

The Crisis of Undercoordination

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Abstract

Technological progress—especially in the realms of information processing, communication, transportation, commerce and distribution of energy—is leading to an accelerated growth in interdependence on all levels of modern society. A well-known result in systems analysis is that highly interdependent large-scale systems carry a high risk of catastrophic failures. To ensure stability, an increase in interdependence must be accompanied by an increase in coordination/regulation. In democratic societies there is an imbalance between interdependence and coordination/regulation. A manifestation of this imbalance is a chronic crisis of undercoordination. In large measure, the debt crisis of 2008 may be viewed as an eruption of the crisis of undercoordination.

Keywords: Interdependence, coordination/regulation, undercoordination.

The painful debt crisis is not as much in the news today as it was a while ago, but it may flare up again. Cyprus is a case in point. What is widely unrecognized—and what should be a cause for worry—is that the debt to GDP ratio in the United States stands at 105%, not far behind Greece's 157% and far above China's 15%. The debt crisis poses a serious threat to the financial stability of the world's banking system. Among the many contributing causes of the debt crisis, a cause that stands out in importance is the high interconnectedness of banking systems, with a failure of one system triggering failures of others. In large measure, high interconnectedness is a side effect of technological progress—progress which facilitates communication, trade, travel, networking and transfer of material and intellectual resources.

In a 1974 paper entitled "On the Analysis of Large Scale Systems," I drew attention to what I called the Crisis of Undercoordination. In essence, the crisis of undercoordination relates to insufficiency of coordination in highly interconnected large-scale systems. Two doctrines emerge from an analysis of behavior of such systems. The first doctrine is: Highly interconnected large-scale systems are intrinsically vulnerable to catastrophic failures. The second doctrine is: To maintain stability of a highly interconnected large-scale system, an increase in the degree of interconnectedness must be accompanied by a commensurate increase in the degree of coordination. Today, these doctrines are more or less conventional wisdom. However, what is not recognized to the extent that it should is that the doctrines in question apply to all large-scale systems -- physical, social and economic.

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The European debt crisis is a quintessential instance of the first doctrine. There are many other instances. An example drawn from the past is the massive failure of the electric power distribution system in the Northeast in 1965. In that event, in the absence of coordination, the tripping of local circuit breakers spread unchecked through the whole system.

The first doctrine is descriptive. The second doctrine is prescriptive. In general, coordination involves regulation, control and higher levels of taxation. In democratic societies, governments are responsive to the wishes of the electorate. Nobody likes regulation, control and higher taxes. As a consequence, there is a chronic imbalance between the degree of interconnectedness and the degree of coordination. The crisis of undercoordination is a manifestation of this imbalance. In democratic societies the crisis of undercoordination is a chronic crisis which erupts when conditions are ripe. In this perspective, the European debt crisis may be viewed as an eruption of the crisis of undercoordination. The balance between interconnectedness and coordination is achieved without resistance when there is a compelling need for safety and stability, as in air traffic control.

In democratic societies, the path of least resistance for dealing with undercoordination involves borrowing money, with future generations repaying the debt. This is the path of least resistance because future generations have no vote. In the United States, in particular, the crisis of undercoordination reflects—more so than in most other countries—the deep-seated tradition of distaste for big government. Viewed against this backdrop, the credo of the Republican Party is in direct conflict with the second doctrine. In Europe, the second doctrine was not considered when the European Union was formed, resulting in a jump in the degree of interconnectedness. Had it been employed, the chances are that we would not be faced with the European debt crisis.

The crisis of undercoordination suggests a sobering thought. Most democratic societies—with the exception of societies which have highly educated and sophisticated electorates, such as Scandinavian countries—have become addicted to living on borrowed money, harboring seeds of self-destruction brought about by catastrophic failures of economic and financial systems. Is this what awaits the United States? A

troubling thought is that the 16 trillion dollar debt of the United States may well be a ticking bomb.