

Unemployment and other challenges. On the Nobel Prize in Economics awarded to Peter A. Diamond, Dale T. Mortensen and Christopher A. Pissarides*

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Resum. Les contribucions del guanyadors del Premi Nobel d'Economia 2010 destaquen en els exàmens de la funció de les friccions en els diferents mercats, en què les heterogeneïtats i especificitats fan que sigui necessari un procés de recerca per a trobar una coincidència raonable entre les parts en una transacció. Les aplicacions per als mercats de treball són dignes de menció, amb grans implicacions per als determinants de l'ocupació i l'atur i per a les polítiques en aquesta matèria. No obstant això, els resultats també es poden extrapol·lar a altres tipus de mercats i aplicacions.

Paraules clau: friccions · cerca · coincidència · atur · vacants

Abstract. The contributions by the 2010 Nobel Prize winners in Economics stand out in examinations of the role of frictions in different markets, in which heterogeneities and specificities make a search process necessary in order to find a reasonable match between the parties in a transaction. The applications to labor markets are noteworthy, with major implications for the determinants of employment and unemployment, and for policies on these matters. However, the findings can also be extrapolated to other kinds of markets and applications.

Keywords: frictions · searching · matching · unemployment · vacancies

The 2010 Nobel Prize in Economics was awarded to Dale Mortensen, a professor at Northwestern University; Peter Diamond from MIT; and Christopher Pissarides from the London School of Economics, for their “analysis of markets with search frictions”... especially job markets (Fig. 1). However, their research also has broad applications and implications for other dimensions of economic life and beyond.



Fig. 1. Left to right, Peter A. Diamond, Dale T. Mortensen, Christopher A. Pissarides. © The Nobel Foundation. Photos: Ulla Montan.

Interestingly, the award, which is officially called the ‘Swedish Central Bank Prize in Economic Sciences in Memory of Alfred Nobel,’ was not stipulated by Nobel in his will, as the other Nobel Prizes were; rather it was launched as part of the commemorations to celebrate the third centennial of the Swedish Central Bank (1668–1968). The Economics Prize was awarded along with the other prizes for the first time in 1969, with Ragnar Frisch and Jan Tinbergen as the winners. In fact, the initial comparison to the other Nobel Prizes was opposed by some of Alfred Nobel’s family members, so the official name was changed, although obviously in public opinion, the media, and academia reference to the prize as the ‘Nobel in Economics’ is fully entrenched.

The Swedish Central Bank can boast that it was officially founded prior to 1694, which is usually considered the date that the Bank of England was established as a central bank, a claim often cited to endorse its role as the ‘first central bank’ in history, in the modern sense of the term. Sweden, too, occupies a prominent place in the history of paper money issuances [1], although it should be noted that the *Riksbens Ständers Bank* was created in 1668 as a ‘replacement’ for the Bank of Stockholm, a private bank under royal privilege. The improper issuance of bank bills led the latter to declare bankruptcy, which would explain why the new bank was placed under the control of the Parliament instead of the King’s authority.

The researchers who were ultimately awarded the 2010 Nobel Prize in Economics did not figure prominently on the informal lists of candidates. Other choices were Albert Alesina for his economic-political analyses; Nordhaus, Weitzman or Das-

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gupta for their environmental analyses; Paul Romer for his creative approaches; Tirole, Holstrom or Hart for their focus on businesses and organizations; and Reinhart and Rogoff for their hindsight analyses of the crisis. There were also the classical candidates, like Robert Barro, Jagdish Bhagwati and William Baumol, while members of the ‘young group’—at least by the Nobel in Economics’ standards—such as Acemoglu and Rodrik, would have to wait in the wings. Ultimately, the timeliness of and societal concern with the problems of unemployment must have guided the choice of the three winners within the inscrutable criteria of the Selection Committee, although in any case they are certainly up to par with the history of the Nobel in Economics.

‘Find the right match’

This was the title of the note announcing the prize winners. It refers to the basic notions that in many markets—in the broad sense, which we shall discuss below—there is no absolute homogeneity in the goods, assets, or characteristics that are the object of transaction, likewise in the broadest sense. For this reason, what are needed are *search* processes or mechanisms in order to find a reasonable *match* between those who supply and those who demand, i.e., both sides of the transaction, in order to “close the agreement.”

Even though, as has been amply pointed out, many of the Nobel Prize winners’ contributions with the greatest impact refer to the labor market and in particular to determining the unemployment rate, their search + matching processes are applicable in a more general sense than is often assumed. Each individual unquestionably has specific characteristics in terms of his or her job, professional qualifications, attitudes, and personality, and these affect the productive potential of work teams, companies, and organizations. Likewise, despite advances in the standardization of jobs, each potential vacancy to be covered has specific features. For this reason, search processes in job markets as a prelude to a proper match (to differing degrees) are important and frequent. In fact, these approaches are applicable to all cases in which the objects being transacted are homogeneous and/or standardizable commodities. But jobs are not commodities and, obviously neither are people, not even terms of merely their productive potential ...

Similar descriptions can be applied in other fields. One timely example is, of course, the real estate market. In this case, the specific needs and preferences of each person or family are unique, while the parameters of each home in terms of its price, location, layout, surroundings, and accessibility, etc., have their own more or less unique traits. The recent dynamics in the real estate industry—first a surge and then a drop—has familiarized us with indicators such as visits per vacant apartment prior to purchase and others that clearly refer to the search process. Credit markets, too, largely fit this description in that the true solvency and solidity of the investment projects seeking financing have idiosyncratic factors of specificity [2]. Even the role of money has been rationalized as a tool that ‘lubricates’ exchanges in economies with widespread intrinsic

search costs—Kiyotaki and Wright is a well-known reference [3,30]—thus placing search + match as a foundation of the monetary economy.

In the world of business and in everyday life, search + matching mechanisms are more frequent than we may realize. Searching for and finding suppliers and clients with guarantees of quality and solvency and the absence of ‘opportunistic behaviors’ is a well-known factor that globalization has revalued, now that the networks of both suppliers and clients can readily be geographically larger in scope, implying a complexity in the ‘rules of the game’ and ‘institutional frameworks’ that require approaches and experimentation until reasonably reliable partners are found. Arthur Okun’s contrast between ‘the invisible hand’ and the ‘handshake’ (sometimes visible and explicit, but other times invisible or implicit) could serve as a partial description of search + match mechanisms.

However, these situations naturally occur not only in economic spheres but also in many other realms of human interaction. In the sphere of interpersonal relations, [4] the processes that lead us to forge friendships and pair off in couples have these traits of heterogeneity among individuals, specificities that must ‘match,’ longer or shorter search processes, situations in which a ‘match’ is made, and of course others characterized by phenomena like break-ups, ruptured relations, and changes in partners. People who gladly note a certain ‘imperialism’ of the analytic concepts and tools of economics beyond its strict boundaries will find these ideas to be an interesting means of stating and confirming the potential of the broad discipline of human and social sciences which economics is, or should be.

The role of frictions

The most basic formulations on how markets operate, which revolve around the usual analysis of supply and demand that students are taught from day one, start with the simplification of referring to standard, homogeneous goods for which supply and demand relations are defined to determine a price and equilibrium amount. The recognition that the real world is more complex leads us to wonder whether the ‘deviations’ are of a second or third order, meaning that the standard formulation is a reasonable approximation, or whether, to the contrary, they are something more than ‘frictions,’ in the sense that they can have quite significant impacts on the determination and configuration of the equilibrium. An essential aspect of the 2010 Nobel Prize winners’ contributions is their proof that frictions are important in the sense that even though they may seem to be of limited scope, they substantially affect the equilibrium. Let’s examine some of the facets of this argumentation.

First, in 1972 Peter Diamond published an article in the *Journal of Economic Theory* in which he argued that, in markets with a multiplicity of buyers and sellers but with search + match costs, frictions can even lead to a situation in which the ultimate price is not the competitive equilibrium price but actually the price that might occur in a monopoly! [5] This result, known as the Diamond paradox, is based on the fact that each

potential buyer will have a reference price, such that if they find an offer at an equal or lower price they will accept it and stop searching. Since sellers know this, they have an incentive to set the price at the maximum that buyers as a whole would be willing to pay (monopoly price), since for any lower price asked by sellers some of them will have the incentive to ask a higher price, yet one that is only slightly higher in order to avoid triggering a costly additional search. Thus, the only balanced configuration would be that all the sellers ask the monopoly price only as a result of low search costs.

The assumption implicit in the Diamond paradox is homogeneity among buyers and sellers. One major step towards realism in this literature came from explicitly introducing diverse dimensions of heterogeneity that can partly explain, or 'resolve,' the Diamond paradox, although they end up leading to a dispersion or multiplicity of prices. The basic case of single competitive market equilibrium thus faded away as a result of frictions that give rise to searches and heterogeneities, laying the groundwork for a research agenda of not only theoretical but also practical importance.

The doubts as to how frictions move us away from the theoretical results of competitive markets involve not only the configuration (price and quantity) of the equilibrium but also its uniqueness. In a world with search costs, there is no guarantee that all the deals and contracts will close at the same price, or at the same wage in the case of the job market. Today we are accustomed to examples such as how the passengers on a given flight probably have a surprisingly high degree of heterogeneity in the prices they paid, or how the salaries earned by people with similar educational levels also show degrees of difference that have tended to rise instead of fall.

Mortensen has played a particularly prominent role in stressing this implication of wage/price dispersions: his 2005 book is the best compendium of contributions in this literature on job markets [6,35]. The properties of the distributions of prices or salaries, the factors that affect their dispersion, and their economic and social implications are interesting and realistic spheres of analysis and debate. Likewise, the multiplicity of possible equilibria poses the question of whether they are equally valuable in terms of efficiency and/or social desirability; having proven that they are not begs the question of which measures or policies will encourage the real results to polarize as the ones regarded as the most desirable. The fact that search activities imply costs in resources is at the core of these analyses.

Another important implication refers to the macroeconomic dimensions of frictions. At around the same time that Diamond was working on the paradox that bears his name, Dale Mortensen published an article [32] that would have a huge impact in academia. In a volume edited by fellow Nobel Prize winner Edmund Phelps, on the microeconomic foundation of inflation and employment, Mortensen demonstrated how search + match costs can explain both the famous short-term relationship between inflation and unemployment, which we know as the Phillips curve, and how the middle- and long-term dissipation of the capacity to 'exchange' drops in unemployment with rises in the inflation rate.

This article appeared back when Milton Friedman had just explained how the purported 'trade-off' between inflation and unemployment—which post-Keynesians like Samuelson and Solow had included in the recommended tools for macroeconomic policy—disappeared in the long term as a result of changes in the expectations generated by their use, while Phelps and his associates, including the young Mortensen, had rigorously grounded these ideas [7] by conferring a key role on search + match costs. Dovetailing with the debates on macroeconomic theories and policies, developments in the 1970s revealed the need to complement this approach on the aggregate demand side—crucial to basic Keynesian ideas, including macroeconomic fiscal and monetary policies—with ingredients that were from the increasingly relevant supply side. Aspects such as the functioning of job markets and interactions with the dynamics of prices and costs were revalorized due to the problems of the 1970s and 1980s, phenomena that have returned today, such as stagflation.

The debates on the Phillips curve had become one way of introducing the problems of job markets as a crucial consideration in the supply side. The 2010 Nobel Prize winners stressed that the so-called Beveridge curve or relation, which associates the behavior of vacant jobs to be covered with unemployed persons looking for a job, also play a key role. As Blanchard and Diamond [23] explained in an article explicitly entitled 'The Beveridge curve,' this relationship did not deserve the secondary status to which the spread of the Phillips curve had relegated it, since it is "conceptually earlier and contains essential information on the functioning of the job market and the shocks that affect it."

Focus on flows: The role of matching

The partnership between Peter Diamond and Olivier Blanchard [8] in the late 1980s and early 1990s was fruitful in providing a basic version that contributed to popularizing the ideas of the search + matching approach. In 1994, the other two prize winners, Mortensen and Pissarides, published a more elaborate and formalized article which is frequently cited as a reference to these formulations. However, to describe the essential aspects, we should briefly state what Blanchard and Diamond [24] called a 'minimalist model.'

One point stressed by those authors is the large inflows and outflows in job markets. Back then, around seven million people per month started and left jobs in the United States. According to 1980 figures, around 10% of the working population in manufacturing in the United States was part of the quarterly job turnover. Naturally, in other more rigid economies—such as the European economies, with Blanchard's (a Frenchman) contribution being important for introducing the 'European perspective' in this analysis, just as the mix between the American Mortensen and the European Pissarides was important for the other facet of formulations of the approaches, which led to the Nobel Prize—the magnitudes may not be quantitatively as important yet they are nonetheless notable.

Therefore, studying labor markets in terms of inflows and

outflows, and in terms of the ‘flows’ in the creation and destruction of jobs, was the natural way, beyond the fact that socio-political concern focused on the varying ‘stock’ in the volume of unemployment. Precisely one essential aspect of the problems stemmed, and still stems, from the lack of correspondence between the “geography of job destruction and the geography of job creation,” from the differences between the qualifications needed for the jobs that are created compared to those that are destroyed, as well as from the heterogeneities between the degree of zeal with which companies seek to cover their vacancies and the individuals who are actively seeking jobs at any given time.

For this reason, the Blanchard-Diamond [24] ‘minimalist model’ starts with the functions of job destruction and job creation. The explanatory variable of each aspect is both salaries and parameters that represent the shocks that affect the destruction and creation of jobs, which range from fluctuations in the aggregate demand to the role of foreign competition—a factor included in the formulation almost 20 years ago, when the mechanisms of offshoring, outsourcing, and their kin were much less important than today—as well as changes associated with technology. Naturally, the process of job creation and destruction must be coupled with forced job hiring and firing in order to provide a broader and more realistic view of the dynamics of job market flows.

The other key piece in these formulations, and probably the one that most specifically defines them, is the matching function, m , which relates hires (denoted by h) as a function of the components of the Beveridge relation: vacancies, v , and unemployed persons, u , so that its most basic formal formulation can be written as:

$$h = m(u, v)$$

The repeated Blanchard-Diamond formulation shows the possible interpretation of this matching function [9] as a ‘black box’ that relates the input of vacancies with the output of hires. In fact, clarifying, quantifying, and substantially refining the content of this ‘black box’ was the enormous task that the Nobel Committee particularly valued. The initial formulations of the matching function fit reasonably well with a stable Cobb-Douglas-style function, with constant performances at scale, results which are known in other realms of economic analysis. [10]

The other basic piece refers to the determination of wages. This includes criteria on the ease with which workers can find alternative jobs, the companies’ ease or difficulty in replacing workers, and other aspects derived from approaches such as efficiency wages [11]—which include the capacity of good salaries to induce more effort and to retain the best people for the company—and bargaining factors, both individual and collective. Just like in other fields of economic analysis, the “Nash efficient bargaining” criterion is used in the most common formulation. Without delving into overly technical details, the most basic formulation of salaries makes them depend positively on vacancies and negatively on unemployment, relationships that can be rationalized in many ways, all of them related to what each of the bargaining parties will get in the absence of an agreement.

The interaction between the ingredients just mentioned, i.e., job inflows and outflows, matching, and salary determination, as well as both Blanchard-Diamond’s [24] ‘minimalist’ version and Mortensen-Pissarides’ [38] more comprehensive and sophisticated version make up the key pieces in the 2010 Nobel Prize winners’ analyses of job markets in their microeconomic and macroeconomic dimensions. These powerful and useful analytical and empirical tools have demonstrated their universality, have been inserted into broader formulations on the functioning of the economy, and have thus generated important applications and debates. We discuss some of them in the following sections.

A crucial point: Cyclical and reallocation components

One of the timeliest aspects of the prize winners’ contributions lies in the distinction between two different dynamics that can affect the relationships between unemployment and job vacancies. The first comprises the more strictly and classically cyclical aspects linked to the ebb and flow of economic activity, and in particular to the aggregate demand. At a time of cyclical expansion, vacancies rise while unemployment drops, while in cyclical contractions the opposite occurs. In fact, this was the original dynamic of the Beveridge curve.

Figure 2 is precisely what was stressed by the Nobel Committee when it awarded the 2010 prizes. It demonstrates the correlation between vacancies and unemployment (the aforementioned Beveridge curve relationship) in the United States, with information from the first decade of the 21st century. This shows the chiefly cyclical dynamic during that period, with the prime and noteworthy exception of 2009 and 2010, in which the need for more important reassignment mechanisms clearly emerged.

However, there are times when the relationships between vacancies and unemployment are not so simple: one particularly significant case is during a major reallocation of resources between sectors or activities, such that new vacancies appear in sectors quite different from those where jobs are being

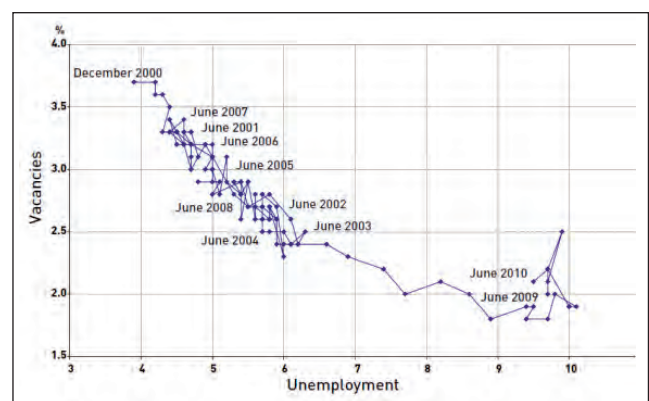


Fig. 2. Dynamics of job vacancies and unemployment in the United States (2000–2010). Source: Nobel Committee (2010), with figures from the Bureau of Labor Statistics.

destroyed and unemployment is appearing. These are situations in which economies grapple with structural changes as the result of technological changes or modifications in the specialization patterns as a result of global or local changes, or in which a given growth model has exhausted its potential or alternatives must be found. In these cases, the movement between vacancies and unemployment will show a positive correlation. Naturally, at each specific point in time the two facets can be combined, and structural adjustments often dovetail with recessions, giving rise to particularly serious problems in terms of magnitude and conflictivity.

One application of this analysis is a comparison of the effects of the economic crisis that started in 2007–2008 on Germany and Spain. The German productivity model is clearly oriented towards exportation and other avenues of internationalization, with highly competitive products that have made Germany, with a population substantially less than that of the United States or, of course, China, the top-ranked exporter of goods in the world for some years (although it was replaced by China in 2009, at least when exports are measured in aggregate terms, not added value). Germany's competitive position meant that in 2009 its drop in GDP was even higher than the drop in Spain, [12] despite the fact that the labor market's response mechanisms were oriented more towards shortening workdays and other work-sharing mechanisms than towards layoffs, such that the unemployment rate in Germany had one of the lowest rises in the crisis years. However, when the recovery got underway on a global scale, the competitiveness of the German productive apparatus had remained intact, so that its privileged ties with the emerging economies spearheading the recovery enabled Germany to experience 3.6% growth in 2010.

By contrast, in Spain, as is well known, the crisis is not only, or not primarily, a cyclical phenomenon; rather the failure of the 'growth model' that was in place prior to the crisis has prompted the need to find new activities that can relieve the engines that were exhausted pre-crisis. [13] This process is taking longer than is desirable, such that the appearance of new sources of jobs has been particularly slow, as evidenced by sustained unemployment rates of around 20%. Some of the Nobel Prize winners' studies mention the 'cleansing' role of recessions, which contribute to eliminating inefficiencies in companies and unsustainable patterns of resource allocation, which would have been desirable in Spain had the environmental conditions not allowed it to reach so far. In Germany, therefore, circumstances reflect a cyclical dynamics more in terms of the GDP than unemployment, whereas in Spain they show a particularly delicate superimposition between cyclical problems and the even more serious problem of the reallocation of resources between sectors or activities in the quest for new parameters to improve competitiveness and create jobs.

Discussion

As mentioned above, the Mortensen-Pissarides [38] formulation has earned recognition as one piece in the post-graduate

macroeconomic formulations that turn these approaches into 'classics.' This recognition has also triggered a surge, almost an avalanche, of analytical debates and empirical testing. Of all the criticism offered thus far, Robert Shimer's deserves mention [14]. Its main feature is a painstaking methodology for proving the interpretative power of the standard formulations of the matching function to explain a relatively large part of the fluctuations in unemployment. Shimer's most famous result is that this explanatory capacity would be lowered by only around 10% of the volatility of vacancies and changes observed in unemployment when the fluctuations stem from shocks in productivity. As Shimer himself stresses, the core target of his criticism is not so much the search + matching model as a whole (which he recognizes as useful, analytically operative, with rich and intuitively attractive results for comparative statics, and which can be easily adapted to study matters such as unemployment insurance, restrictions on dismissals, etc.) but mainly the last of the 'pieces' mentioned in Sect. 4: the determination of wages through Nash-style bargaining mechanisms. Shimer proposes wage determination mechanisms that give rise to greater wage rigidity as an alternative, with a possible role for a more complex matching function than postulated in the basic formulations.

The Nobel Prize winners' responses rose to the insightfulness and seriousness of the criticisms. Mortensen's articles written in conjunction with Nagypál [37] and Pissarides [38] are among the most cogent of these responses. After acknowledging the seriousness of Shimer's criticism, the authors offer matching mechanisms that are more sophisticated than those of the basic formulations. Without delving into the technical details, we could say that the search + matching model has also demonstrated its versatility by including more heterogeneous and realistic bargaining and matching mechanisms, which some experts believe are particularly delicate and important in cases of reallocation dynamics, mentioned in the previous section.

Another interpretation of these debates was precisely the role of adjustments via wages compared to adjustments via employment as response mechanisms to diverse shocks. This consideration, as discussed below, has sparked criticism of the theory of matching, and is, of course, an extremely timely issue given the reemergence not only of higher unemployment rates owing to the current recession but also, and more importantly, of evidence of major differences in the responses of different national and institutional systems to this crisis. Once again, the contrast between the above-discussed conditions in Germany and Spain has become a benchmark, even in some International Monetary Fund (IMF) reports comparing responses to the global economic crisis.

In the view of the media and from a socio-political perspective, one extremely controversial point is the potential implications of these approaches on social protection policies, and particularly on unemployment benefits. There are arguments on many fronts. The first concerns how benefits can extend the active search—or at least the length of the search—or simply the passive waiting of the unemployed. However, others ask how these benefits can contribute to a more efficient match

which allows for greater leeway so that the ‘right person’ finds the ‘right job,’ with all the gains in efficiency—in social and in human terms—that this entails.

Aware of several biased interpretations regarding the implications of this approach with respect to policies on unemployment benefits, the Nobel Prize winners used the particularly momentous occasion of the awards ceremonies to clarify their views. In particular, in Mortensen’s toast on behalf of all three winners at the gala dinner, he addressed the importance of “supporting the income of the unemployed during the recession... and restoring prosperity as quickly as possible.” Beyond technical arguments, the emphasis is on the social and human dimensions that support the provision of benefits and guarantees. After all, as Mortensen explained, economics is the “strange science” (to quote him in his toast at the gala dinner in Stockholm before the King of Sweden) that deals with the most important and yet most mundane issues affecting the human condition, and job markets and unemployment are the ‘perfect example.’ [15]

Other contributions by the prize winners

Peter Diamond’s contributions to extraordinarily timely issues, such as the debt and social security, both related to intertemporal and intergenerational dimensions, are particularly noteworthy. One of Diamond’s first academic studies [27] introduced the public debt into the neoclassical growth model formulated by Solow and Swan. Several discussions are worth highlighting. Diamond distinguishes between the destination of the resources obtained and debt issuances: one alternative is investments in productive capital that raises the economy’s potential, [16] while the other is investments in expenditures “without permanent effects,” which at one point he described as “gifts to part of the populace” with low or even dubious productivity.

The role of public policies in growth models is also the topic of two Diamond-Mirrlees articles published in 1967. The role of intermediate inputs, especially imported ones, is a thoroughly modern consideration, and the implication of the result of the advantages of not assessing imports of intermediate goods might be an interesting further issue. Regarding his contributions to the social security system, there are few striking surprises, yet a great deal of common sense. Diamond focuses on a balanced approach, with the introduction of gradual changes as the demographics evolve—an interesting reminder particularly in societies that did not take advantage of the economic windfalls yet are experiencing broad demographic changes (in the birth rate, migration, life expectancy)—to make the adjustments that must ultimately be shouldered at a time of crisis, with higher social costs than what might have been reasonable. The opinions of Diamond and his coauthors such as Nicholas Barr were solicited not only in the United States but also in China, which is particularly important given the role of Chinese savings in this country’s dynamic and in its surplus [21,22]. The latter is a crucial ingredient in the ‘external imbalances’ and ‘global savings glut,’ which, to a disputed degree,

has been one of the basic factors in understanding the recession that got underway in 2007–2008. Launching something similar to a social security or social protection system in China and other emerging economies is a crucial aspect of the proposals for the “solid, sustainable, and balanced growth” (to use an expression from the G-20 reports) of the world economy. [17]

Christopher Pissarides, the only European among the trio of prize winners, has made interesting contributions on the specificities of unemployment on the Old Continent. We should emphasize his insistence on the role of the rising, yet unfinished and certainly unequal, influx of women into job markets as a major positive factor. Also interesting are his analyses, coauthored with Ngai [39], of interactions between the ‘domestic (household) production’ of certain services and their market provision, with differing impacts on the levels and dynamics of employment depending on the particular ‘welfare state’ model (they specifically compare the European continental model with its English and Scandinavian counterparts). Also noteworthy is his carefully considered opinion on a better future positioning of Europe in terms of global competitiveness and improved job performance, and on the mix between contributions from the knowledge sector and from fields that are less productive yet have a major social presence, such as distribution. He has also contributed to formalizing intuitions on the implications of the new global rules in terms of asymmetrical impacts that are more favorable to the capital factor than to the work factor. An article by Azariadis-Pissarides [20] presents the impacts of the new realities and outlines how greater tensions may be displaced towards the work factor, especially regarding the dynamics of unemployment.

Mortensen has spotlighted the role of heterogeneities in different spheres, as mentioned regarding his analysis of wage dispersions. His more recent major contributions, largely the outcome of his partnership with European institutions and researchers, especially in Denmark, stress the role of heterogeneity in the productivities between companies even in the same sector, the potential role of the reallocation of workers and other resources as a tool to improve aggregate productivity, [18] and the role of innovation in products as a Schumpeter-style mechanism of progress. The role of public policies when the innovation rate that market mechanisms would generate is lower than what is socially optimal is an important implication. [19]

Finally, it is useful to revisit a relatively recent text by Peter Diamond [28], one that is somewhat atypical at first glance in that in his evaluation of the contributions of behavioral economics he offers somewhat broader perspectives on human behavior and its motivations than those of conventional formalized economic theory. Diamond revives a quote from Alfred Marshall in which this Cambridge don stated the wisdom and need to combine partial analyses, “step by step, decomposing a complex issue” into aspects that are easier to deal with and which have broader, most holistic visions that avoid the risks inherent in apparently exact formulations on issues which, however, “less closely correspond to real life.” He links this with the recommendation of fellow MIT Professor Ricardo Caballero [26], that in order to overcome, with intellectual honesty, the

claims of severe deficiencies in some approaches that have dominated economic orthodoxy in recent times, we must give more weight, considerably more weight, to broad exploration instead of the excesses that have come about in the name of fine-tuning, which beyond a certain level—and that level has been greatly exceeded—can be impoverishing and counter-productive. Peter Diamond's [29] insistence on the role of education and how through teaching one learns, one is forced to clarify things, and one gains stimuli for research is an interesting message at a time when the undervaluing of teaching has become an ailment in the profession.

Thus, we should also learn flexibility and pragmatism from the messages of the winners of the 2010 Nobel Prize in Economics in order to turn this 'strange science' (to use Mortensen's term) into a useful tool for understanding, and for attempting to shore up, the functioning of our societies, thus reviving Economics' place at the cutting edge of the social sciences and humanities.

To learn more

The prize winners' websites provide extensive information on their careers and especially their publications:

Peter Diamond, <http://econ-www.mit.edu/faculty/pdiamond>

Dale T. Mortensen, <http://www.dalemortensen.com/>

Christopher Pissarides, <http://personal.lse.ac.uk/pissarid/>

Selected bibliography

1. Blanchard O, Diamond P (1989a) The Aggregate Matching Function. NBER Working Paper 3175
2. Blanchard O, Diamond P (1994) Ranking, Unemployment Duration, and Wages. *Review of Economic Studies* 61:417-434
3. Diamond P (1971) A Model of Price Adjustment. *Journal of Economic Theory* 3:156-168
4. Diamond P, Mirrlees J (1971) Optimal Taxation and Public Production. Part I: Production Efficiency and Part II: Tax Rules. *American Economic Review* 61
5. Lentz R, Mortensen D (2008) An Empirical Model of Growth through Product Innovation. *Econometrica* 76(6):1317-1373
6. Pissarides C (1990, 2000) *Equilibrium Unemployment Theory*, 1st and 2nd ed. Basil Blackwell
7. Pissarides C (2006) What Future for European Jobs? *CentrePiece*
8. Pissarides C (2009) The Unemployment Volatility Puzzle: Is Wage Stickiness the Answer? *Econometrica* 77(5):339-1369
9. Pissarides C (2010) Why Do Firms Offer 'Employment Protection'? *Economica*, October, 613-636
10. Royal Swedish Academy of Sciences (2010) *Markets with Search Frictions*. Document compiled by the Economic Sciences Prize Committee, 11 October 2010 [www.nobelprize.org]

Notes

1. In his *Financial History of Western Europe*, Charles Kindleberger subscribes to the thesis that the relative scarcity of precious metals in Sweden made the advent of bills particularly important as a tool to replace monetary transactions of a certain size, which are particularly cumbersome to pay in metals of lesser value.
2. In the case of the credit market, as well as in insurance, the emphasis has been more on the components of imperfect and/or asymmetrical information, aspects which earned the 2001 Nobel Prize in Economy, which was awarded to George Akerlof, Michael Spence, and Joseph Stiglitz.
3. Brunner-Meltzer [25] deserves mention as a rigorous approach to the fundamentals of a monetary economy.
4. Mortensen [33] is an explicit application of this approach to personal relationships.
5. This result is radically counterbalanced by the result of the Nash Equilibrium on competition via prices, according to which even a duopoly would end up setting the perfect competition price. Instead of a small dose of competition leading to perfect competition, Diamond's result is that even a small deviation from the assumptions of perfect competition can lead to monopoly prices.
6. Mortensen [39] is a more recent contribution that questions salary dispersion in a context with heterogeneous productivity among different companies.
7. The Phillips Curve relating inflation and unemployment becomes a vertical line in the long term—when expectations are revised—without the possibility of lowering unemployment in exchange for accepting more inflation. This result is sometimes known as the 'Phillips Friedman-Phelps Curve.' Mortensen's contribution to this curve deserves to be spotlighted.
8. Allow me to express my conviction that if it had not been for the job that Olivier Blanchard had when the 2010 Nobel Prizes were awarded—as the Chief Economist and Head of Research at the International Monetary Fund—it would have been likely, and in any event fair, for him to have also shared the prize because of the merits of the articles I mention.
9. Naturally, even the minimalist formulation explicitly recognizes the job that Pissarides and Mortensen have performed in parallel. The reference to Pissarides' studies from 1985 [40] and 1986 [41] is particularly important.
10. In fact, Blanchard and Diamond linked up with their MIT colleague Robert Solow, the 1987 Nobel Prize winner, in two ways. First, because of their use of the theory of economic growth, of an 'aggregate production function' with an analytical expression similar to the ones that the matching function initially adopted, and secondly because Solow, along with fellow MIT professor and Nobel Prize winner (1970) Paul Samuelson, introduced the Phillips Curve in the United States, helping to turn it into a media and analytical tool for introducing the dimensions of the supply—including job markets—into macroeconomic theory and policies.

11. Robert Solow also played a prominent role in the development of 'efficiency salaries.'
12. According to figures from the IMF, in 2009 the real GDP dropped 4.7% in Germany, while in Spain it declined 3.7%.
13. Several estimates situate the weight of the real estate and construction industries in Spain at between five and seven percent of the GDP, well above the average in the leading European countries, making this a prima facie magnitude of the requirements for generating new sources of wealth and jobs.
14. Shimer [42] is a key reference.
15. His toast speech can be found at: http://nobelprize.org/nobel_prizes/economics/laureates/2010/mortensen-speech_en.html.
16. Recently one argument tried to explain international financial flows in terms of Bretton Woods III, which, in contrast to Bretton Woods II during the first decade of the 21st century, meant that now the surpluses of countries with a capacity for financing would go to cover public debt instead of private sector debt, the accumulation of which was one of the catalysts of the crisis that broke out in 2007–2008. Some authors have indicated that as public resources finance public capital (infrastructures, etc.) in Bretton Woods III, there would be a greater contrast between the ownership of the assets financed and the debt burden.
17. Peter Diamond's contributions on this issue are a recent additional factor that exposes the Republican Congress members who initially vetoed his candidacy, proposed by President Obama at the request of a former Diamond disciple, Ben Bernanke, as a member of the Board of the Federal Reserve.
18. We should recall that the intra-industry heterogeneity of productivity and other parameters, as well as the role of intra-industrial reallocations as a mechanism for improving productivity as the result of more supply-oriented and globalized economies, are some of the core features of the new approaches in international trade and multinationalization, along the lines of Marc Melitz, Stephen Yeaples, Elhanan Helpman, and others who should also earn a Nobel Prize at some point.
19. Regarding this issue, see Lentz-Mortensen [31].
20. Azariadis C, Pissarides C (2007) Unemployment dynamics with international capital mobility. *European Economic Review* 51(1):27-48
21. Barr N, Diamond P (2009) Reforming Pensions. CESifo Working Paper 2523
22. Barr N, Diamond P (2010) Pension Reform in China: Issues, Options and Recommendations. LSE-MIT
23. Blanchard O, Diamond P (1989b) The Beveridge Curve. *Brookings Papers on Economic Activity* 1:1-60
24. Blanchard O, Diamond P (1992) The Flow Approach to Labor Markets. *American Economic Review*, February, pp. 354-359
25. Brunner K, Meltzer A (1971) The Uses of Money: Money in the Theory of an Exchange Economy. *American Economic Review*, December, pp. 784-805
26. Caballero R (2010) Macroeconomics after the Crisis: Time to Deal with the Pretense-of-Knowledge Syndrome. *Journal of Economic Perspectives*, pp. 85-102
27. Diamond P (1965) National Debt in a Neoclassical Growth Model. *American Economic Review* 55(5):1126-1150
28. Diamond P (2008) Behavioral economics. *Journal of Public Economics* 92:1858-1862
29. Diamond P (2011) My research strategy. In: Szenberg M, Ramrattan L (ed) *Eminent Economist II – Their Work and Life Philosophies*. Cambridge University Press
30. Kiyotaki N, Wright R (1993) A Search-Theoretic Approach to Monetary Economics. *American Economic Review* 83:63-77
31. Lentz R, Mortensen D (2006) Optimal Growth through Product Innovation. *Society for Economic Dynamics, Meeting Papers* 279
32. Mortensen D (1970) A Theory of Wage and Employment Dynamics. In: Phelps E, et al. (eds) *Microeconomic Foundations of Employment and Inflation Theory*. Macmillan
33. Mortensen D (1988) Matching: Finding a Partner for Life or Otherwise. *American Journal of Sociology*, 94:S215-S240
34. Mortensen D (1989) The Persistence and Indeterminacy of Unemployment in Search Equilibrium. *Scandinavian Journal of Economics* 91(2):347-360
35. Mortensen D, Pissarides C (1994) Job Creation and Job Destruction in the Theory of Unemployment. *Review of Economic Studies* 61(3):397-415
36. Mortensen D (2005) *Wage Dispersion: Why Are Similar Workers Paid Differently?* MIT Press
37. Mortensen D, Nagypál É (2007) More on unemployment and vacancy fluctuations. *Review of Economic Dynamics* 10:327-347
38. Mortensen D (2009) Wage Dispersion in the Search and Matching Model with Intra-Firm Bargaining. NBER Working Paper 15033.
39. Ngai RL, Pissarides C (2008) Employment Outcomes in the Welfare State. *Revue économique* 59(3):413-436
40. Pissarides C (1985) Short-Run Equilibrium Dynamics of Unemployment, Vacancies, and Real Wages. *American Economic Review* 75:676-690
41. Pissarides C (1986) Unemployment and vacancies in Britain. *Economic Policy* 1(3):499-559
42. Shimer R (2005) The Cyclical Behavior of Equilibrium Unemployment and Vacancies. *American Economic Review* 95(1):25-49

References