on them and does not pay the dollar. That is, in the Knightian situation the swap trade can happen only if *each* of them has a unit of capital. The trade consumes *two* rather than the *one* unit of capital that is effectively needed.

Of course, real world transactions and scenarios are a lot more complex than this simple example, which is in itself part of the problem. In order to implement transactions that effectively require one unit of capital, the government needs to inject many units of capital into the financial system.

But there is a far more efficient solution, which is that the government takes over the role of the insurance markets ravaged by Knightian uncertainty. That is, in our example, the government uses one unit of its own capital and instead sells the insurance to the private parties at non-Knightian prices.

The Knightian uncertainty perspective also sheds light on some of the virtues of the now defunct asset-purchases programme of the original TARP. In practice, financial institutions face a constraint such that value-at-risk must be less than some multiple of equity. In normal times, this structure speaks to the power of equity injections, since these are “multiplied” many times in relaxing the value-at-risk constraint. In contrast, buying assets reduces value-at-risk by reducing risk directly, which typically does not involve a multiplier. However, when uncertainty is rampant, some illiquid and complex assets, such as CDOs and CDO-squared, can reverse this calculation. In such cases, removing the uncertainty-creating assets from the balance sheet of the financial institution reduces risk by multiples, and frees capital, more effectively than directly injecting equity capital.

Does this mean that there is no role for capital injections? Certainly not. Knightian uncertainty is not the only problem in financial markets, and capital injections are needed for conventional reasons. Our point is simply that these injections need to be supplemented by insurance contracts, unless the government is willing to increase the TARP by an order of magnitude (i.e. measure it in trillion)

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