Federal Reserve Bank of Cleveland

Coordination Failures in the Labor Market

by Guillaume Rocheteau and Murat Tasci

Coordinating the actions of individuals is not a trivial task. Take a simple example: Two cars arrive at an intersection. How should the drivers proceed? In most countries, there are lights or stop signs to indicate who has the right of way. If such coordination devices did not exist, it would be much harder to avoid situations where both drivers are stuck at the intersection and no one wants to move or, worse, where they simultaneously try going first.

If it is not obvious how to coordinate the actions of two individuals at a crossroad, how hard must it be to coordinate the actions of hundreds of millions of producers, consumers, and workers in a large economy? Paradoxically, one of the most celebrated ideas in economics—what Adam Smith called the *invisible hand*—tells us that it is not hard at all: Market forces will guarantee an efficient allocation of resources.

Economic models demonstrate the validity of this result, but they assume the presence of stylized markets, which work like organized exchanges (such as the New York Stock Exchange) for all goods and commodities. This assumption means that individuals in the models are informed about all the prices that prevail in the economy and that they cannot affect prices individually.

While this is a useful abstraction, economists recognize that most markets do not operate in this way. Several economists have suggested that conditions in real markets might prevent individuals from coordinating their decisions properly. Consider, for instance, the labor market. It consists of many workers looking for jobs and open jobs needing to be filled by workers, and these are matched together through a time-consuming and costly search process. It is rather difficult for a worker to locate a suitable position and, reciprocally, it is not always easy for firms to find suitable unemployed workers for the jobs they make available. Furthermore, workers and firms have only an incomplete knowledge of the prevailing wages—the price of labor—in the economy. And unlike in the stylized market, individuals can affect prices; workers and firms can set the wage through bilateral negotiation.

Because of such conditions, it is possible for the labor market to wind up in different states, some being better from society's perspective than others. Two economies with the same technologies and policies, for instance, could achieve entirely different activity levels and unemployment rates. Moreover, economic activity could fluctuate even though the economy receives no shock. In this context, there may be a room for some government intervention to help individuals coordinate on a good outcome, just like with the traffic lights at the intersection.

When Do Coordination Failures Arise?

In order to define situations with coordination failures, it is useful to consider a simple example. Take a team of workers with identical skills. Assume that the productivity of each individual increases with the effort of his co-workers. Every worker chooses how intensely he will work, but his choice is affected by his co-workers' level of effort: If they work harder, he will increase his own level of effort. (The workers' choices for how intensely they will work in this case are said to be *complements*.)

Can two countries, or two different states, with similar technologies, resources, and policies exhibit differences in labor market performance? In contrast to a commonly held view, the answer is yes under some conditions that we review in this *Commentary*. If these conditions are satisfied, the unemployment rate and the production of an economy can fluctuate even in the absence of shocks. Moreover, government intervention can be useful if it coordinates the economy on the preferred outcome.

The way a worker reacts to others' choices (his *reaction function*) is depicted in figure 1 by the curved line. The curve specifies the level of one worker's effort, e, for any level of his co-workers' effort, $\bar{e}$. This reaction function slopes upward, reflecting the fact that if all other workers increase their effort, the remaining worker will find it optimal to work harder.

There are several possible outcomes for this simple economy. If all individuals but one exert little effort, the productivity of the remaining worker will be low and, as a consequence, he finds it optimal to put forth little effort. In this outcome, all workers supply a low level of effort and no worker has an incentive to choose unilaterally to work harder. Suppose next that

ISSN 0428-1276

all workers but one work hard. In this case, the productivity of the remaining worker is high and he finds it optimal to work hard, too. This outcome features all workers choosing a high level of effort.

These situations are depicted by the straight line in figure 1 and the multiple points at which it intersects the individual's reaction function. The straight line represents the situation in which all individuals make the same choices. In such situations, every individual's choice of effort is the same as the average choice of effort, so $e = \bar{e}$, which results in the 45 degree line. If each worker chooses his effort optimally given the effort choice of his coworkers, any possible outcome must lie on his reaction function. Therefore, all plausible outcomes are at points where the individual's reaction function and the 45 degree line intersect. The example illustrated in figure 1 shows three such outcomes (referred to as *equilibria*): an equilibrium where the worker supplies a low level of effort, an equilibrium with medium effort, and an equilibrium with high effort.

Economists have shown that the high-effort equilibrium makes *all* workers better off than the equilibria with low or middle effort. The low- and middle-effort equilibria exemplify a coordination failure, because no one has an incentive to deviate from the choice of low or medium effort unilaterally, but if workers could choose their actions jointly, they would choose the high level of effort.

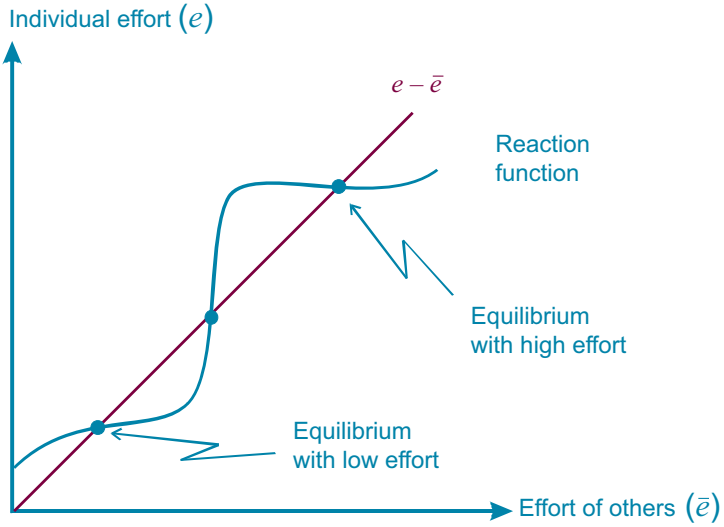
Sources of Labor Market Coordination Failures

Should anyone hope to coordinate workers and employers on the preferable equilibrium, the sources of coordination failures need to be specified. We will discuss three possibilities here. One is the search process itself, and one is government policies that affect the labor market. The third has to do with the skills of the workforce, in that they can be increased by employment and diminished by periods of unemployment.

Search and Recruiting

One plausible source of coordination failure in the labor market is the matching process through which

FIGURE 1 COMPLEMENTARITIES IN EFFORT CHOICES



available jobs and suitable workers are brought together, a process which requires that firms spend resources and time finding and hiring workers and that unemployed workers spend time and effort finding suitable jobs. The possibility of coordination failure comes about because the hiring decisions of firms and the job search efforts of workers are complements.

Consider, for instance, a labor market where workers choose the *intensity* (or speed) with which they search for a job, while firms choose the number of vacancies to advertise. If firms decide to open more vacancies, unemployed workers will search more intensely. Because workers are more likely to succeed at finding a job when firms post more vacancies, they have an incentive to allocate a larger fraction of their time to their job search. Reciprocally, if workers devote more effort searching for jobs, what will firms do? Because it takes less time to fill vacancies, hiring is less expensive and firms have an incentive to open additional vacancies.

Provided that the complementarities between firms' decisions to open jobs and workers' decisions to look for jobs are sufficiently strong, multiple equilibria can exist. There is a situation in which firms advertise many vacancies, unemployed workers devote a large fraction of their time looking for jobs, and as a result, unemployment is low. There is also a situation with few jobs and vacancies, low job search intensity, and high unemployment.

Is this multiplicity of equilibria a mere theoretical curiosity, or is it empirically plausible? It is plausible if the matching process is such that it can yield unemployment rates that differ depending on the size or scale of the labor market—that is, the process of matching workers to employment opportunities is characterized by increasing returns to scale. The overall evidence is mixed on this point. While many studies have found constant returns to scale, several studies provide compelling evidence to the contrary. If those studies are accurate, and the condition is met in labor markets, multiple equilibria are possible.

Labor Market Policies

Multiple equilibria can also arise because of labor market policies intended to improve workers' well-being. Employment protection and funded unemployment insurance systems are two examples of such policies.

Employment protection aims to reduce worker displacement and job destruction by imposing various costs (such as advance notices or severance payments) on employers who fire workers. Several European countries have put laws in place that offer this protection.

One of the equilibria that these policies can generate is characterized by low job turnover and high unemploy-

ment. That is, such protection can lead to a situation in which employers are reluctant to hire workers, even when they need them. Believing that workers will be reluctant to quit their jobs voluntarily if economic conditions one day require firms to eliminate some jobs, employers anticipate they will incur various firing costs to reduce their labor forces in the future. The prospect of these firing costs makes employers reluctant to hire workers in the first place.

Reciprocally, if workers believe that firms are reluctant to hire workers, they hang onto their current jobs (and search for better ones while employed) to avoid a long unemployment spell if they quit. Workers behave as employers anticipate, and vice versa.

Interestingly, there is also an equilibrium where workers quit their jobs in bad times and employers open a large number of jobs: Turnover is high and unemployment is low. Of course, this low-unemployment equilibrium would be unanimously preferred by workers and firms if they could make their decisions jointly. The solution to this kind of coordination failure seems straightforward: It is, in fact, to reduce or eliminate firing costs. One can relate such a proposal to the recent debate in France about introducing a new type of employment contract for young workers—one that could be easily terminated.

Another example of a labor market policy that can generate multiple equilibria is a funded unemployment insurance system—a system where the government promises to pay a fixed benefit to unemployed workers. Suppose that the funding necessary for the unemployment insurance is generated through a payroll tax. The amount of the tax levied on filled jobs will increase with the unemployment rate, since higher unemployment implies a reduced tax base as well as a larger expenditure. The fact that the output of a job net of taxes is decreasing with unemployment is what creates complementarities between firms' decisions to hire workers. Multiple equilibria can arise because employers may anticipate either high or low taxes. If they anticipate high taxes, they are reluctant to open vacancies, and consequently, unemployment is high. Because there are few jobs, the tax base is small and employers must pay more for each job, in accordance with employers' initial beliefs. If employers anticipate low taxes, they are willing to hire more workers. Unemployment is low, and the tax base is large.

Not too surprisingly, the situation with a low unemployment rate and low taxes is preferred by society to high unemployment and high taxes. Again, there is a simple way for the government to coordinate individuals on the good equilibrium: If instead of committing to a level of benefits, the government commits to a level of taxes and adjusts the benefits according to the taxes it collects, then the low-unemployment, low-tax equilibrium can become the unique equilibrium.

Learning-by-Doing and Loss of Skills when Unemployed

The process through which workers accumulate knowledge and skills—what economists call *human capital accumulation*—constitutes another realistic channel through which multiple equilibria can occur in the labor market. Workers tend to accumulate some general knowledge and skills when they are employed—through learning-by-doing, for instance. Conversely, they tend to lose some general skills—which could have been useful in their future jobs—when they go through some unemployment spell. As a consequence of this process, the stock of workers' knowledge and skills will depend negatively on the unemployment rate. A firm's decision to hire a worker generates a positive, but an unintended, effect for other firms, by maintaining and increasing the economy's stock of human capital.

This loss of skill during unemployment is one possible source of multiple equilibria. If firms believe that workers' average skills and human capital are low, they are reluctant to hire new workers. As a consequence, the labor market is depressed, the average spell of unemployment is long, and workers who lose their jobs experience a large depreciation of their human capital. Thus, unemployed workers are not very productive, in accordance with firms' initial beliefs. Of course, there is also an equilibrium where firms post a large number of vacancies, unemployment spells are short, and workers' average productivity is high.

Similarly, employed workers' learning-by-doing can be a source of coordination failures and multiple equilibria. Suppose that workers who are employed acquire general skills that make them more productive in their current jobs as well as in their future jobs. If firms believe that workers are on average very productive because of all the human capital they have accumulated in previous jobs, they find it profitable to open many vacancies. As a consequence, the average spell of unemployment is short, workers spend most of their time employed, and their stock of human capital remains high, in accordance with firms' initial beliefs.

■ Labor Market Traffic Lights?

Labor markets are particularly susceptible to coordination failures because of the various frictions that exist within the complicated process through which workers and employers are matched together. Coordination failures make it possible for a labor market to wind up in a number of states, some of which are far more desirable in terms of social welfare.

But so long as coordination failures are possible, the undesirable states may be as likely as the desirable ones. Imagine a nation of ambitious employers, eager workers, and ample resources ending up with high unemployment and low productivity—accidentally in a sense—because of such coordination failures.

Just as drivers at an intersection benefit from traffic signals, labor markets might benefit from mechanisms that force particular outcomes in situations where coordination failures are possible. Hence, the presence of coordination failures might create some room for government intervention. For instance, active labor market policies such as job training, career counseling, and job-search assistance could promote a more efficient matching between workers and employers.

Our analysis here also argues that government policies themselves could create coordination failures, as in the example of funded unemployment insurance. How such coordination of

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individuals on a good outcome can be accomplished when coordination failures are possible is a subject of ongoing research.

■ Recommended Readings

"Fiscal Increasing Returns, Hysteresis, Real Wages and Unemployment," by Olivier Blanchard and Lawrence Summers. 1987. *European Economic Review*, vol. 31, 543–66.

"Coordinating Coordination Failures in Keynesian Models," by Russell Cooper and Andrew John. 1988. *Quarterly Journal of Economics*, vol. 103, 441–63.

"Aggregate Demand Management in Search Equilibrium," by Peter A. Diamond. 1982. *Journal of Political Economy*, vol. 90, 881–94.

"Costly Search and Recruiting," by Peter Howitt and R. Preston McAfee. 1987. *International Economic Review*, vol. 28, 89–107.

"Animal Spirits," by Peter Howitt and R. Preston McAfee. 1992. *American Economic Review*, vol. 82, 493–507.

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"Loss of Skill during Unemployment and the Persistence of Employment Shocks," by Christopher A. Pissarides. 1992. *Quarterly Journal of Economics*, vol. 107, 1371–92.

"The High Unemployment Trap," by Gilles Saint-Paul. 1995. *Quarterly Journal of Economics*, vol. 110, 527–50.

"Balanced-Budget Rules, Distortionary Taxes, and Aggregate Instability" by Stephanie Schmitt-Grohe and Martin Uribe. 1997. *Journal of Political Economy*, vol. 105, 976–1000.

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